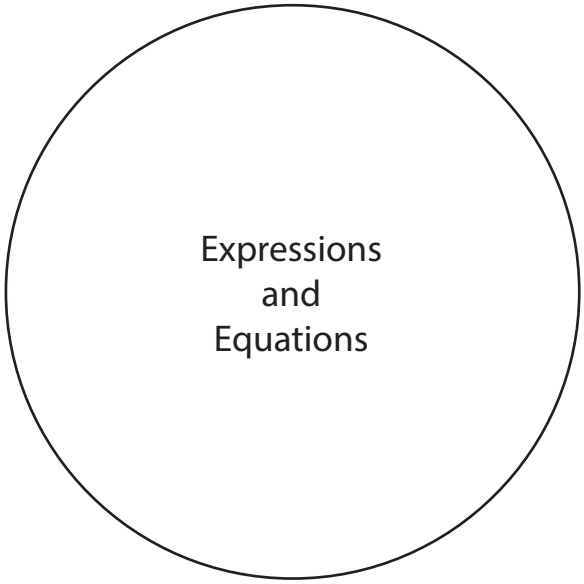
Expressions and Equations 2

Teacher Masters

The Meadows Center for Preventing Educational Risk—Mathematics Institute
The University of Texas at Austin

Warming Up:



Learning to Solve:

Use what you know about order of operations to simplify or evaluate.

1. A. $2(6 - 4)$ **B.** $2(6) - 2(4)$

2. A. $6(1 + 5)$ **B.** $6(1) + 6(5)$

3. A. $(-3)(2 + 3)$ **B.** $(-3)(2) + (-3)(3)$

4. A. $5(2 \times 4)$ **B.** $5(2) \times 5(4)$

5. A. $6(6 \div 2)$ **B.** $6(6) \div 6(2)$

Learning to Solve:

Use what you know about order of operations to simplify or evaluate.

1. A. $2(6 - 4)$

$2(6 - 4) = 2(2) = 4$

B. $2(6) - 2(4)$

$2(6) - 2(4) = 12 - 8 = 4$

2. A. $6(1 + 5)$

$6(1 + 5) = 6(6) = 36$

B. $6(1) + 6(5)$

$6(1) + 6(5) = 6 + 30 = 36$

3. A. $(-3)(2 + 3)$

$(-3)(2 + 3) = (-3)(5) = -15$

B. $(-3)(2) + (-3)(3)$

$(-3)(2) + (-3)(3) = (-6) + (-9) = -15$

4. A. $5(2 \times 4)$

$5(2 \times 4) = 5(8) = 40$

B. $5(2) \times 5(4)$

$5(2) \times 5(4) = 10 \times 5(4) = 50(4) = 200$

5. A. $6(6 \div 2)$

$6(6 \div 2) = 6(3) = 18$

B. $6(6) \div 6(2)$

$6(6) \div 6(2) = 36 \div 6(2) = 6(2) = 12$

Simplify: $3(x + 5)$

We can represent $x + 5$ by using a square for x and 5 circles for 5.

x + 5

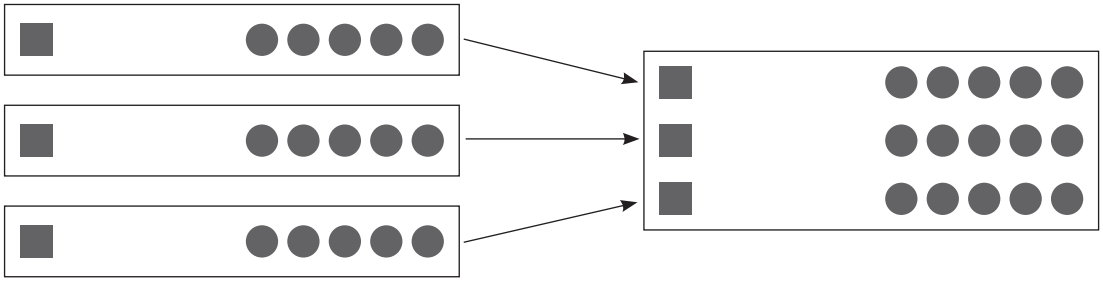
What does the 3 outside the parentheses indicate?

We can show 3 groups of $x + 5$ like this.

A. How many x's do we have?

B. How many circles do we have?

C. How would we write the sum?



Look at the symbolic representation and talk to your neighbor about how you can apply the distributive property without drawing a picture.

$$3(x + 5) = 3x + 15$$

Simplify: $3(x + 5)$

We can represent $x + 5$ by using a square for x and 5 circles for 5.

What does the 3 outside the parentheses indicate?

3 groups of $x + 5$

We can show 3 groups of $x + 5$ like this.

A. How many x's do we have?

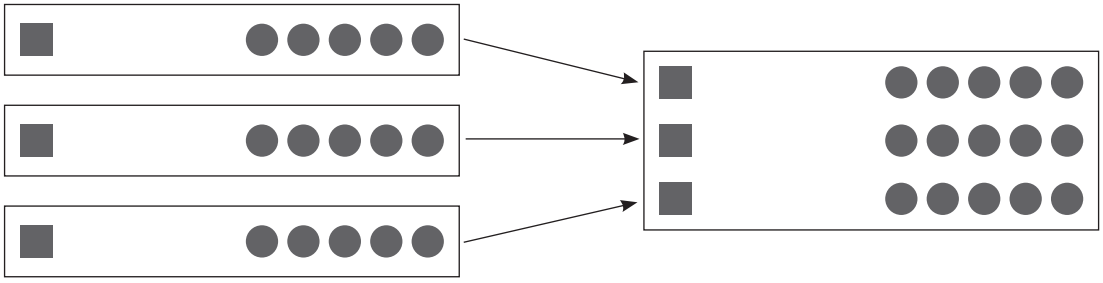
3

B. How many circles do we have?

15

C. How would we write the sum?

$3x + 15$



Look at the symbolic representation and talk to your neighbor about how you can apply the distributive property without drawing a picture.

$$3(x + 5) = 3x + 15$$

Practicing Together:

Simplify each algebraic expression.

1. $2(m + 6)$

2. $3(4g + 7)$

3. $8(y - 1)$

4. $(-5)(d + 3)$

5. $9(2 + k)$

6. $-4(5n - 2)$

Practicing Together:

Simplify each algebraic expression.

1. $2(m + 6)$

$2(m + 6) = 2m + 12$

2. $3(4g + 7)$

$3(4g + 7) = 12g + 21$

3. $8(y - 1)$

$8(y - 1) = 8y + (-8)$ or $8y - 8$

4. $(-5)(d + 3)$

$(-5)(d + 3) = -5d + (-15)$ or $-5d - 15$

5. $9(2 + k)$

$9(2 + k) = 18 + 9k$

6. $-4(5n - 2)$

$-4(5n - 2) = -20n + 8$ or $8 - 20n$ or $8 + (-20n)$

Trying It on Your Own

1. Simplify $(-2)(3a + 1)$

a. $-8a$ because you add $3a$ and 1 first in the parentheses before you multiply.

b. $a - 1$ because you add -2 to each of the terms in the parentheses to simplify.

c. $-6a + 1$ because you multiply -2 by $3a$ to simplify.

d. $-6a + (-2)$ because you multiply -2 by each of the terms in the parentheses to simplify.

2. Simplify $9(g - 4)$

a. $9g - 4$ because you multiply 9 by the first term in the parentheses when they are close together.

b. $9g + 36$ because you multiply 9 by both terms in the parentheses.

c. $9g - 36$ because you multiply 9 by both terms in the parentheses.

d. $g - 36$ because you can multiply numbers together only when they are in parentheses.

Trying It on Your Own

1. Simplify $(-2)(3a + 1)$

a. $-8a$ because you add $3a$ and 1 first in the parentheses before you multiply.

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d. $g - 36$ because you can multiply numbers together only when they are in parentheses.

3. Simplify $5(8 - h)$

a. $40 - 5h$ because when you use the distributive property, you multiply 5 by both terms in the parentheses.

b. $40 - h$ because you multiply the 2 numbers that are next to each other with parentheses when you use the distributive property.

c. $8 - 5h$ because you multiply the variable by 5.

d. $13 + 5h$ because you add 5 to each of the numbers in the parentheses.

4. Simplify $6(p + 6)$

a. $6p + 12$ because you multiply 6 by the variable in the parentheses and add 6 to the number in the parentheses.

b. $p + 12$ because you can only add 6 to the number in the parentheses.

c. $6p + 36$ because you multiply 6 by both terms in the parentheses.

d. $p + 36$ because you can only multiply 6 by the number in the parentheses.

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4. Simplify $6(p + 6)$

a. $6p + 12$ because you multiply 6 by the variable in the parentheses and add 6 to the number in the parentheses.

b. $p + 12$ because you can only add 6 to the number in the parentheses.

c. $6p + 36$ because you multiply 6 by both terms in the parentheses.

d. $p + 36$ because you can only multiply 6 by the number in the parentheses.

Wrapping It Up

Rewrite 47(35) + 47(15), using the distributive property of multiplication over addition.

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Rewrite 47(35) + 47(15), using the distributive property of multiplication over addition.

47(35 + 15)

Warming Up:

Solve the problems.

1. Marci went to the ice cream store with 4 friends. All of them each ordered a sundae with 2 scoops of ice cream and various toppings. A sundae with 2 scoops of ice cream costs $2.99, but the final cost of each sundae depended on the number of toppings added. The average cost, including sales tax, of the sundaes they ordered was $3.73. What was the total cost for all 5 sundaes?

2. Sonia wants to make 10 bowls of peach punch and 15 bowls of pineapple punch. Each punch bowl holds 16 liters of punch. She needs 7 liters of soda to make each bowl of punch. How many liters of soda will Sonia need in all?

Warming Up:

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1. Marci went to the ice cream store with 4 friends. All of them each ordered a sundae with 2 scoops of ice cream and various toppings. A sundae with 2 scoops of ice cream costs $2.99, but the final cost of each sundae depended on the number of toppings added. The average cost, including sales tax, of the sundaes they ordered was $3.73. What was the total cost for all 5 sundaes?

$18.65

2. Sonia wants to make 10 bowls of peach punch and 15 bowls of pineapple punch. Each punch bowl holds 16 liters of punch. She needs 7 liters of soda to make each bowl of punch. How many liters of soda will Sonia need in all?

175 liters of soda

Learning to Solve:

Hot dogs cost $1.25 and large soft drinks cost $0.75 at the carnival. Jerome has to buy hot dogs and large drinks for 8 people. How much money does he need?

Learning to Solve:

Hot dogs cost $1.25 and large soft drinks cost $0.75 at the carnival. Jerome has to buy hot dogs and large drinks for 8 people. How much money does he need?

Either solution is appropriate:

$8(1.25) + 8(0.75) = 10 + 6 = 16$

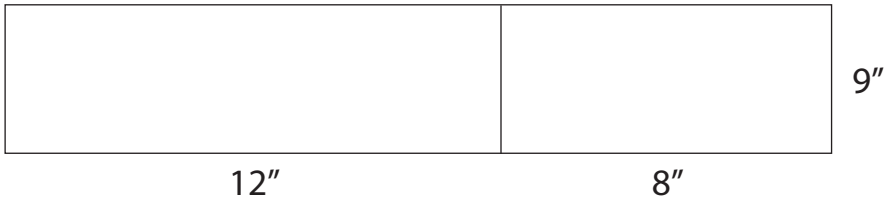
$8(1.25 + 0.75) = 8(2) = 16$

Practicing Together:

Solve each problem.

1. Jacki took 3 of her friends to the movies. All 4 of them wanted a small bag of popcorn that cost $2.75 each and a small drink that cost $1.25 each. How much did they spend altogether on their drinks and popcorn?

2. Ken drew a picture of 2 rectangles. He wondered what the area of the combined rectangle would be. Find the areas. (Remember that the area of a rectangle is found by multiplying base times height.)



3. Bev said she could use the distributive property of multiplication over addition to help her multiply mixed numbers. Here is what she wrote:

$$3\frac{2}{3} \times 4\frac{1}{2} = (3 \times 4) + (\frac{2}{3} \times \frac{1}{2})$$

$$= 12 + \frac{1}{3}$$

$$= 12\frac{1}{3}$$

Is her method correct? Why or why not?

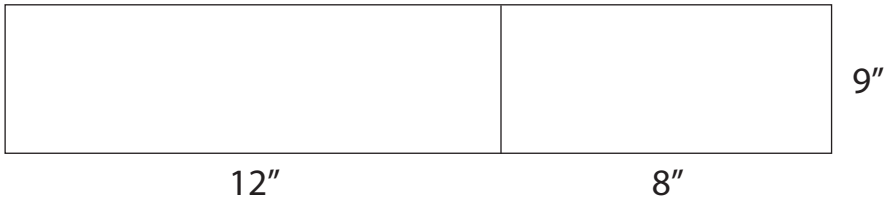
Practicing Together:

Solve each problem.

1. Jacki took 3 of her friends to the movies. All 4 of them wanted a small bag of popcorn that cost $2.75 each and a small drink that cost $1.25 each. How much did they spend altogether on their drinks and popcorn?

$4(2.75) + 4(1.25) = 11 + 5 = 16$ or $4(2.75 + 1.25) = 4(4) = 16$

2. Ken drew a picture of 2 rectangles. He wondered what the area of the combined rectangle would be. Find the areas. (Remember that the area of a rectangle is found by multiplying base times height.)



$9(12) + 9(8) = 108 + 72 = 180$ in^2 or $9(12 + 8) = 9(20) = 180$ in^2

3. Bev said she could use the distributive property of multiplication over addition to help her multiply mixed numbers. Here is what she wrote:

$$3\frac{2}{3} \times 4\frac{1}{2} = (3 \times 4) + (\frac{2}{3} \times \frac{1}{2})$$

$$= 12 + \frac{1}{3}$$

$$= 12\frac{1}{3}$$

Is her method correct? Why or why not?

No, her method is not correct. Bev multiplied the whole numbers and then multiplied the fractional parts. She should have used the distributive property or changed the fractions to mixed numbers.

Trying It on Your Own

Solve the problems on your own.

1. Kayla rewrote the expression (0.75)(45) + (0.75)(55) as 0.75(100). Do you agree with Kayla?

a. Yes, I agree with Kayla because she used 0.75 as a multiple.

b. Yes, I agree with Kayla because she can rewrite the original expression as 0.75(45 + 55).

c. No, I disagree because you have to do the operations in order in the expression.

d. No, I disagree because you get a different answer.

2. A school supply store sells pencils with matching erasers. Each pencil costs $0.79 and the erasers are $0.46 each. Tate bought 10 sets of pencils and erasers. Which expression shows the cost of the pencils and erasers that Tate bought?

a. 10 + 0.79 + 0.46 because you want to know the total cost, so you add the amounts.

b. 0.79(10 + 0.46) because each pencil costs $0.79, so you need to multiply by 10.

c. 10(0.79 + 0.46) because you multiply the cost of each set by the number of sets.

d. (10)(0.79) + 0.46 because you multiply the cost of each set by the number of sets.

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Solve the problems on your own.

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a. 10 + 0.79 + 0.46 because you want to know the total cost, so you add the amounts.

b. 0.79(10 + 0.46) because each pencil costs $0.79, so you need to multiply by 10.

c. 10(0.79 + 0.46) because you multiply the cost of each set by the number of sets.

d. (10)(0.79) + 0.46 because you multiply the cost of each set by the number of sets.

3. Carmen used the distributive property to multiply:

$$150(30 + 5)$$

$$(30 \cdot 150) + (5 \cdot 150)$$

$$4{,}500 + 750$$

$$5{,}250$$

Do you agree with her work?

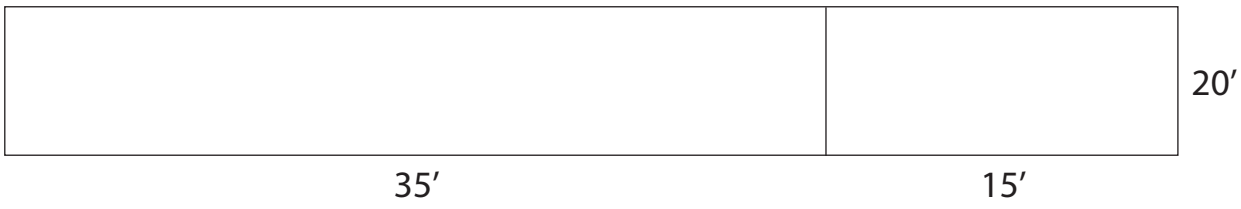
a. No, I do not agree because she used addition when she was supposed to multiply.

b. No, I do not agree because she should have written $(30 + 150) \cdot (5 + 150)$.

c. Yes, I agree because addition is the inverse of multiplication.

d. Yes, I agree because her method is equivalent to $150(30 + 5)$.

4. Sam wanted to find the combined area of 2 rectangular playgrounds that are connected to each other. What expression might Sam use to solve the problem?



a. $20(35) + 20(15)$

b. $35(15) + 20$

c. $15(35 + 20)$

d. $15(20) + 35$

3. Carmen used the distributive property to multiply:

$$150(30 + 5)$$

$$(30 \cdot 150) + (5 \cdot 150)$$

$$4{,}500 + 750$$

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Do you agree with her work?

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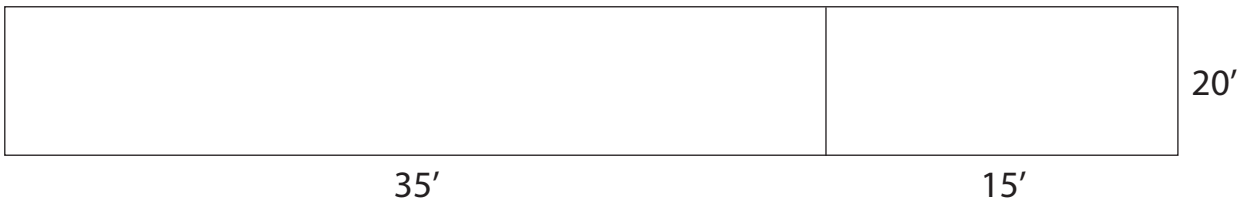

a. 20(35) + 20(15)

b. 35(15) + 20

c. 15(35 + 20)

d. 15(20) + 35

Wrapping It Up

Solve the problem.

John simplified an algebraic expression by using the distributive property. His simplified expression was $12q + 24$. What algebraic expression might he have simplified?

Wrapping It Up

Solve the problem.

John simplified an algebraic expression by using the distributive property. His simplified expression was $12q + 24$. What algebraic expression might he have simplified?

Answers may vary.

For example:

$4(3q + 6)$

OR

$3(4q + 8)$

OR

$12(q + 2)$

OR

$2(6q + 12)$

Warming Up:

Evaluate each expression for $u = 2$.

1. $10 - 4u$

2. $4u - 10$

3. $2u + 6 - 3 + 5u$

4. $9u - 3u - 3$

5. $7 + 6 - 7u$

Warming Up:

Evaluate each expression for $u = 2$.

1. $10 - 4u$

2

2. $4u - 10$

–2

3. $2u + 6 - 3 + 5u$

17

4. $9u - 3u - 3$

9

5. $7 + 6 - 7u$

–1

Learning to Solve:

2 algebraic expressions are equivalent when the value of 1 expression equals the value of the other for all replacements of the variables.

Value of the variable	$6n$	$4n + 2n$
2		
–1		

The value of each of the following expressions is 4 when $x = -2$.

$2x + 8$ $x + 6$ $2 - x$ $2(x + 4)$

Evaluate these expressions for $x = 2$ and $x = \frac{1}{2}$.

	Value of the variable	
Expression	$x = 2$	$x = \frac{1}{2}$
$2x + 8$		
$x + 6$		
$2 - x$		
$2(x + 4)$		

Which expressions have the same value when you substituted 2 and $\frac{1}{2}$?

Learning to Solve:

2 algebraic expressions are equivalent when the value of 1 expression equals the value of the other for all replacements of the variables.

Value of the variable	$6n$	$4n + 2n$
2	12	12
–1	–6	–6

The value of each of the following expressions is 4 when $x = -2$.

$2x + 8$ $x + 6$ $2 - x$ $2(x + 4)$

Evaluate these expressions for $x = 2$ and $x = \frac{1}{2}$.

	Value of the variable	
Expression	$x = 2$	$x = \frac{1}{2}$
$2x + 8$	12	9
$x + 6$	8	$6\frac{1}{2}$
$2 - x$	0	$1\frac{1}{2}$
$2(x + 4)$	12	9

Which expressions have the same value when you substituted 2 and $\frac{1}{2}$?

$2x + 8$ and $2(x + 4)$

Practicing Together:

Decide whether the expressions in the table are equivalent.

Write "Y" if the expressions are equivalent or "N" if the expressions are not equivalent.

Expression 1	$a = 4$	Expression 2	$a = 4$	Equivalent
$2a + 3a$		$a(2 + 3)$		
$5a - 4a$		$3a - 2a$		
$5(a + 3)$		$8a$		
$0.7a$		$a - 0.3a$		

Practicing Together:

Decide whether the expressions in the table are equivalent.

Write "Y" if the expressions are equivalent or "N" if the expressions are not equivalent.

Expression 1	$a = 4$	Expression 2	$a = 4$	Equivalent
$2a + 3a$	20	$a(2 + 3)$	20	Y
$5a - 4a$	4	$3a - 2a$	4	Y
$5(a + 3)$	35	$8a$	32	N
$0.7a$	2.8	$a - 0.3a$	2.8	Y

Trying It on Your Own

1. Are 6(36 ÷ 2) and (6)36 ÷ (6)2 equivalent?

a. No, because the parentheses mean that you should divide each number by 6, not multiply.

b. No, because 6 is multiplied by the quotient, which results in a larger product than multiplying each term before dividing.

c. You cannot tell because you are supposed to do what is in the parentheses first.

d. This is impossible to do because you cannot combine multiplication and division.

2. Sammi found an expression equivalent to $36k - 48$. Which expression might Sammi have found?

a. $3k - 4$ because you can multiply both terms by 12 to get $36k - 48$.

b. $-12k$ because $36 - 48 = -12$.

c. $12(3k) - 12(4)$ because $36k - 48$ is the same as $12(3k - 4)$.

d. $-4(9k + 12)$ because multiplying 12 by –4 will give a product of –48.

Trying It on Your Own

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c. $12(3k) - 12(4)$ because $36k - 48$ is the same as $12(3k - 4)$.

d. $-4(9k + 12)$ because multiplying 12 by –4 will give a product of –48.

3. Jason said, "9*t* and 10*t* – 1 are equivalent." Megan disagreed. Who do you agree with? Why?

a. Jason because 10 – 1 = 9.

b. Jason because if *t* = 1, the 2 expressions have the same value.

c. Megan because the 2 expressions have the same value for only *t* = 1.

d. It is impossible to tell because you do not know the values for *t*.

4. Kim used –3 as the value for the variable in the expression 3 – 4*x*. Which of the following is the value she found?

a. 15

b. 9

c. –9

d. –15

3. Jason said, "9*t* and 10*t* – 1 are equivalent." Megan disagreed. Who do you agree with? Why?

a. Jason because 10 – 1 = 9.

b. Jason because if *t* = 1, the 2 expressions have the same value.

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d. It is impossible to tell because you do not know the values for *t*.

4. Kim used –3 as the value for the variable in the expression 3 – 4*x*. Which of the following is the value she found?

a. 15

b. 9

c. –9

d. –15

Wrapping It Up

Solve the problem.

Is $5b + 4b$ equivalent to $9b$? Explain your answer.

Wrapping It Up

Solve the problem.

Is $5b + 4b$ equivalent to $9b$? Explain your answer.

Yes, because substituting any number for b results in the same answer.

Sample explanation:

$b(5 + 4) = b(9) = 9b$ OR

$5b$ is 5 b's and $4b$ is 4 b's and together, this is 9 b's or $9b$.

Warming Up:

Evaluate each expression by substituting 4 as the value for the variable.

1. $5a$

2. $-b + 7$

3. $\frac{1}{2}x$

4. $\frac{100}{m}$

5. $-6.1g$

Warming Up:

Evaluate each expression by substituting 4 as the value for the variable.

1. $5a$

20

2. $-b + 7$

3

3. $\frac{1}{2}x$

2

4. $\frac{100}{m}$

25

5. $-6.1g$

-24.4

Learning to Solve:

1. Simplify or evaluate the expression $6 + 8 \div 2 \times 3 - 5$.

In another class, 3 students solved the problem in a different way.

A. One student solved it this way:

$$6 + 8 \div 2 \times 3 - 5$$
$$14 \div 2 \times 3 - 5$$
$$7 \times 3 - 5$$
$$21 - 5 = 16$$

B. Another student solved it this way:

$$6 + 8 \div 2 \times 3 - 5$$
$$6 + 4 \times 3 - 5$$
$$10 \times 3 - 5$$
$$30 - 5 = 25$$

C. A third student solved it this way:

$$6 + 8 \div 2 \times 3 - 5$$
$$6 + 8 \div 6 - 5$$
$$6 + 8 \div 1$$
$$6 + 8 = 14$$

Write how you remember the order of operations.

Learning to Solve:

1. Simplify or evaluate the expression $6 + 8 \div 2 \times 3 - 5$.

13

First, you divide 8 and 2 to get 4.

Then, you multiply 4 x 3 to get 12.

$6 + 12 - 5 = 13$.

In another class, 3 students solved the problem in a different way.

A. One student solved it this way:

$6 + 8 \div 2 \times 3 - 5$

$14 \div 2 \times 3 - 5$

$7 \times 3 - 5$

$21 - 5 = 16$

B. Another student solved it this way:

$6 + 8 \div 2 \times 3 - 5$

$6 + 4 \times 3 - 5$

$10 \times 3 - 5$

$30 - 5 = 25$

C. A third student solved it this way:

$6 + 8 \div 2 \times 3 - 5$

$6 + 8 \div 6 - 5$

$6 + 8 \div 1$

$6 + 8 = 14$

Write how you remember the order of operations.

The order of operations is: parentheses or other groupings, exponents, multiplication or division, and subtraction or addition. However, keep in mind that this is not a strict order.

In this example you have multiple ways that you can solve this without violating order of operations:

$3 \times 2 + 8 \div 4 + 3 + 9$

You can add 3 and 9 first without changing the value of the expression.

You can do the multiplication first, then the addition, then the division, then evaluate and not change the value of the expression.

2. What operations are in this expression?

$$\frac{6y - 3}{3} + 2y$$

According to the order of operations, which operation could we perform first?

Evaluate the expression for the value of the variable.

$$\frac{6y - 3}{3} + 2y$$

$y =$ _____

2. What operations are in this expression?

$$\frac{6y - 3}{3} + 2y$$

Division, multiplication, subtraction, and addition.

According to the order of operations, which operation could we perform first?

Multiplication

Evaluate the expression for the value of the variable.

$$\frac{6y - 3}{3} + 2y$$

$y =$ _____

Answers will vary depending on the value of the variable. For example, if $y = 2$, the value of the expression is 7.

Practicing Together:

Work with your partner to complete the table by evaluating each expression for the indicated value.

	Value of the variable				
Expression	2	$\frac{2}{5}$	–2	0.3	0
$5x - 5 + 10x$					
$h(10 + 25) - 10h$					

Practicing Together:

Work with your partner to complete the table by evaluating each expression for the indicated value.

	Value of the variable				
Expression	2	$\frac{2}{5}$	–2	0.3	0
$5x - 5 + 10x$	25	1	–35	–0.5	–5
$h(10 + 25) - 10h$	50	10	–50	7.5	0

Trying It on Your Own

Solve the problems on your own.

1. Evaluate the expression $\frac{4b + 8}{2} + 2b \times 5$ if $b = 6$.

a. 160 because you multiply 4 times 6 then divide by 2. After that, you do the computations from left to right.

b. 140 because you evaluate the numerator first, then divide. Next, add 12, and finally multiply by 5.

c. 88 because you do the multiplication in the numerator first, then divide 8 by 2. Next, you add 24 and 4, then add the product of 12 times 5.

d. 76 because you evaluate the numerator first, then divide. Next, multiply 12 times 5, and add the value from the division.

2. Which of the following values of the variable would give 34 for the expression $3x - 5x + 6(3 - x)$?

a. 3

b. 1

c. –2

d. –5

Trying It on Your Own

Solve the problems on your own.

1. Evaluate the expression $\frac{4b+8}{2} + 2b \times 5$ if $b = 6$.

a. 160 because you multiply 4 times 6 then divide by 2. After that, you do the computations from left to right.

b. 140 because you evaluate the numerator first, then divide. Next, add 12, and finally multiply by 5.

c. 88 because you do the multiplication in the numerator first, then divide 8 by 2. Next, you add 24 and 4, then add the product of 12 times 5.

d. 76 because you evaluate the numerator first, then divide. Next, multiply 12 times 5, and add the value from the division.

2. Which of the following values of the variable would give 34 for the expression $3x - 5x + 6(3 - x)$?

a. 3

b. 1

c. –2

d. –5

3. Ted evaluated the expression $5x - 3(2x - 8)$ for $x = 5$. He got 19. Kennie said, "I disagree. I got 44." Who do you agree with?

a. I agree with Ted because he evaluated the expression in the parentheses, multiplied it by 3, and then subtracted that from 25.

b. I agree with Kennie because she evaluated $5x$ first, then subtracted 3. Her last step was to multiply by the value of the expression in the parentheses.

c. Neither answer is correct. The correct answer is 11 because you evaluate $5x$ first, then subtract the product of 3 and $2x$. The last step is to subtract 8.

d. Both answers are possible because you can use the Order of Operations in different ways.

4. Which expression has the same value as the expression $7x + 3x - 2x - 7x$, when $x = 4$?

a. $10x - 9$

b. $2x - 4x + 3x$

c. $2x - 4(1 - 2x)$

d. $7x - 3x + 2x - 7x$

3. Ted evaluated the expression $5x - 3(2x - 8)$ for $x = 5$. He got 19. Kennie said, "I disagree. I got 44." Who do you agree with?

a. I agree with Ted because he evaluated the expression in the parentheses, multiplied it by 3, and then subtracted that from 25.

b. I agree with Kennie because she evaluated $5x$ first, then subtracted 3. Her last step was to multiply by the value of the expression in the parentheses.

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4. Which expression has the same value as the expression $7x + 3x - 2x - 7x$, when $x = 4$?

a. $10x - 9$

b. $2x - 4x + 3x$

c. $2x - 4(1 - 2x)$

d. $7x - 3x + 2x - 7x$

Wrapping It Up

Martha said that $3n + 8$ has the same value as $6n + 2$ for $n = 2$.

A. Is she correct?

B. Are the expressions equivalent?

Wrapping It Up

Martha said that $3n + 8$ has the same value as $6n + 2$ for $n = 2$.

A. Is she correct?

Yes

B. Are the expressions equivalent?

No, because their value is not the same for all replacement values of the variable.

Warming Up:

Evaluate each expression for the given value.

1. $2m + 8$ for $m = 6$

2. $-3x + 4$ for $x = -5$

3. $9n - 3$ for $n = \frac{1}{3}$

4. $2 + 5.5g$ for $g = 2$

Evaluate each expression for the given value.

1. $2m + 8$ for $m = 6$

20

2. $-3x + 4$ for $x = -5$

19

3. $9n - 3$ for $n = \frac{1}{3}$

0

4. $2 + 5.5g$ for $g = 2$

13

Learning to Solve:

Each expression in the table is equal to 14. Find the value of the variable that will make this statement true.

Value of the Expression is 14	
Expression	**Value of Variable**
$7m - 14$	$m =$
$5y + 4$	$y =$
$6 + 8u$	$u =$
$4q - 10$	$q =$

Learning to Solve:

Each expression in the table is equal to 14. Find the value of the variable that will make this statement true.

Value of the Expression is 14	
Expression	**Value of Variable**
$7m - 14$	$m = 4$
$5y + 4$	$y = 2$
$6 + 8u$	$u = 1$
$4q - 10$	$q = 6$

Practicing Together:

Work with your partner to complete the table by finding the value of the variable that will make the expression equal to 10.

Value of the Expression is 10	
Expression	**Value of Variable**
$10a + 5$	$a =$
$2f - 12$	$f =$
$2(g + 2)$	$g =$
$1 + 3e$	$e =$
$6x - 14$	$x =$

Practicing Together:

Work with your partner to complete the table by finding the value of the variable that will make the expression equal to 10.

Value of the Expression is 10	
Expression	**Value of Variable**
$10a + 5$	$a = \frac{1}{2}$
$2f - 12$	$f = 11$
$2(g + 2)$	$g = 3$
$1 + 3e$	$e = 3$
$6x - 14$	$x = 4$

Trying It on Your Own

Solve the problems.

1. What value of the variable will make the expression $4r + 12$ equal to 12?

a. 0

b. 3

c. –4

d. 4

2. What value of the variable will make the value of the expression $5h - 13$ equal to 12?

a. 1 because 1 minus 13 is 12.

b. 5 because 25 – 13 is 12.

c. 17 because 17 minus 5 is 12.

d. 25 because 25 – 13 is 12.

Trying It on Your Own

Solve the problems.

1. What value of the variable will make the expression $4r + 12$ equal to 12?

a. 0
b. 3
c. –4
d. 4

2. What value of the variable will make the value of the expression $5h - 13$ equal to 12?

a. 1 because 1 minus 13 is 12.
b. 5 because 25 – 13 is 12.
c. 17 because 17 minus 5 is 12.
d. 25 because 25 – 13 is 12.

3. Jon wants to find a value for the variable so that the expression $4(s + 4)$ equals 16. Which of the following describes a process he could use?

a. Use the distributive property to get $4s + 4$. 12 plus 4 is 16, so s must 12.

b. Use the distributive property to get $4s + 16$. 4 times 4 is 16, so s must be 4.

c. Use inverse operations. 16 divided by 4 is 4, so s must be 4.

d. Think about what number times 4 equals 16. S plus 4 must be 4, so s must be 0.

4. Corey wrote an expression that equaled 25 when the variable was 20. Which of the following expressions could Corey have written?

a. $x + 2(30 - x) - 15$

b. $10 - x + 2x$

c. $2x - 4(5x - 3x)$

d. $6x - 3(2x + 1)$

3. Jon wants to find a value for the variable so that the expression $4(s + 4)$ equals 16. Which of the following describes a process he could use?

a. Use the distributive property to get $4s + 4$. 12 plus 4 is 16, so s must 12.

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c. Use inverse operations. 16 divided by 4 is 4, so s must be 4.

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4. Corey wrote an expression that equaled 25 when the variable was 20. Which of the following expressions could Corey have written?

a. $x + 2(30 - x) - 15$

b. $10 - x + 2x$

c. $2x - 4(5x - 3x)$

d. $6x - 3(2x + 1)$

Wrapping It Up

Write an expression that equals 10 when the value of the variable is equal to 5.

Wrapping It Up

Write an expression that equals 10 when the value of the variable is equal to 5.

Answers will vary.

For example:

$2b$ OR

$k - (-5)$

Warming Up:

Find the value of the variable that makes the expression equal to the value given.

1. $c + 8$; the expression equals 20. $c =$ _____

2. $10 - g$; the expression equals –1. $g =$ _____

3. $-7(h)$; the expression equals 49. $h =$ _____

4. $\frac{m}{6}$; the expression equals –8. $m =$ _____

5. $\frac{2}{9} + r$; the expression equals 1. $r =$ _____

Warming Up:

Find the value of the variable that makes the expression equal to the value given.

1. $c + 8$; the expression equals 20. $c =$ 12

2. $10 - g$; the expression equals –1. $g =$ 11

3. $-7(h)$; the expression equals 49. $h =$ –7

4. $\frac{m}{6}$; the expression equals –8. $m =$ –48

5. $\frac{2}{9} + r$; the expression equals 1. $r = \frac{7}{9}$

Learning to Solve:

The guess-and-test method.

Use this method to solve $5m - 3 = 22$.

Let's try
$m = 4$.

$5(4) - 3 =$

$20 - 3 = 17$

$17 \neq 22$

Therefore, 4 is not a solution.

Because 17 is less than 22, let's substitute a larger value than 4 for the variable, m.

Let's try
$m = 5$.

$5(5) - 3 =$

$25 - 3 = 22$

$22 = 22$

$m = 5$

Use the guess-and-test method to find the missing number in the equations when given the value of the variable.

Problem 1:

$3n -$ _____ $= 16$ for $n = 9$

Substitute 9 for n in the term 3n.

$3(9) -$ ___?___ $= 16$

$27 -$ ___?___ $= 16$

Think about what number subtracted from 27 will equal 16. Be able to tell me how you got your answer.

$27 -$ ___?___ $= 16$ $\quad ? =$ _____

Problem 2:

$17 =$ ___?___ $c + 8$ for $c = 1$

Substitute 1 for c in the term ___?___ c.

___?___ $(1) + 8 = 17$

Think about what number multiplied by 1 and then added to 8 will equal 17. Be able to explain how you found your answer.

___?___ $(1) + 8 = 17$ $\quad ? =$ _____

Use the guess-and-test method to find the missing number in the equations when given the value of the variable.

Problem 1:

$3n - \_\_\_\_\_ = 16$ for $n = 9$

Substitute 9 for n in the term 3n.

$3(9) - \_\_?\_\_ = 16$

$27 - \_\_?\_\_ = 16$

Think about what number subtracted from 27 will equal 16. Be able to tell me how you got your answer.

$27 - \_\_?\_\_ = 16$? = 11

Problem 2:

$17 = \_\_?\_\_ c + 8$ for $c = 1$

Substitute 1 for c in the term ? c.

$\_\_?\_\_(1) + 8 = 17$

Think about what number multiplied by 1 and then added to 8 will equal 17. Be able to explain how you found your answer.

$\_\_?\_\_(1) + 8 = 17$? = 9

Practicing Together:

Working with your partner, find a value for the variable or the missing value that will make the equation true in each problem.

1. $8m - 8 = 72$

2. $\frac{2x}{4} + 8 = 12$

3. $-8 = -10g + 12$

4. $15 = 3d -$ ____?____ for $d = 6$

Practicing Together:

Working with your partner, find a value for the variable or the missing value that will make the equation true in each problem.

1. $8m - 8 = 72$

$m = 10$

2. $\frac{2x}{4} + 8 = 12$

$x = 8$

3. $-8 = -10g + 12$

$g = 2$

4. $15 = 3d -$ ___?___ for $d = 6$

? = 3

Trying It on Your Own

1. Solve: $9r - 9 = 81$

a. $r = 10$ because $90 - 9 = 81$

b. $r = 9$ because $9 \cdot 9 = 81$

c. $r = 8$ because $8 \cdot 9 = 72$ and $72 + 9 = 81$

d. $r = 0$ because $90 - 9 = 81$

2. Denny solved the equation $\frac{3x}{5} + 7 = 10$ by using guess-and-test. Which of the following could have been his process?

a. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so x is 3.

b. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 15. 3 times 5 is 15, so x is 5.

c. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 3 and x is 1.

d. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 15. So x is 15.

Trying It on Your Own

1. Solve: $9r - 9 = 81$

a. $r = 10$ because $90 - 9 = 81$

b. $r = 9$ because $9 \cdot 9 = 81$

c. $r = 8$ because $8 \cdot 9 = 72$ and $72 + 9 = 81$

d. $r = 0$ because $90 - 9 = 81$

2. Denny solved the equation $\frac{3x}{5} + 7 = 10$ by using guess-and-test. Which of the following could have been his process?

a. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so x is 3.

b. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 15. 3 times 5 is 15, so x is 5.

c. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 3 and x is 1.

d. Think: What number added to 7 is 10? $3 + 7 = 10$. $\frac{3x}{5}$ must be 3, so $3x$ is 15. So x is 15.

3. Find the missing value in the equation $4d -$ ___?___ $= 16$ for $d = 6$.

a. The missing value is 24 because $4d = 24$ when $d = 6$.

b. The missing value is 40 because $16 + 24 = 40$ when $d = 6$.

c. The missing value is 20 because $4 + 16 = 20$ when $d = 6$.

d. The missing value is 8 because $24 - 8 = 16$.

4. Solve the equation $30 = 10 - 4x$.

a. $x = -5$ because $30 = 10 + 20$.

b. $x = 5$ because $30 = 10 + 20$.

c. $x = 10$ because $30 = 10 - 40$.

d. $x = -10$ because $30 = 40 - 10$.

3. Find the missing value in the equation $4d - \_\_?\_\_ = 16$ for $d = 6$.

a. The missing value is 24 because $4d = 24$ when $d = 6$.

b. The missing value is 40 because $16 + 24 = 40$ when $d = 6$.

c. The missing value is 20 because $4 + 16 = 20$ when $d = 6$.

d. The missing value is 8 because $24 - 8 = 16$.

4. Solve the equation $30 = 10 - 4x$.

a. $x = -5$ because $30 = 10 + 20$.

b. $x = 5$ because $30 = 10 + 20$.

c. $x = 10$ because $30 = 10 - 40$.

d. $x = -10$ because $30 = 40 - 10$.

Wrapping It Up

Orren said that the solution to $8n - 21 = -5$ is $n = 2$.

Is he correct?

Wrapping It Up

Orren said that the solution to $8n - 21 = -5$ is $n = 2$.

Is he correct? Yes

Warming Up:

Use >, <, or = to make a true statement.

1. –254 _____ –256

2. $-\frac{4}{5}$ _____ $-\frac{1}{2}$

3. (–12 • 6) • 2 _____ –12 • (6 • 2)

4. (–12 ÷ 6) ÷ 2 _____ –12 ÷ (6 ÷ 2)

Warming Up:

Use >, <, or = to make a true statement.

1. –254 ___>___ –256

2. $-\frac{4}{5}$ ___<___ $-\frac{1}{2}$

3. (–12 • 6) • 2 ___=___ –12 • (6 • 2)

4. (–12 ÷ 6) ÷ 2 ___>___ –12 ÷ (6 ÷ 2)

Learning to Solve:

Guess a reasonable value for b.

b	$5b + 11$	Does $5b + 11 = 1$?

$b =$ _____

Learning to Solve:

Guess a reasonable value for b.

A possible solution:

b	$5b + 11$	Does $5b + 11 = 1$?
1	$5(1) + 11 = 5 + 11 = 16$	No. It is much larger than 1. Try a smaller number. Let's try $b = 0$.
0	$5(0) + 11 = 0 + 11 = 11$	The solution is still too large. Let's try $b = -1$.
–1	$5(-1) + 11 = -5 + 11 = 6$	We are getting closer. Let's try $b = -2$.
–2	$5(-2) + 11 = -10 + 11 = 1$	Yes, when $b = -2$, this equation is true.

$b =$ –2

Practicing Together:

1. Fill in the column headings.

2. Try different values to find the value of the variable that makes the equation true.

Problem 1: $2h - 9 = 13$ $h =$ _____

h		

Problem 2: $7 + 3u = -20$ $u =$ _____

u		

Practicing Together:

1. Fill in the column headings.

2. Try different values to find the value of the variable that makes the equation true.

Problem 1: $2h - 9 = 13$ $h =$ 11

h	$2h - 9$	Does $2h - 9 = 13$?

Problem 2: $7 + 3u = -20$ $u =$ –9

u	$7 + 3u$	Does $7 + 3u = -20$?

Trying It on Your Own

1. Jeri used a table to solve the equation $9 = 3x + 2(6x - 3)$. She said the solution was $x = 1$. Do you agree with Jeri?

a. Yes, because when you use a table to solve the equation, the answer will be correct.

b. Yes, because when you substitute 1 for the variable, both sides of the equation equal 9.

c. No, because you cannot use a table to solve an equation with parentheses.

d. It is not possible to tell without seeing the table.

2. Derek started to make a table to solve the equation $5w + 2 + 7w = 50$.

Value of w	$5w + 2 + 7w$	Does $5w + 2 + 7w = 50$?
0	2	No

Which of the following describes how he might decide the next entry in his table?

a. He should pick a number between 0 and 10 because the value on the left side is too small.

b. He should pick a number between 0 and –10 because the value on the right side is too large.

c. He should pick a number between 10 and 50 because the value on the right side is 50.

d. He should pick a number larger than 50 because the value on the left side was too small.

Trying It on Your Own

1. Jeri used a table to solve the equation $9 = 3x + 2(6x - 3)$. She said the solution was $x = 1$. Do you agree with Jeri?

a. Yes, because when you use a table to solve the equation, the answer will be correct.

b. Yes, because when you substitute 1 for the variable, both sides of the equation equal 9.

c. No, because you cannot use a table to solve an equation with parentheses.

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a. He should pick a number between 0 and 10 because the value on the left side is too small.

b. He should pick a number between 0 and –10 because the value on the right side is too large.

c. He should pick a number between 10 and 50 because the value on the right side is 50.

d. He should pick a number larger than 50 because the value on the left side was too small.

Use this table to answer problems 3 and 4.

Solve the equation $3(4x - 2) - 8 = 10$.

Value of x	$3(4x - 2) - 8$
–1	–26
0	–2
1	–2
2	10
3	22

3. Which row in the table has a computation error?

a. When $x = -1$, the value of $3(4x - 2) - 8$ should be –2.

b. When $x = 0$, the value of $3(4x - 2) - 8$ should be –14.

c. When $x = 1$, the value of $3(4x - 2) - 8$ should be –14.

d. When $x = 3$, the value of $3(4x - 2) - 8$ should be –22.

4. What is the solution to the equation $10 = 3(4x - 2) - 8$?

a. The solution to the equation is not given in the table.

b. $x = 10$ because that is the value on the left side of the equation.

c. $x = 1$ because then $3(4x - 2) - 8$ equals 10.

d. $x = 2$ because the value of $3(4x - 2) - 8$ is 10.

Use this table to answer problems 3 and 4.

Solve the equation $3(4x - 2) - 8 = 10$.

Value of x	$3(4x - 2) - 8$
–1	–26
0	–2
1	–2
2	10
3	22

3. Which row in the table has a computation error?

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c. When $x = 1$, the value of $3(4x - 2) - 8$ should be –14.

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4. What is the solution to the equation $10 = 3(4x - 2) - 8$?

a. The solution to the equation is not given in the table.

b. $x = 10$ because that is the value on the left side of the equation.

c. $x = 1$ because then $3(4x - 2) - 8$ equals 10.

d. $x = 2$ because the value of $3(4x - 2) - 8$ is 10.

Wrapping It Up

So far, you have learned 2 methods for solving equations—the guess-and-test method and the table method. Compare these methods. Write 1 thing that is similar about these methods and 1 thing that is different.

Similar:

Different:

Wrapping It Up

So far, you have learned 2 methods for solving equations—the guess-and-test method and the table method. Compare these methods. Write 1 thing that is similar about these methods and 1 thing that is different.

Similar:

Answers will vary. Students should notice that a table helps to organize guesses when using the guess-and-check method.

Different:

Answers will vary. Students should notice that a table helps to organize guesses when using the guess-and-check method.

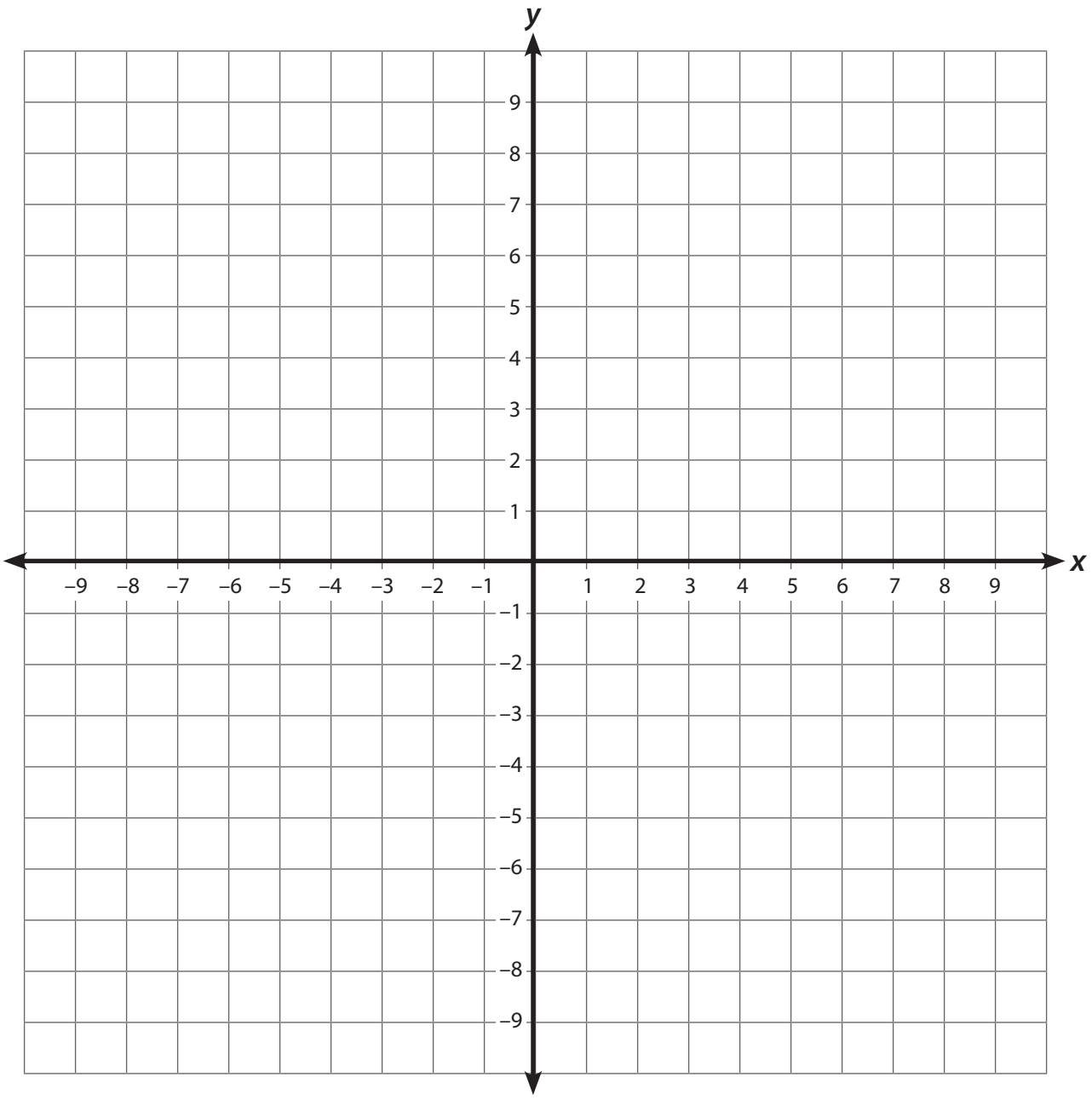
Warming Up:

Graph and label the coordinate points.

A (7, 4) **B (3, 5)** **C (4, –4)**

D (–6, 1) **E (–2, –2)** **F (0, 9)**

G (–5, 8) **H (–1, 0)**



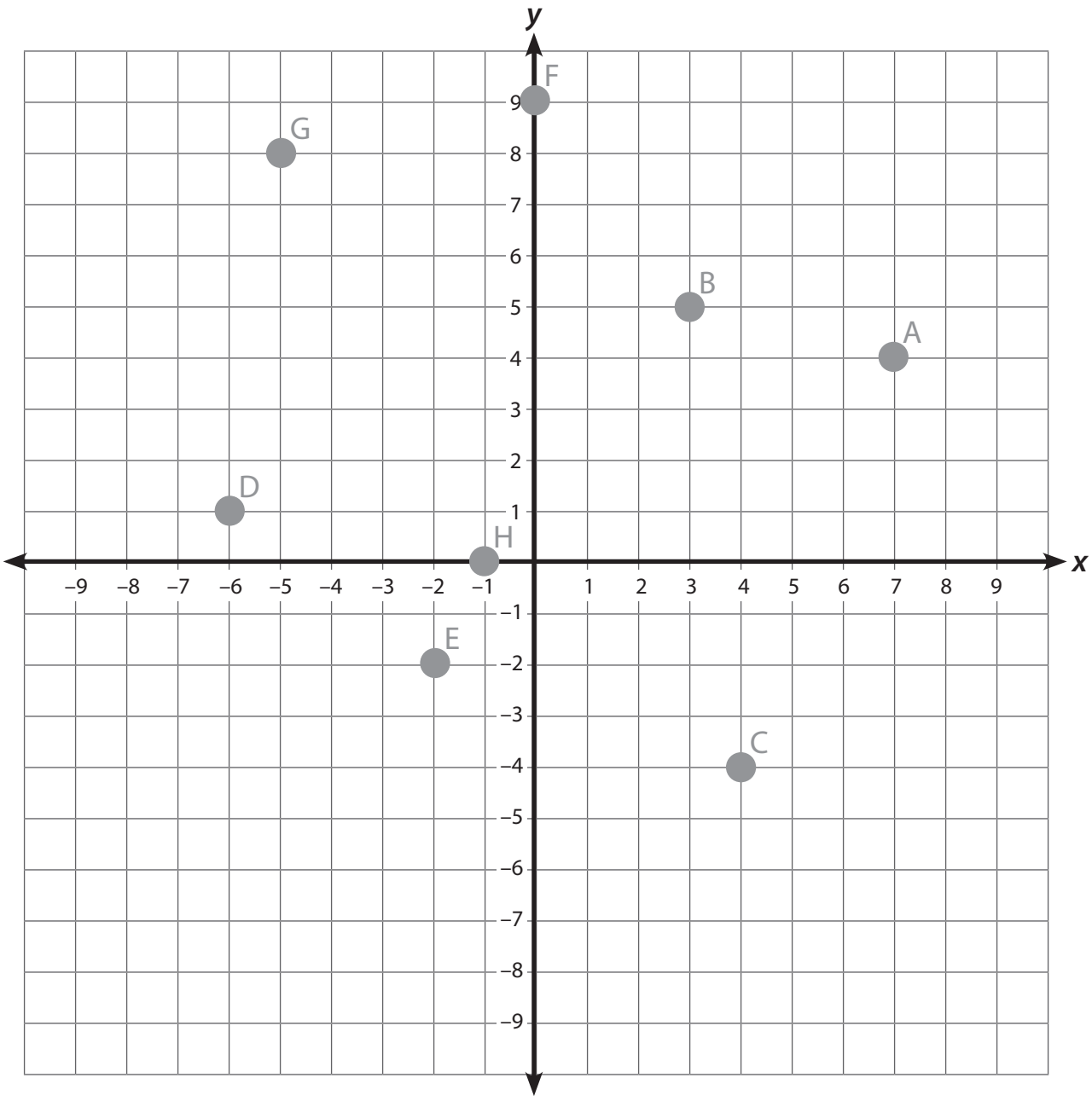
Warming Up:

Graph and label the coordinate points.

A (7, 4) **B (3, 5)** **C (4, –4)**

D (–6, 1) **E (–2, –2)** **F (0, 9)**

G (–5, 8) **H (–1, 0)**



Learning to Solve:

Problem 1: $2x - 3 = 5$

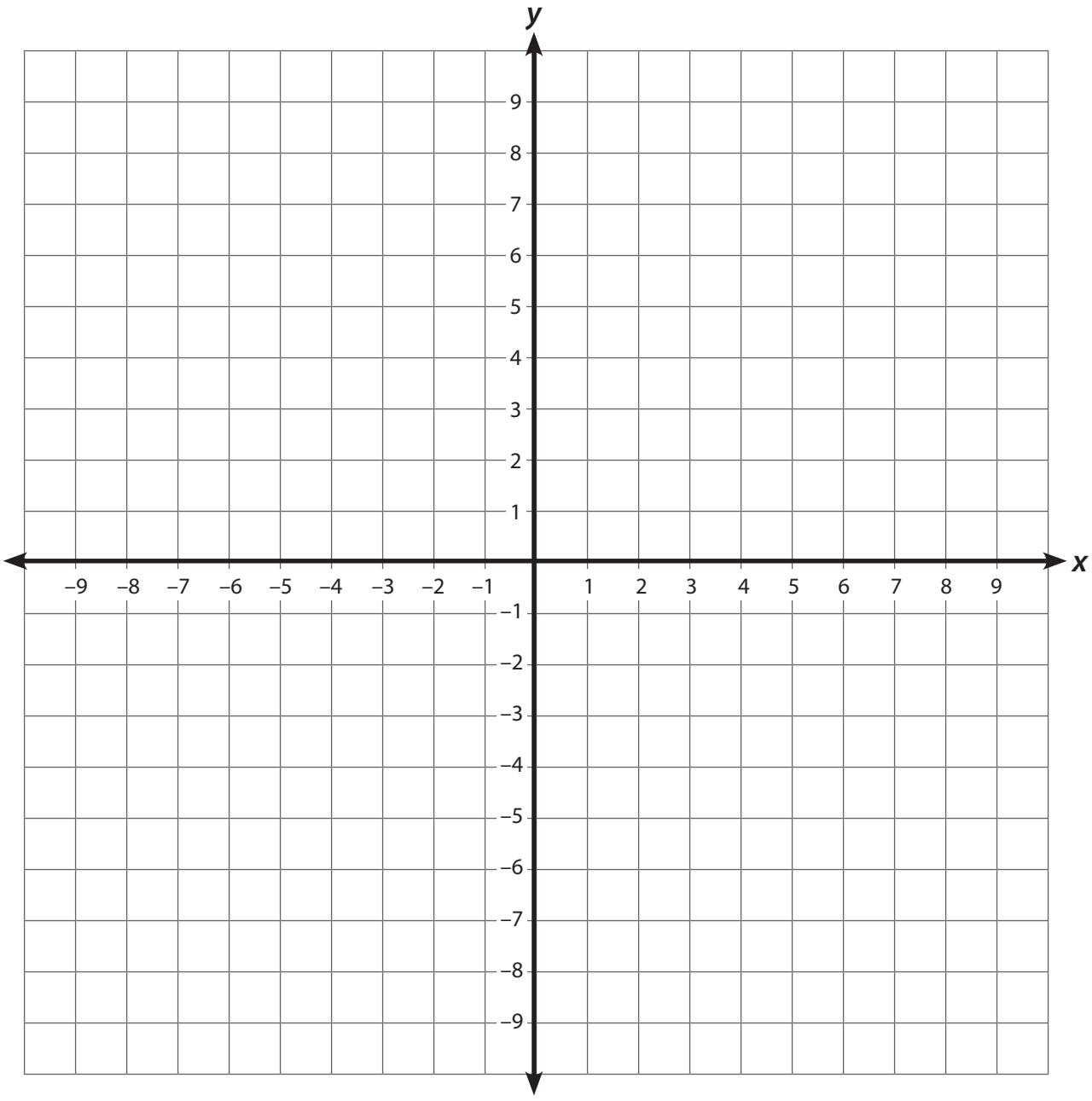
x	$2x - 3$
0	
1	
2	

Learning to Solve:

Problem 1: $2x - 3 = 5$

x	$2x - 3$
0	$2(0) - 3 = 0 - 3 = -3$
1	$2(1) - 3 = 2 - 3 = -1$
2	$2(2) - 3 = 4 - 3 = 1$

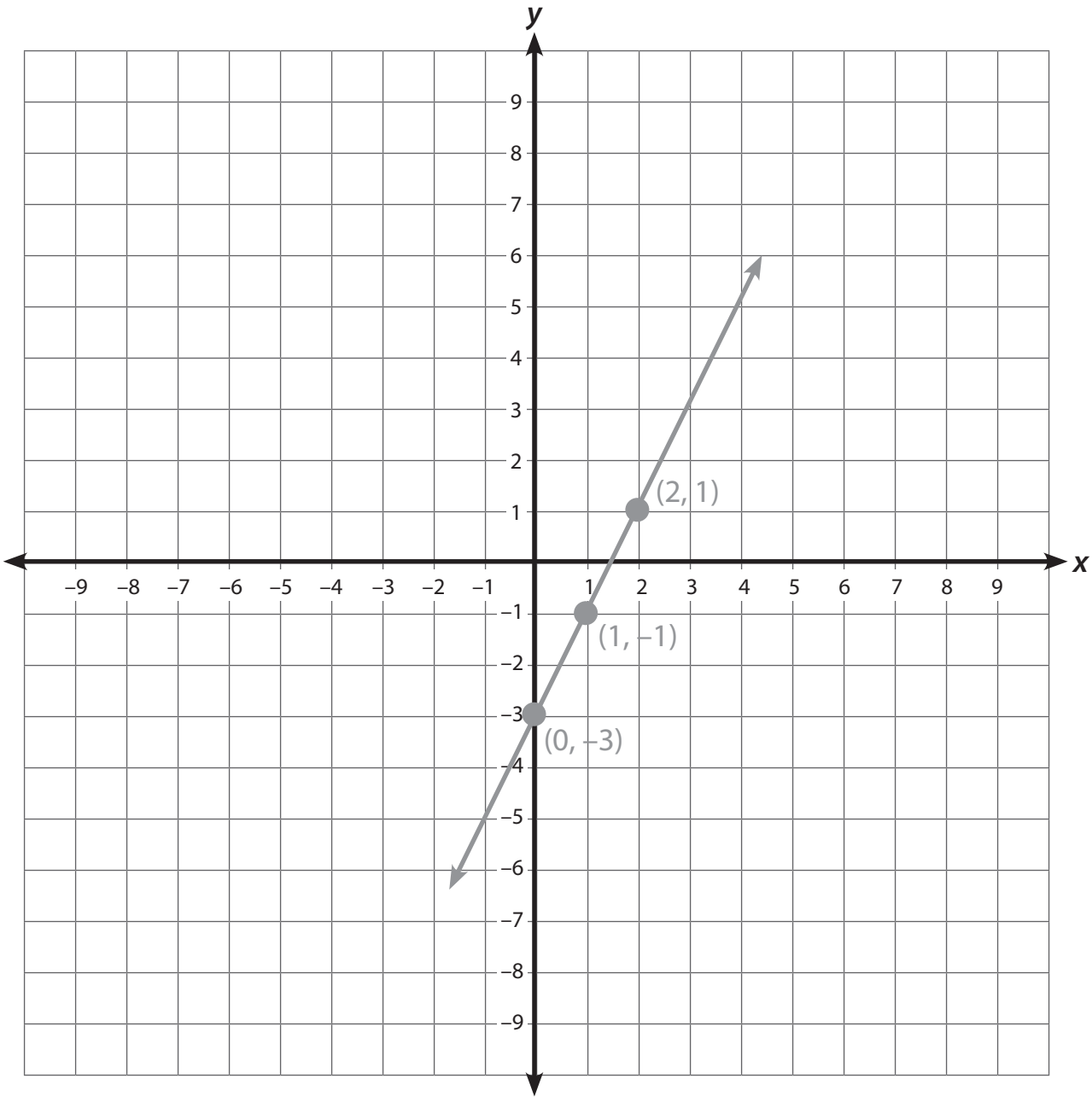
Graph the points on the coordinate grid. Connect them by drawing a line through the points.



How can we use this line, the graph of the expression $2x - 3$, to determine the value of x that will make the equation $2x - 3 = 5$ true?

$x =$ _____

Graph the points on the coordinate grid. Connect them by drawing a line through the points.



How can we use this line, the graph of the expression $2x - 3$, to determine the value of x that will make the equation $2x - 3 = 5$ true?

$x =$ 4

Practicing Together:

If using a graphing calculator:

Working with your partner, solve the problems, using your graphing calculators.

Find the value of x that makes the equation $4x + 1 = -7$ true.

1. What equations will you graph?

$Y =$ _____

$Y =$ _____

Practicing Together:

If using a graphing calculator:

Working with your partner, solve the problems, using your graphing calculators.

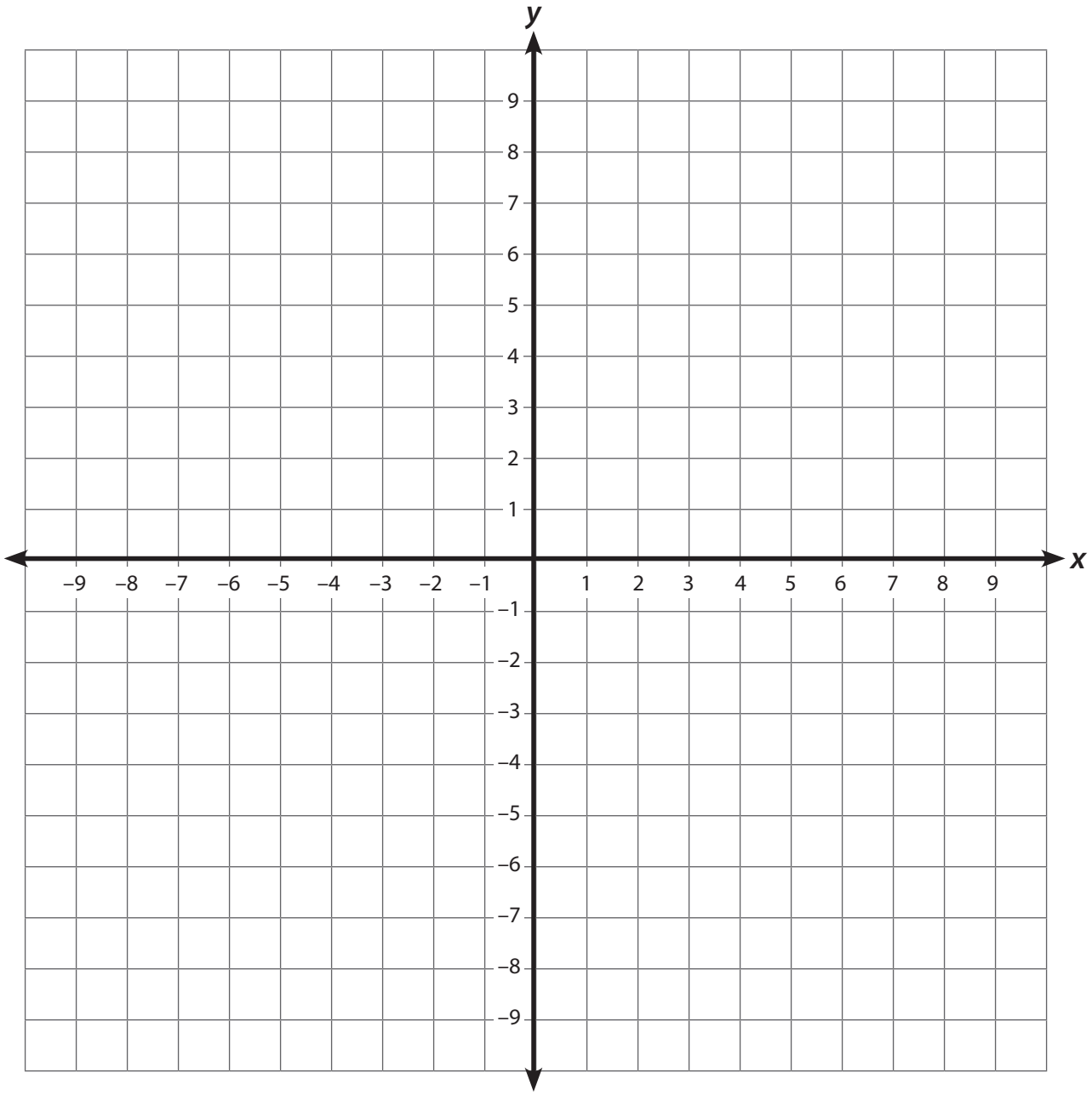
Find the value of x that makes the equation $4x + 1 = -7$ true.

1. What equations will you graph?

$Y =$ $4x + 1$

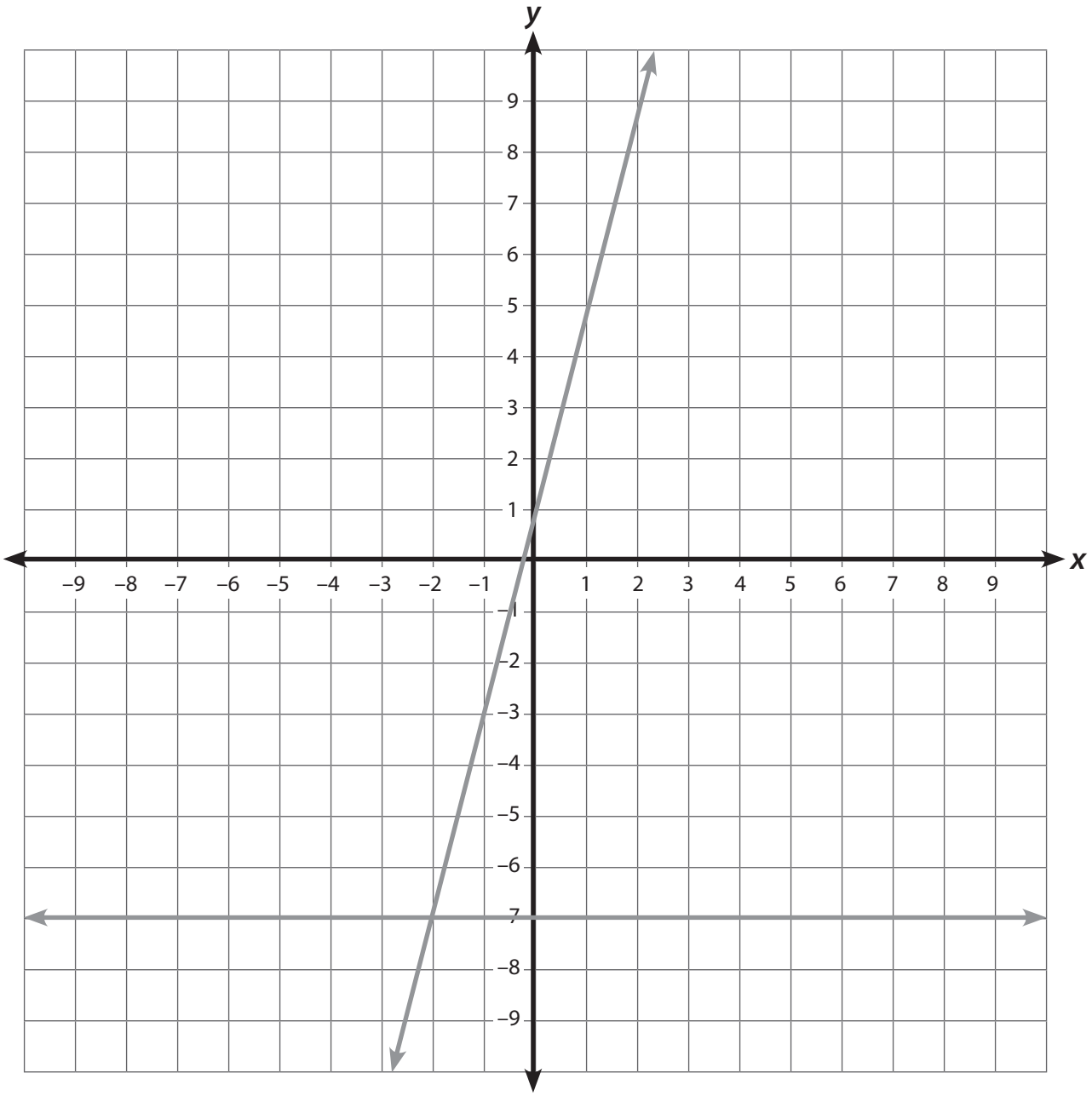
$Y =$ -7

2. Graph the equation on your graphing calculator and then sketch it below.



3. Write the solution to the equation.

2. Graph the equation on your graphing calculator and then sketch it below.



3. Write the solution to the equation.

$x = -2$

Find the solution to the equation $5 = 5(x + 3)$.

4. What equations will you graph?

$Y =$ _____

$Y =$ _____

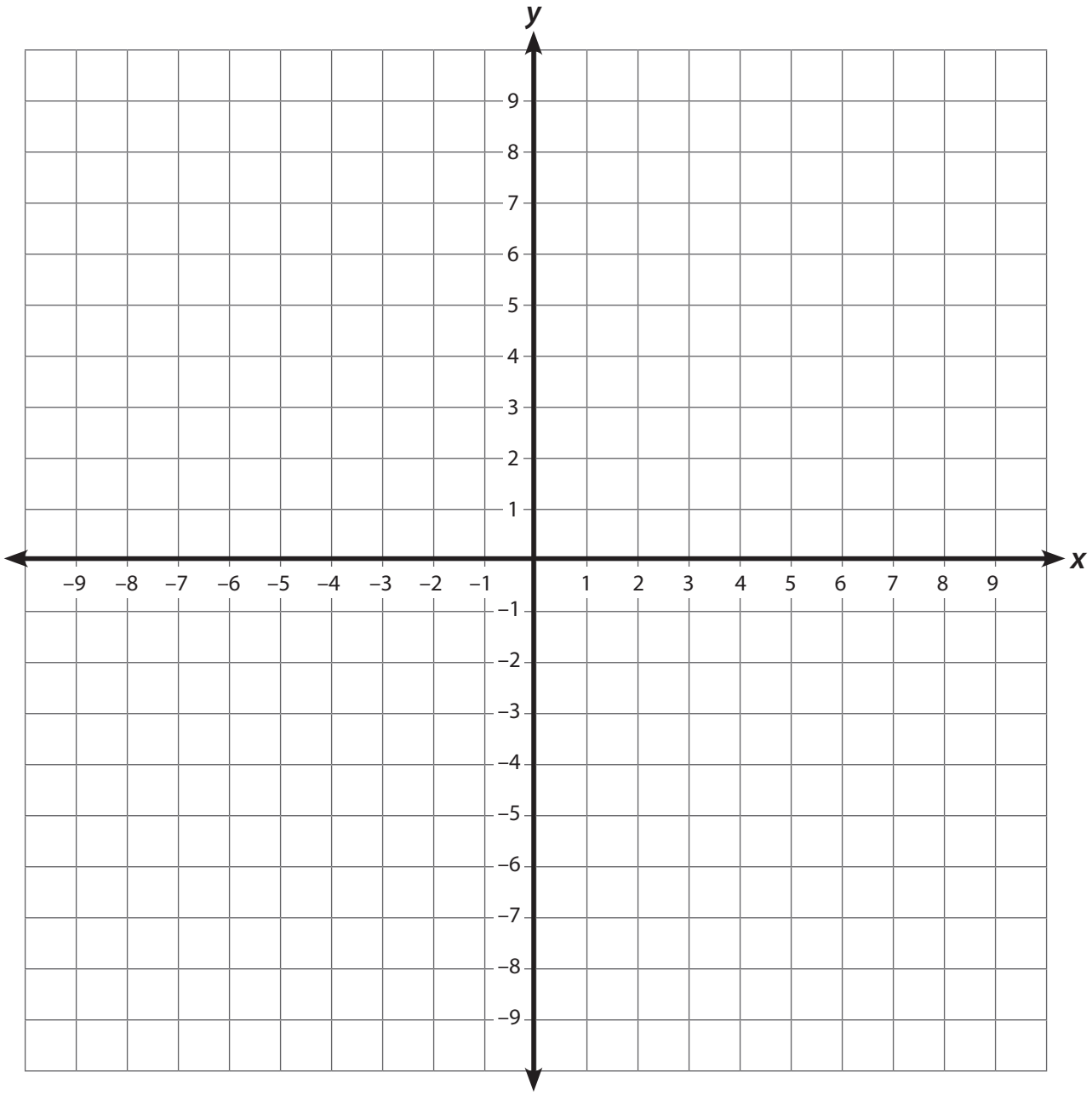
Find the solution to the equation $5 = 5(x + 3)$.

4. What equations will you graph?

$Y =$ 5(*x* + 3)

$Y =$ 5

5. Graph the equation on your graphing calculator and then sketch it below.



6. Write the solution to the equation.

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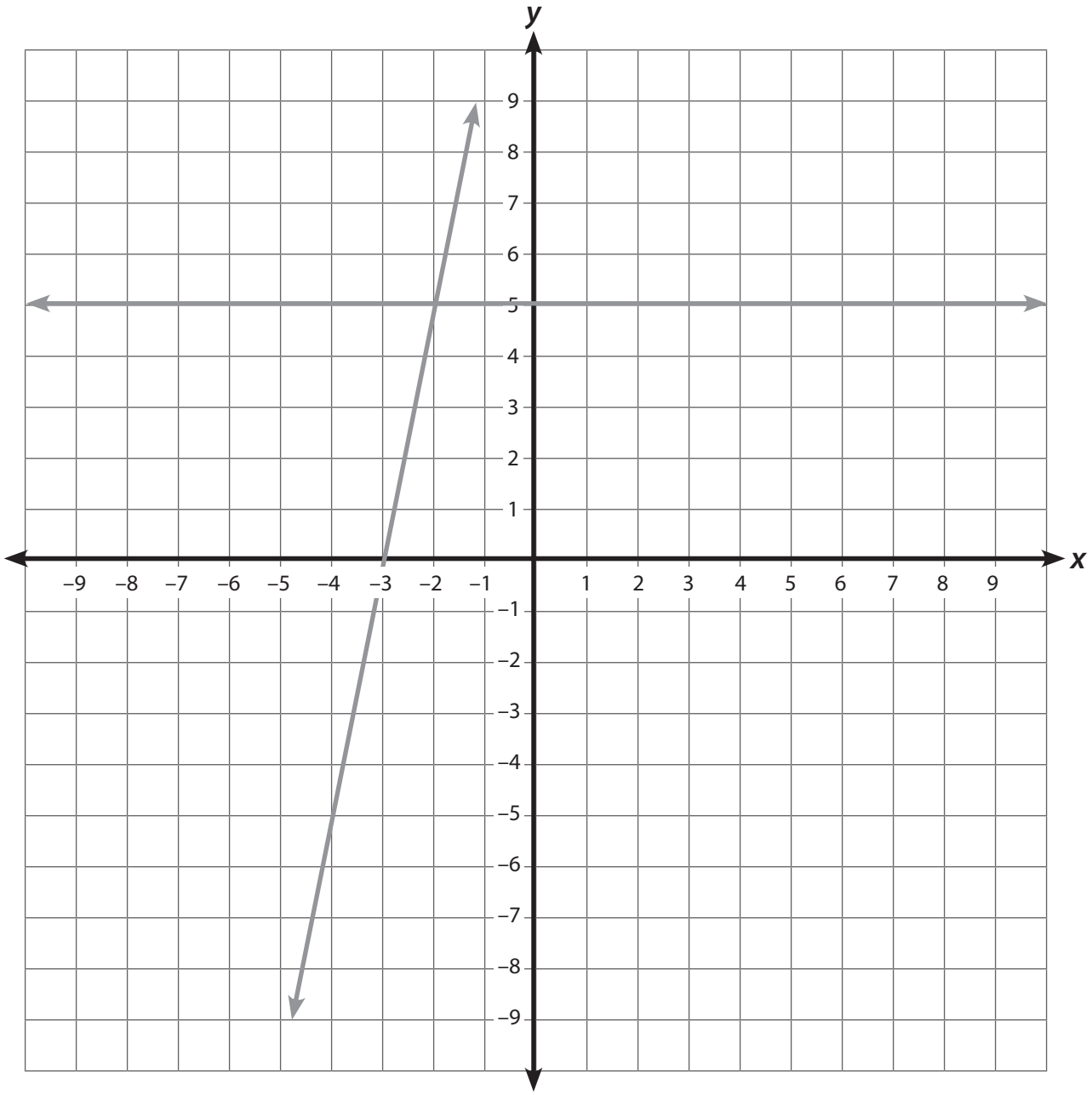


6. Write the solution to the equation.

$x = -2$

If not using a graphing calculator:

Working with your partner, solve the problems, using the graphing method.

Find the value of *d* that makes the equation $4d + 1 = -7$ true.

1. Select values for *d* and fill in the table with those values.

2. Write the coordinate points in the table.

Variable	Expression	Ordered Pair

If not using a graphing calculator:

Working with your partner, solve the problems, using the graphing method.

Find the value of *d* that makes the equation $4d + 1 = -7$ true.

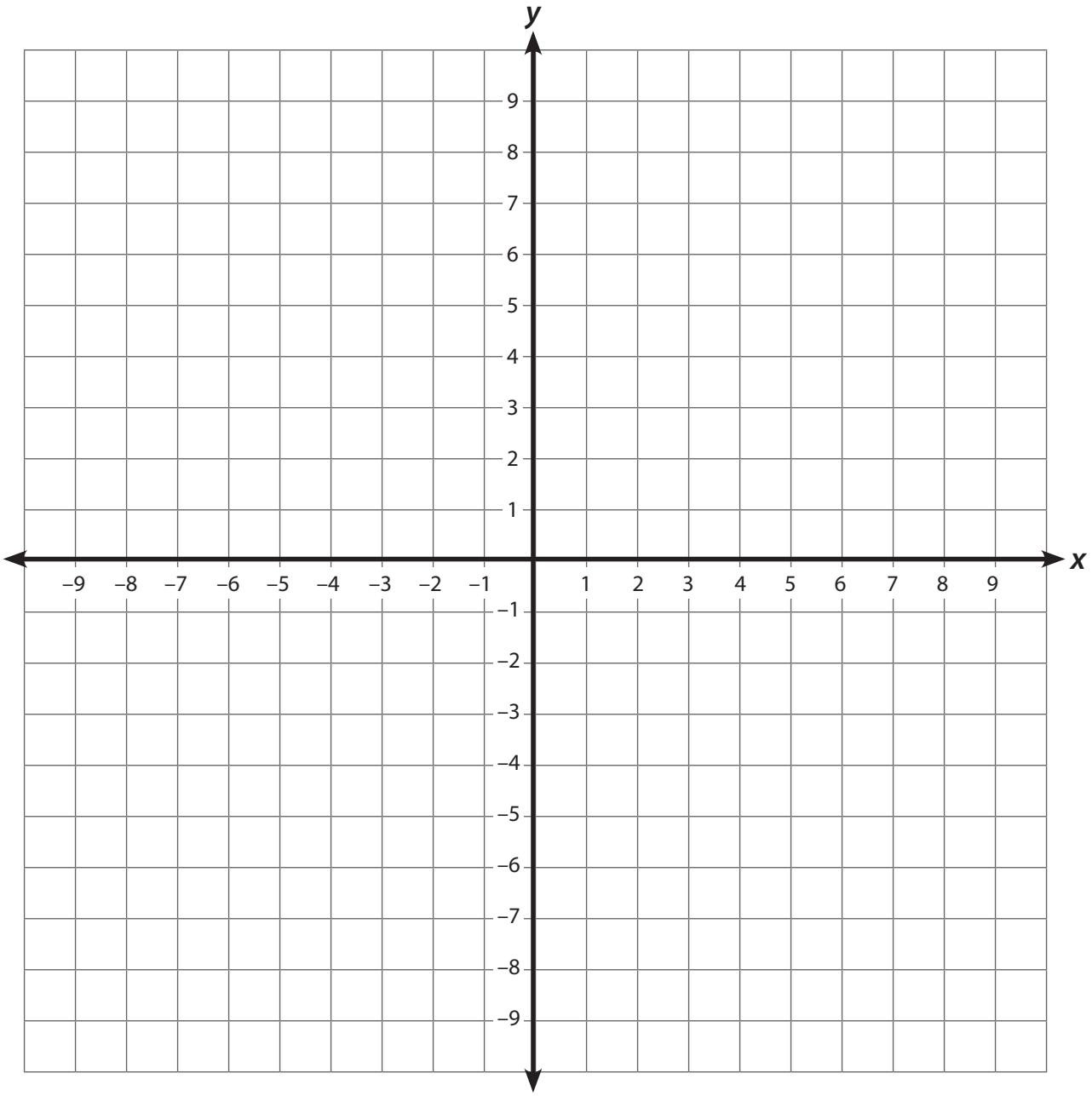
1. Select values for *d* and fill in the table with those values.

2. Write the coordinate points in the table.

Variable	Expression	Ordered Pair
0	1	(0, 1)
1	5	(1, 5),
–1	–3	(–1, –3)

Answers will vary.

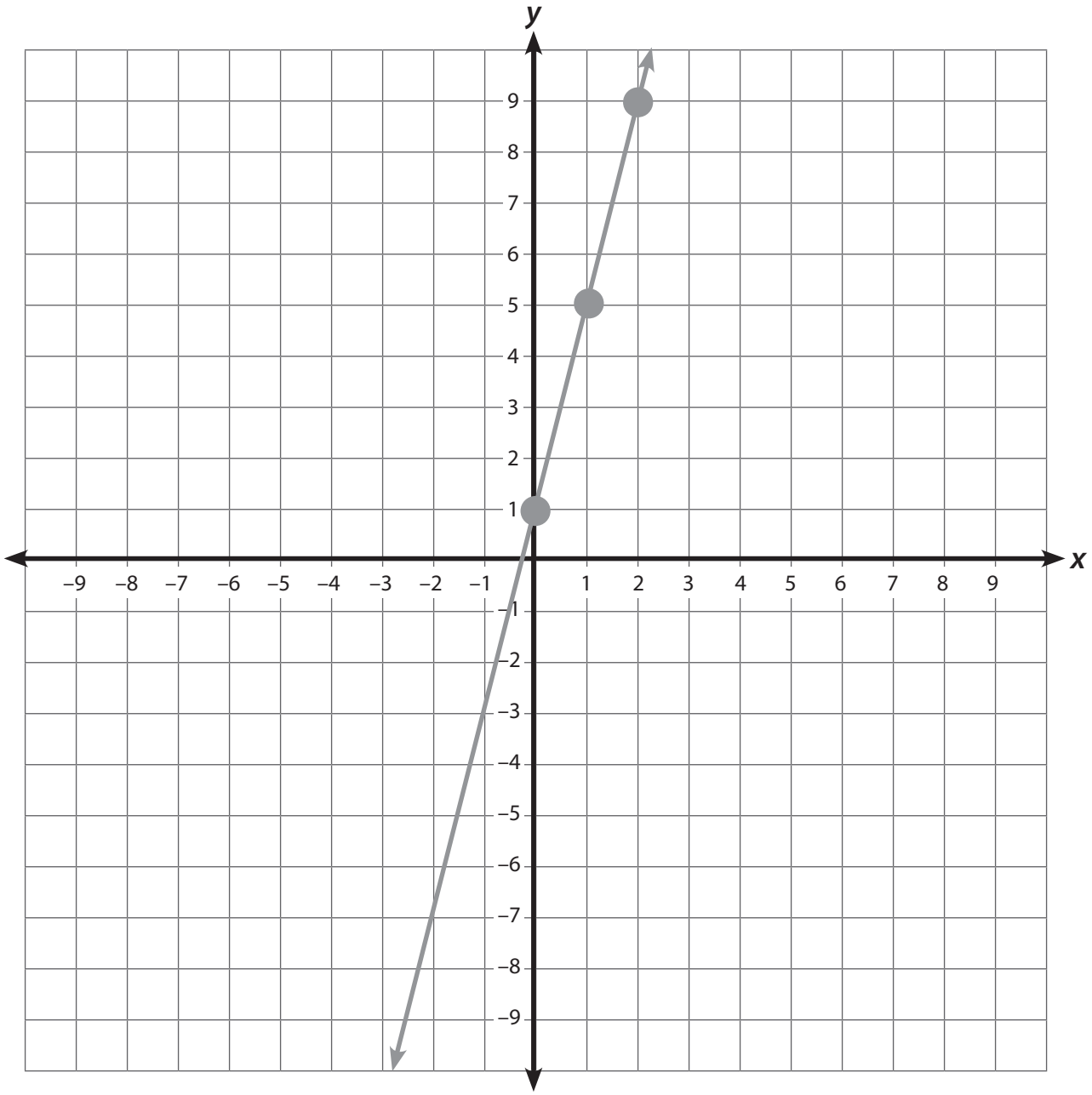
3. Graph the points on the coordinate grid.



4. Draw a line connecting the points.

5. For $4d + 1$ to equal -7, $d =$ _____

3. Graph the points on the coordinate grid.



4. Draw a line connecting the points.

5. For $4d + 1$ to equal -7, $d =$ ___–2___

Trying It on Your Own

If using a graphing calculator:

Find the solution to the equation $3x - 4 = -7$, using your graphing calculators.

1. What equations would Shannon graph to solve the equation?

a. $Y = 3x + 4$ and $Y = 7$

b. $Y = -3x + 4$ and $Y = -7$

c. $Y = 3x - 4$ and $Y = -7$

d. $Y = 3x - 4$ and $Y = 7$

Trying It on Your Own

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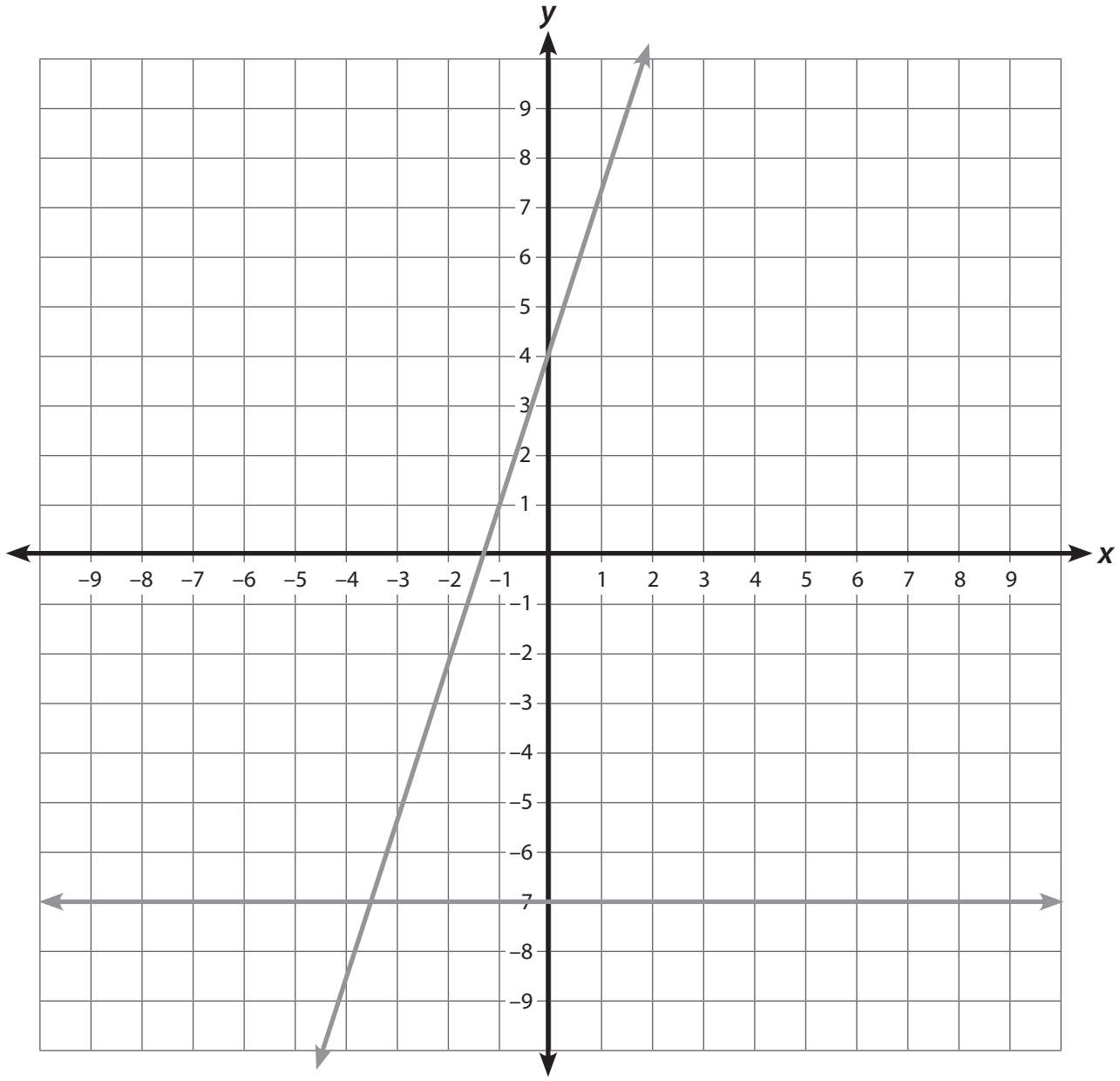
2. Which of the following 4 graphs would Shannon use to solve the equation?

a.



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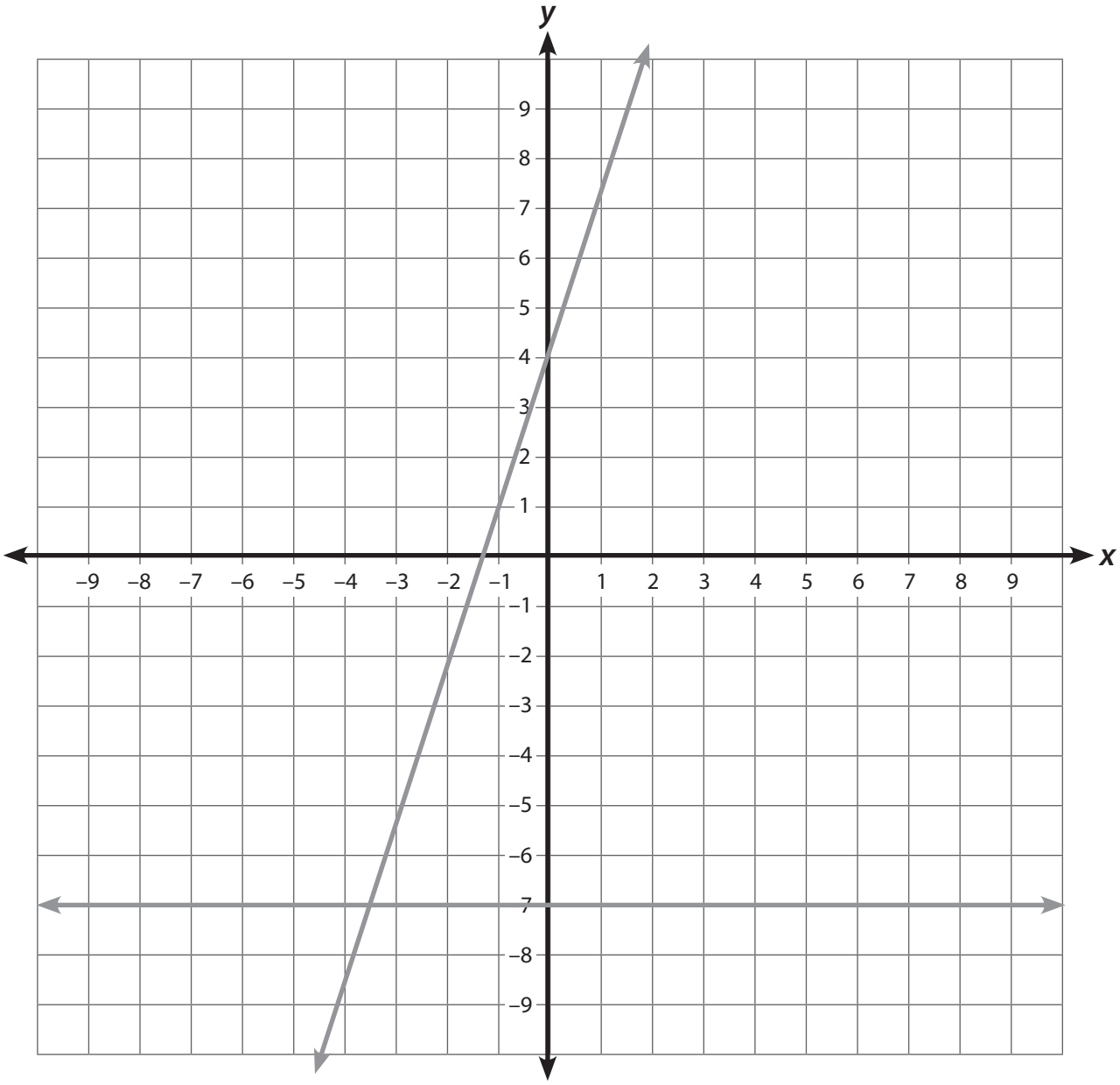
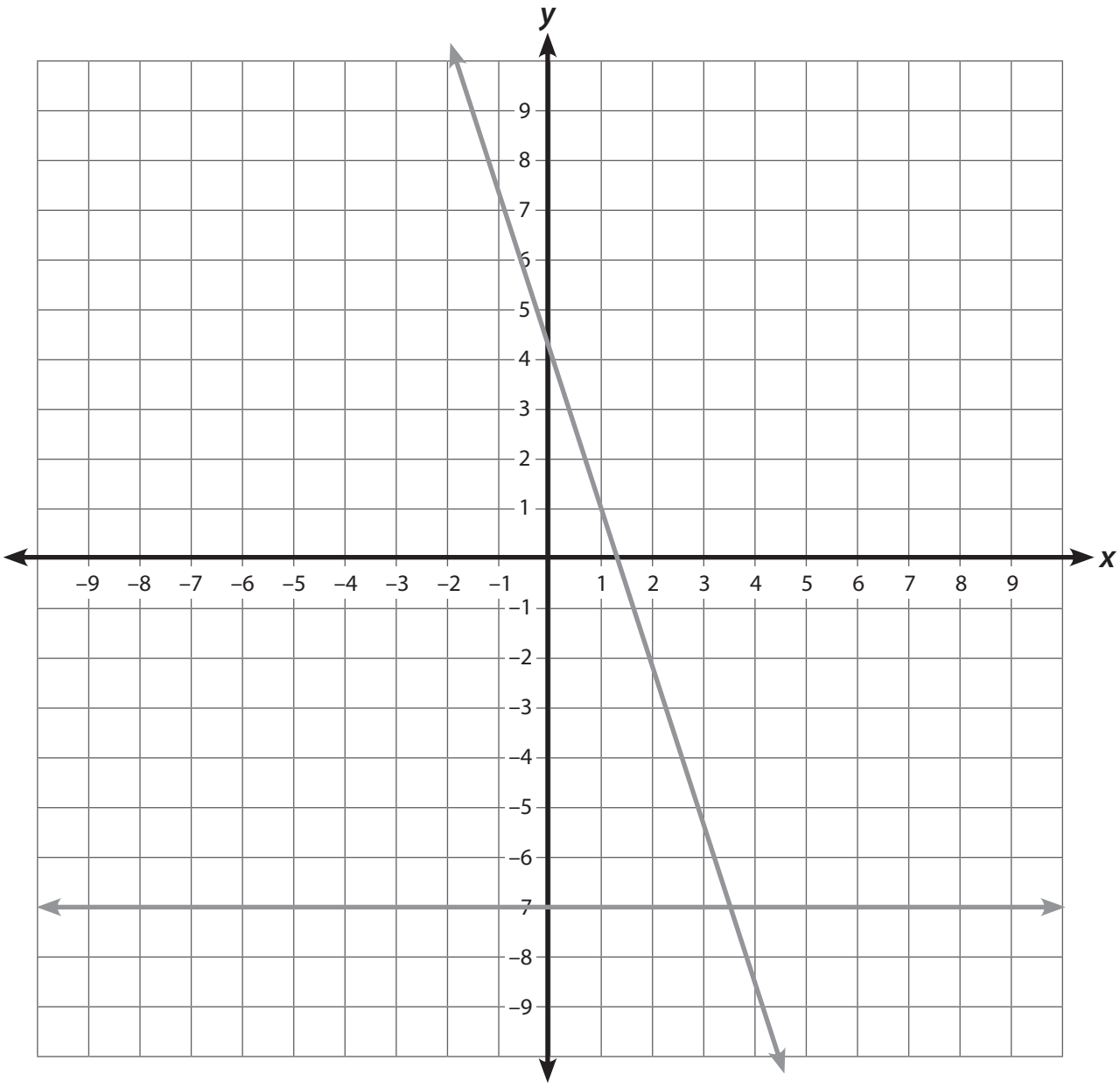


b.



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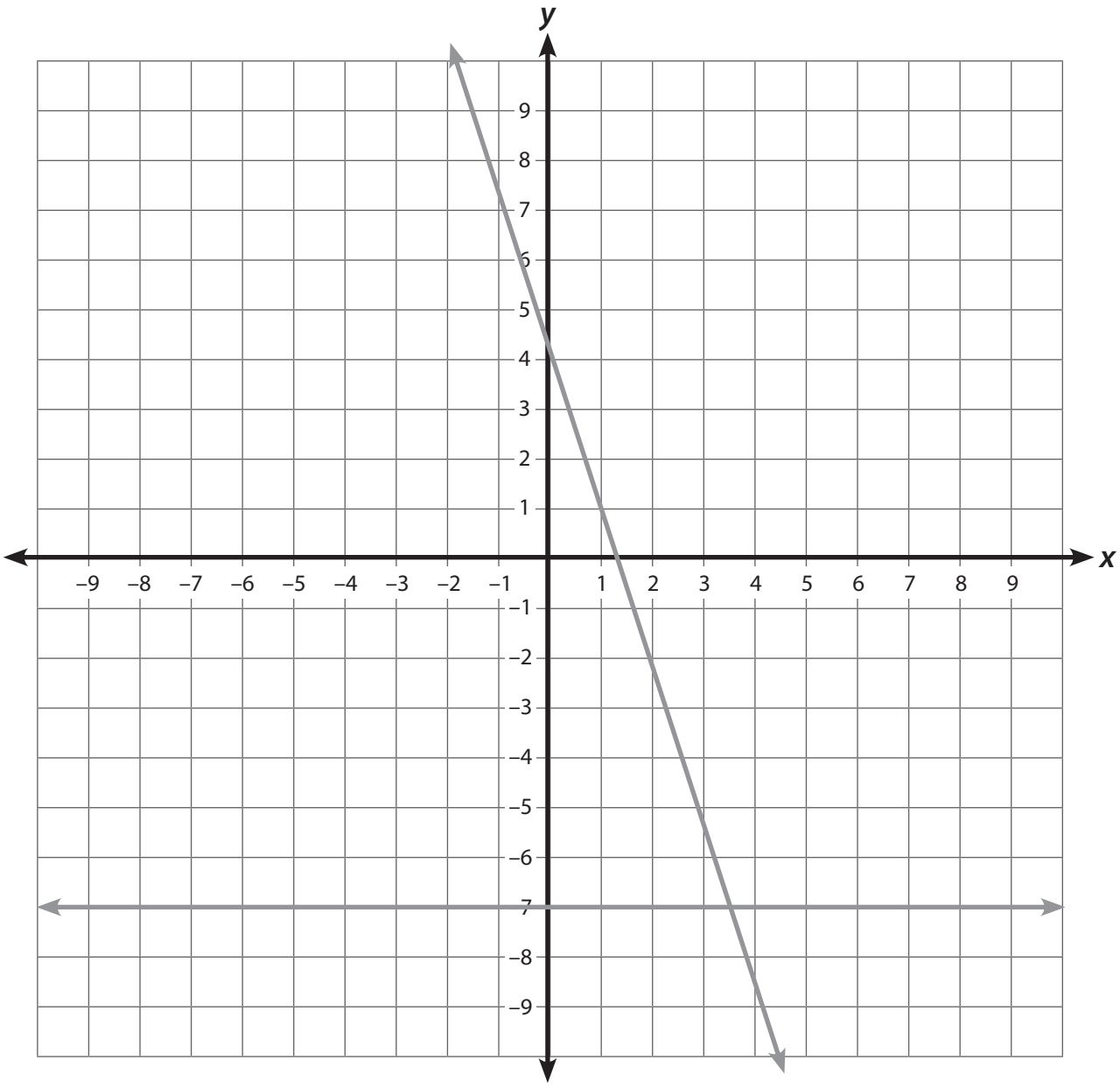
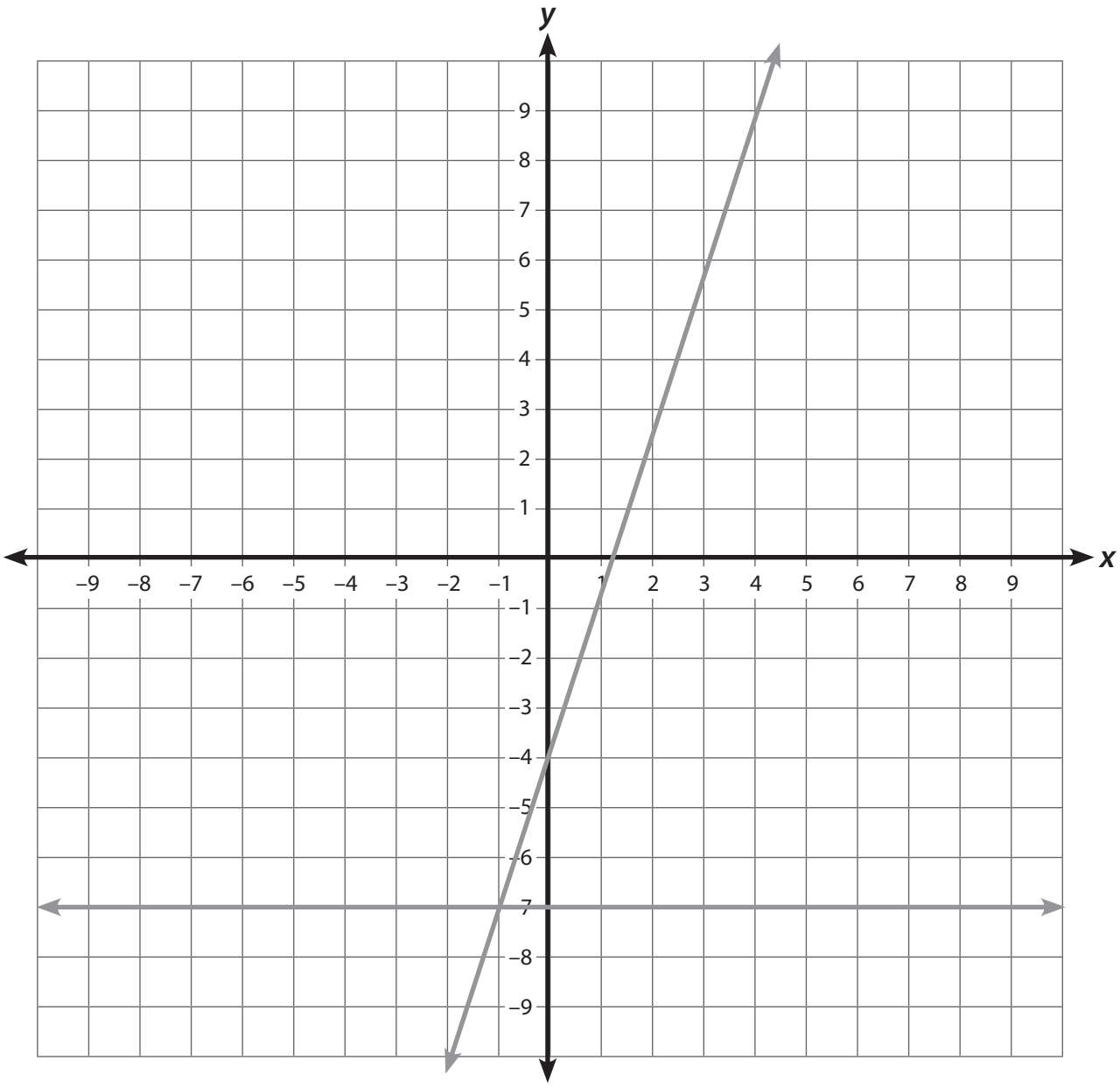


c.



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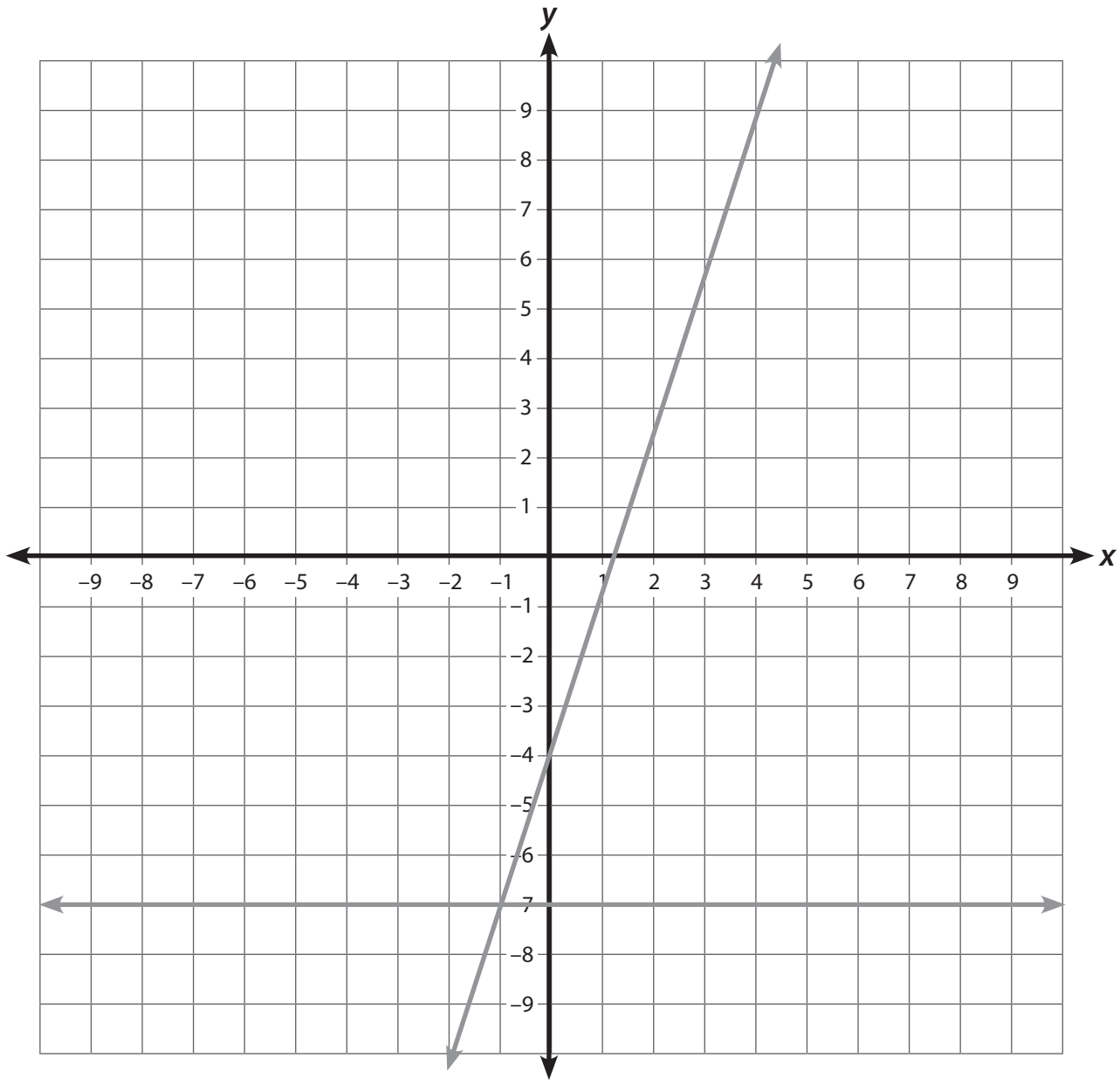
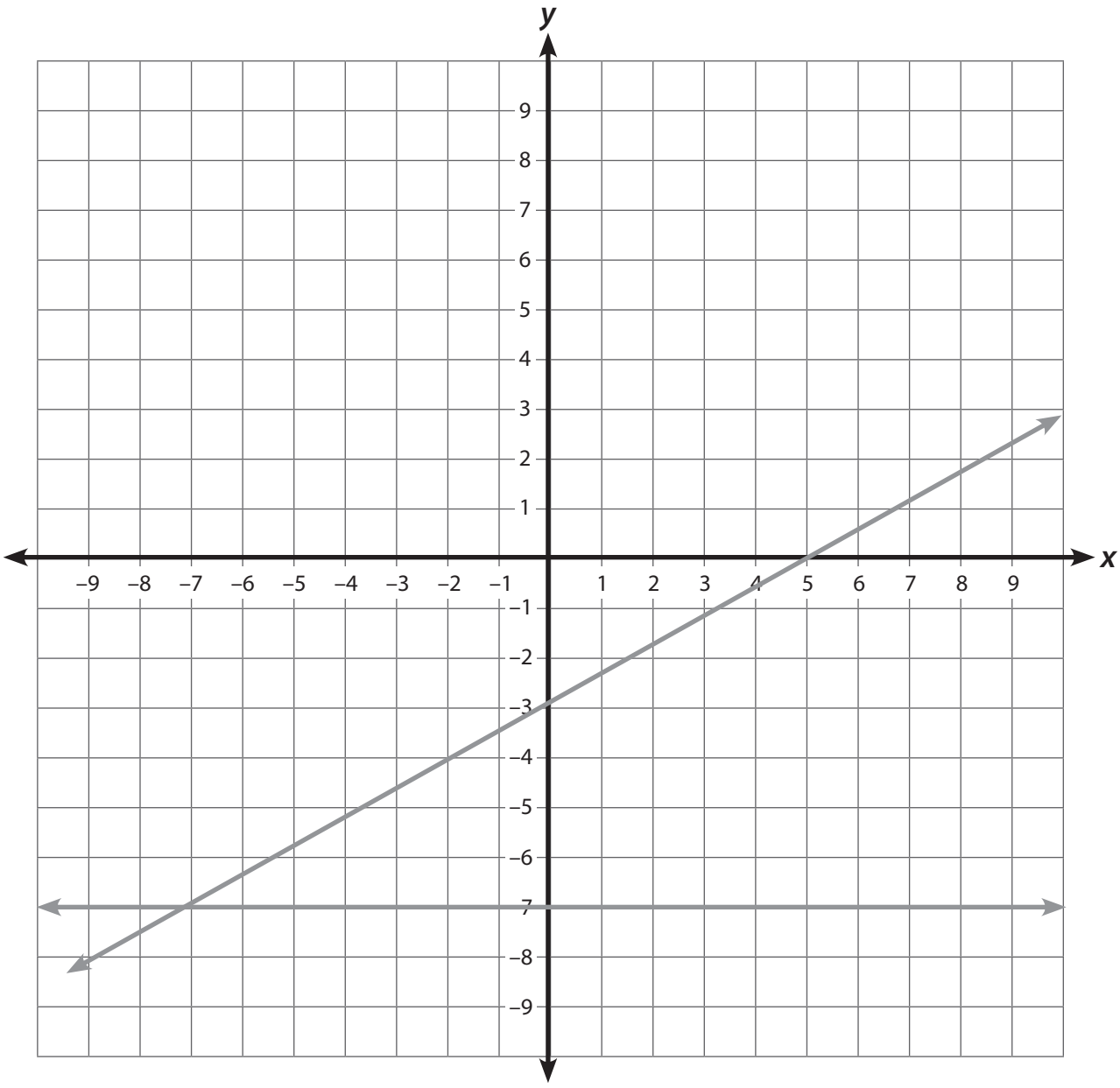
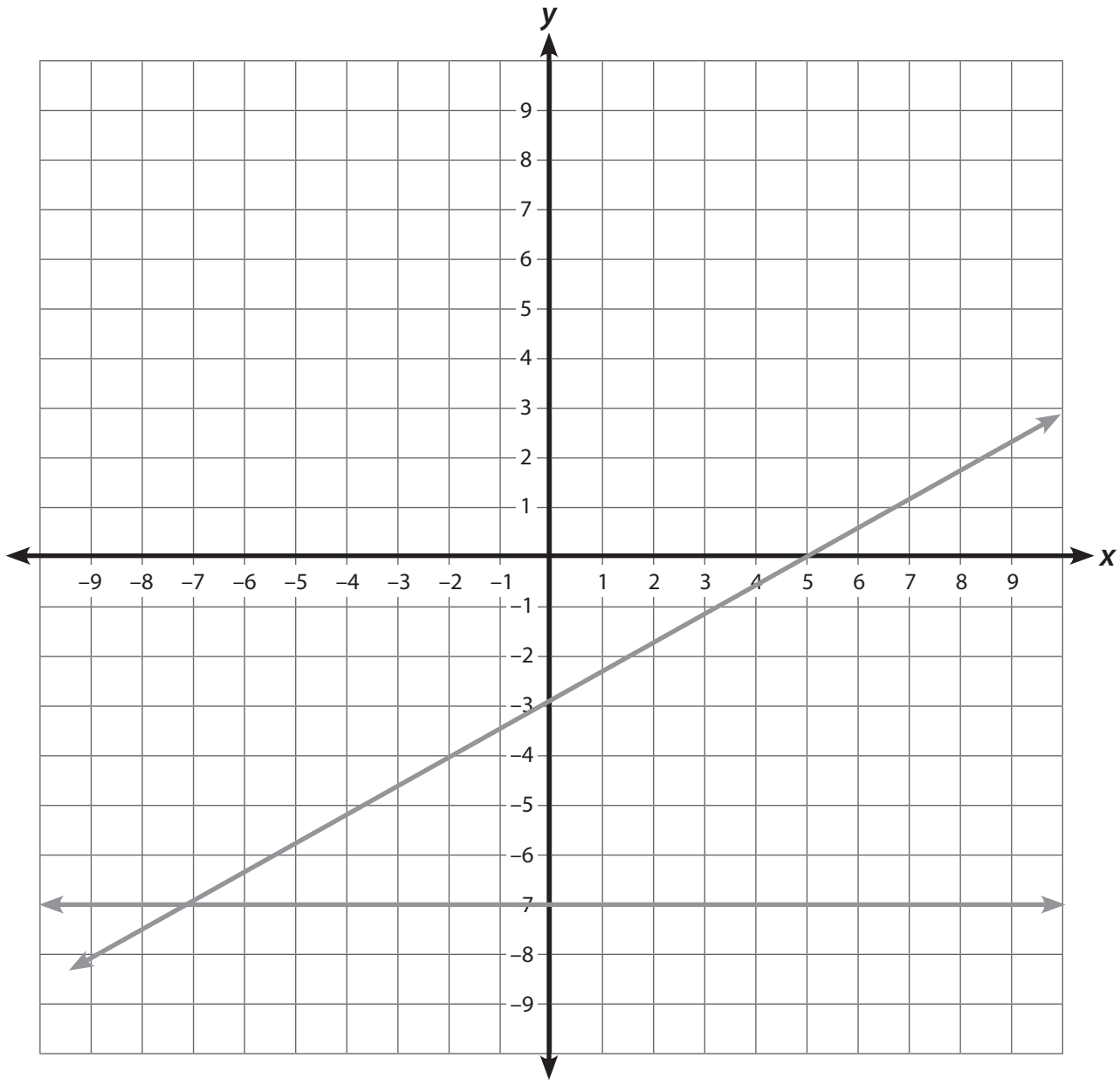


d.



d.



$$3x - 4 = -7$$

3. What is the coordinate of the point where the lines intersect that will make the equation true?

a. (–1, 7)

b. (7, –1)

c. (1, –7)

d. (–1, –7)

4. What is the solution to the equation?

a. The solution to the equation is $x = -1$.

b. The solution to the equation is $x = 1$.

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If not using a graphing calculator:

Find the solution to the equation $3g - 4 = -7$, using the graph method.

1. Shannon completed her table to find values for g and the expression $3g - 4$. Which of the following is a table Shannon could have made?

a.

Value of g	Value of $3g - 4$
0	–4
–1	1
–2	2

b.

Value of g	Value of $3g - 4$
0	4
1	1
2	2

c.

Value of g	Value of $3g - 4$
0	–4
–1	–7
–2	–10

d.

Value of g	Value of $3g - 4$
0	4
1	–1
2	2

2. What are the coordinate points for her graph?

a. (0, –4); (–1, 1); (–2, 2)
b. (0, 4); (1, 1); (2, 2)
c. (0, –4); (–1, –7); (–2, –10)
d. (0, 4); (1, –1); (2, 2)

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0	–4
–1	1
–2	2

b.

Value of g	Value of $3g - 4$
0	4
1	1
2	2

c.

Value of g	Value of $3g - 4$
0	–4
–1	–7
–2	–10

d.

Value of g	Value of $3g - 4$
0	4
1	–1
2	2

2. What are the coordinate points for her graph?

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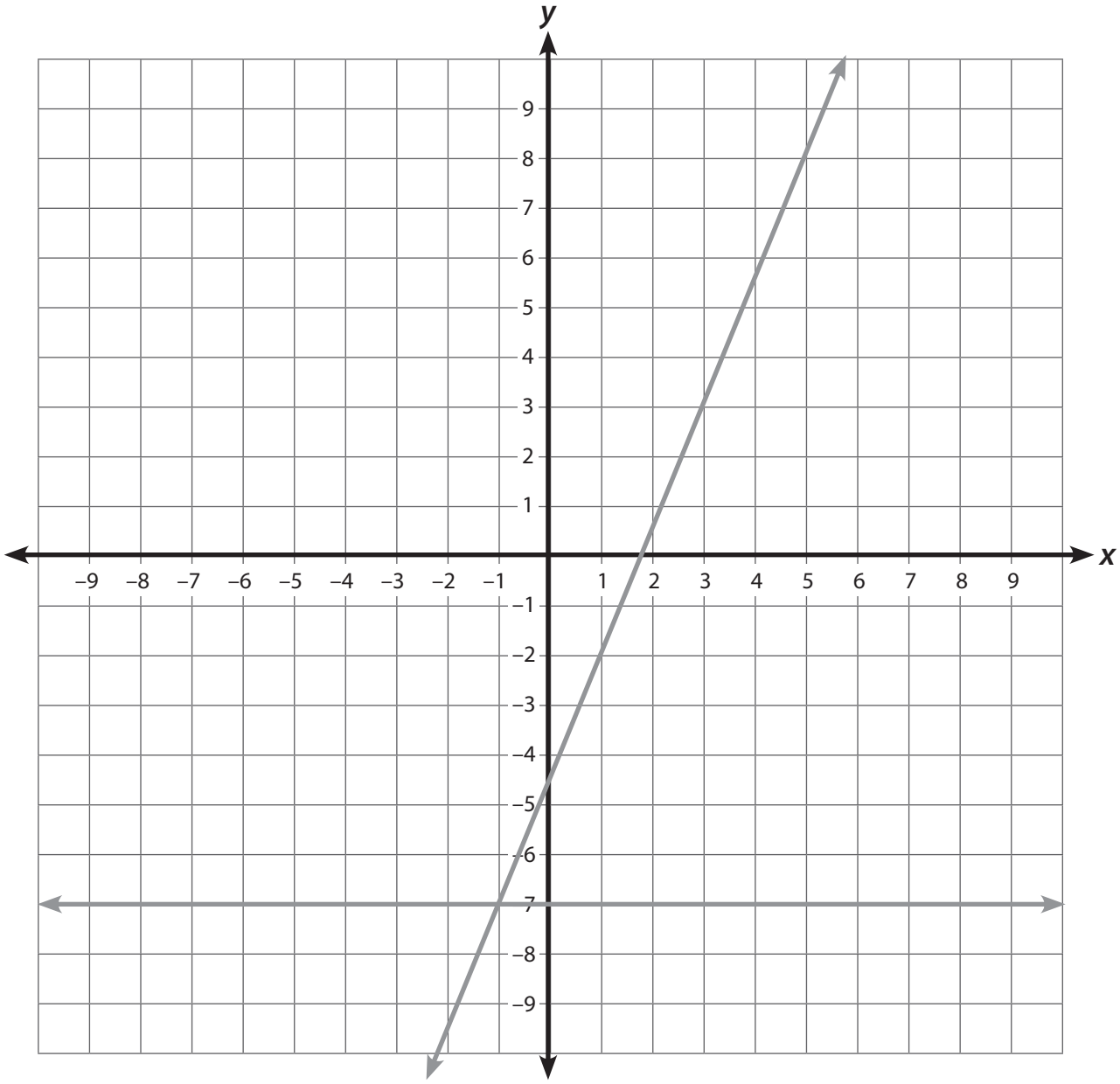
b. (0, 4); (1, 1); (2, 2)
c. (0, –4); (–1, –7); (–2, –10)
d. (0, 4); (1, –1); (2, 2)

3. Which of the following 4 graphs would she use?

a.



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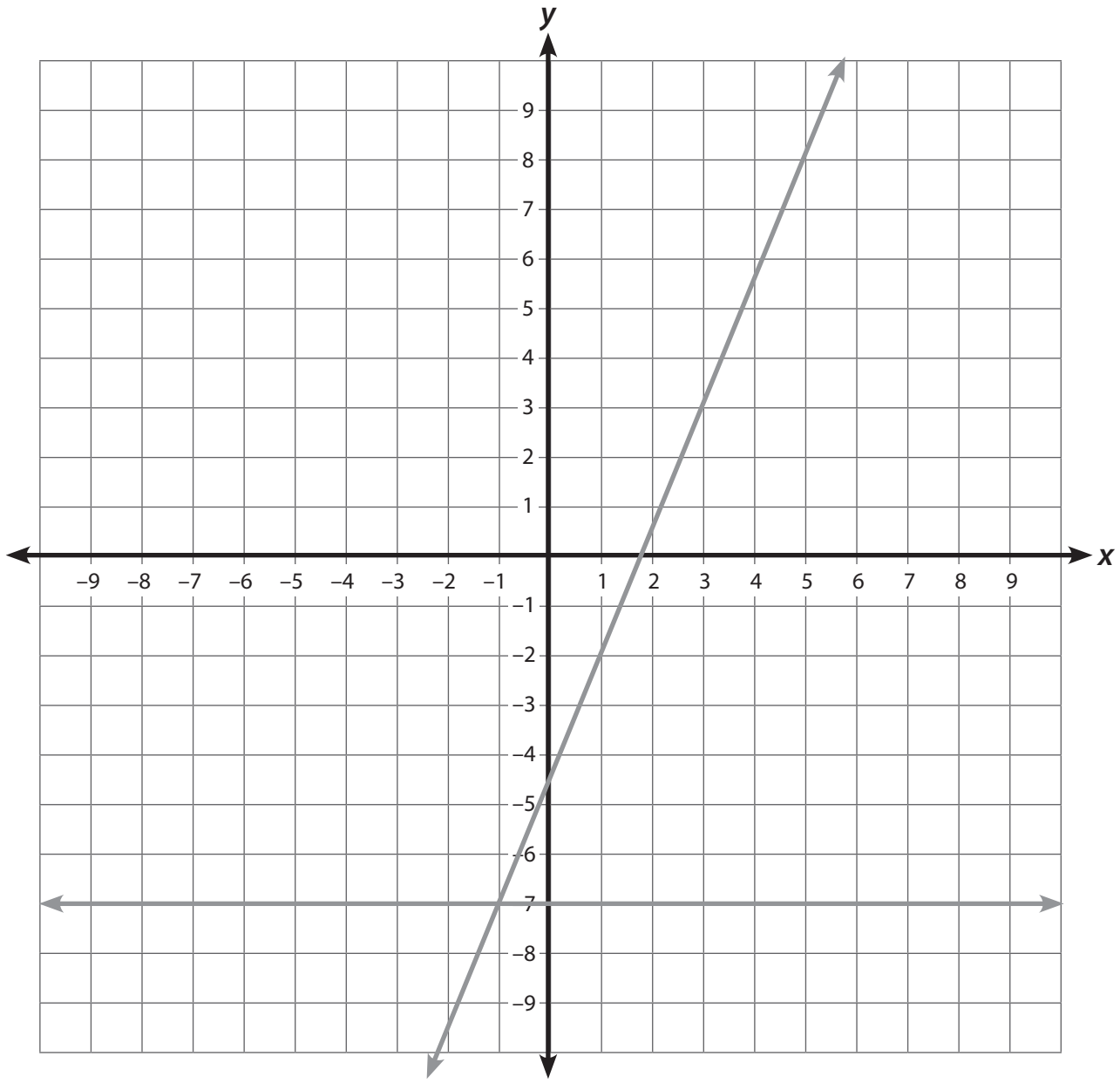
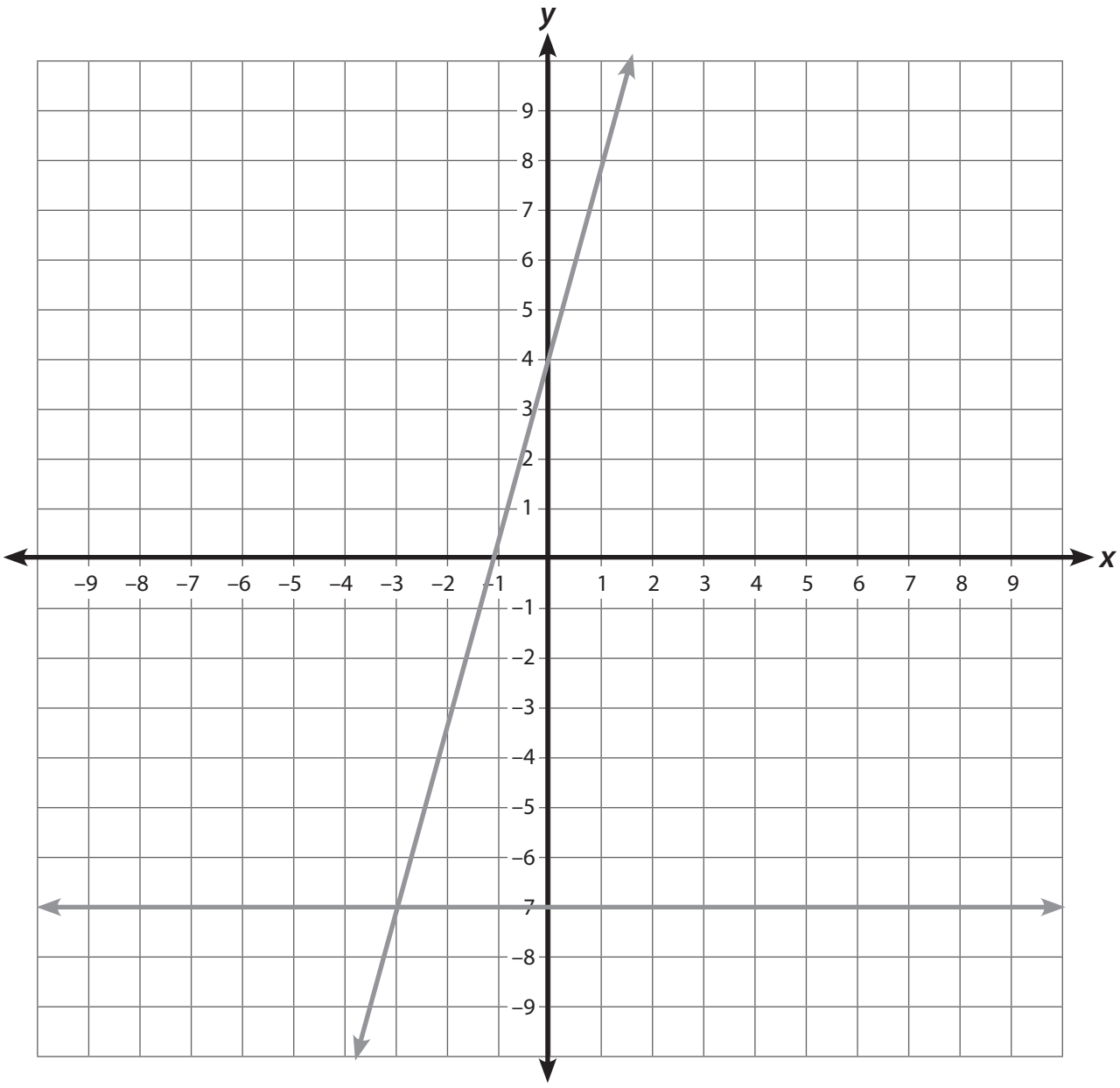
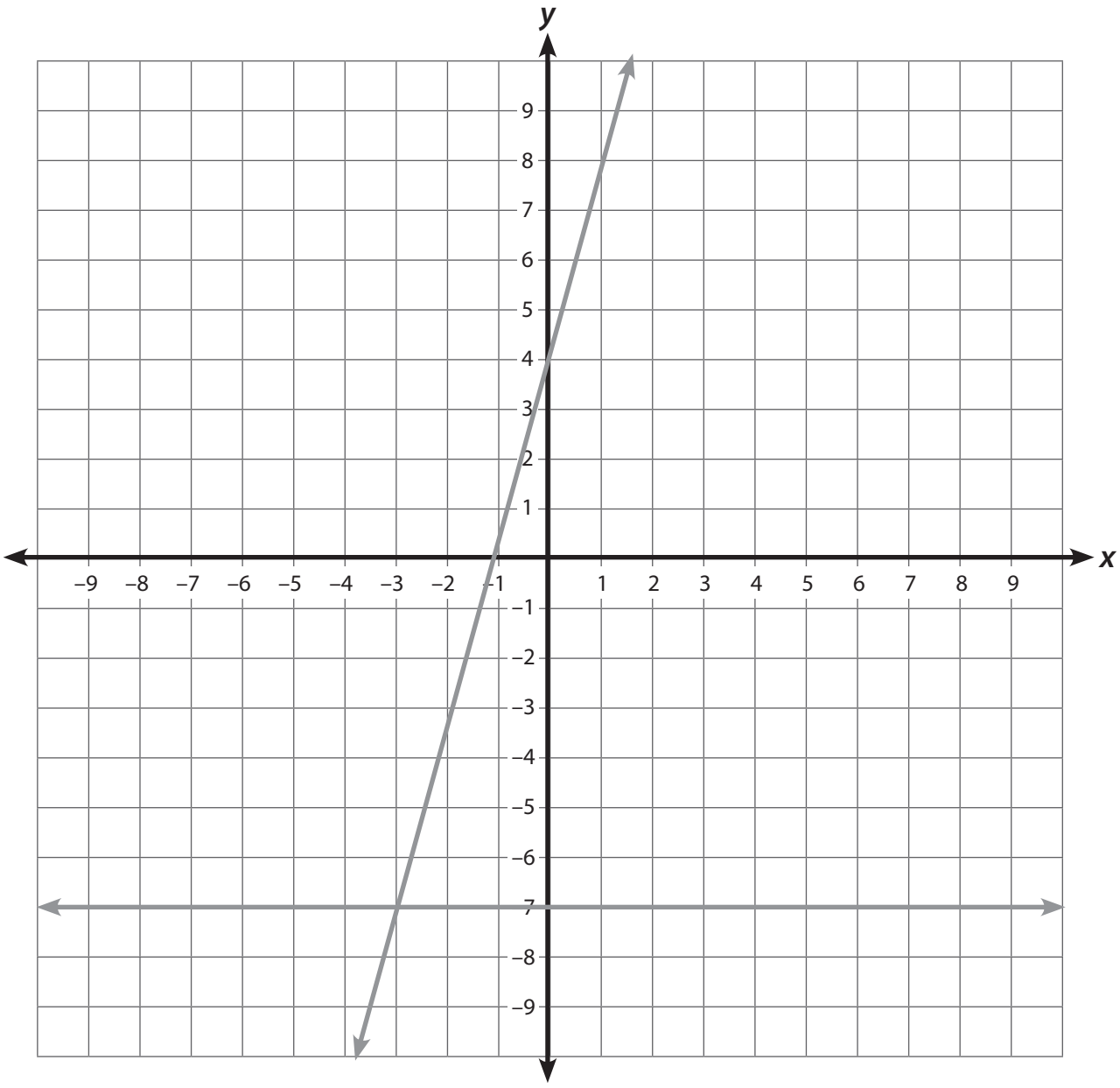


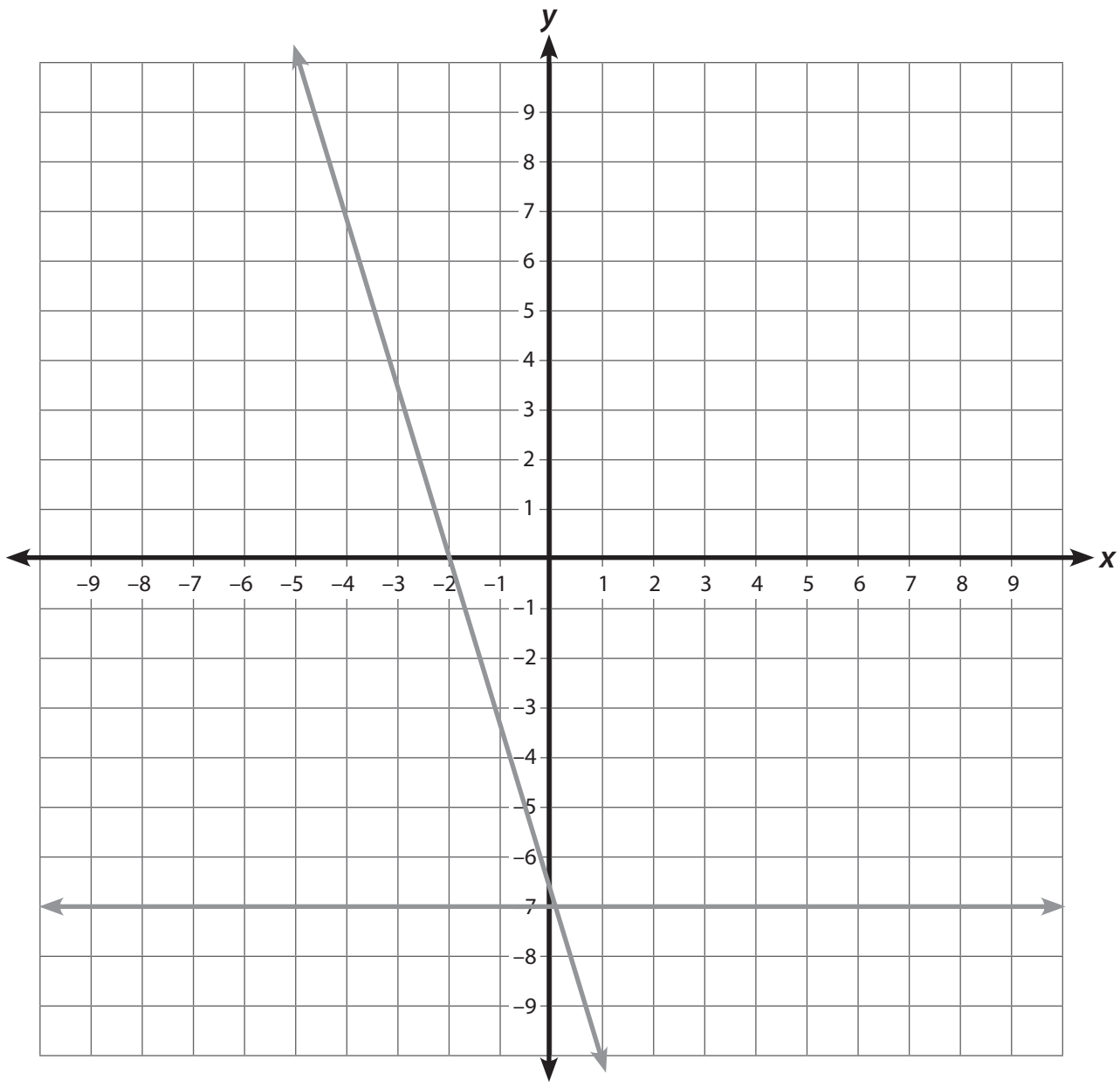
b.



b.



c.



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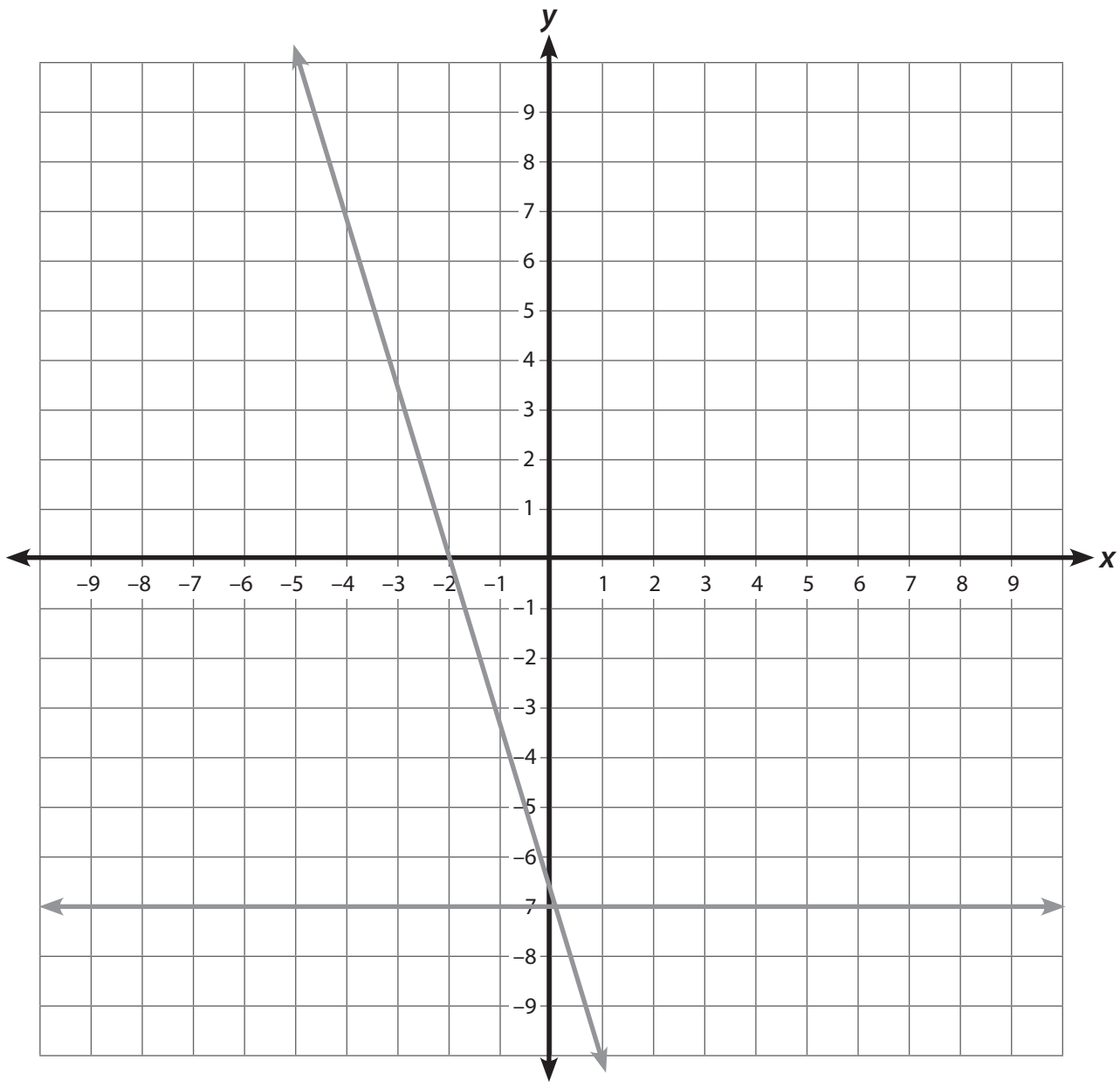

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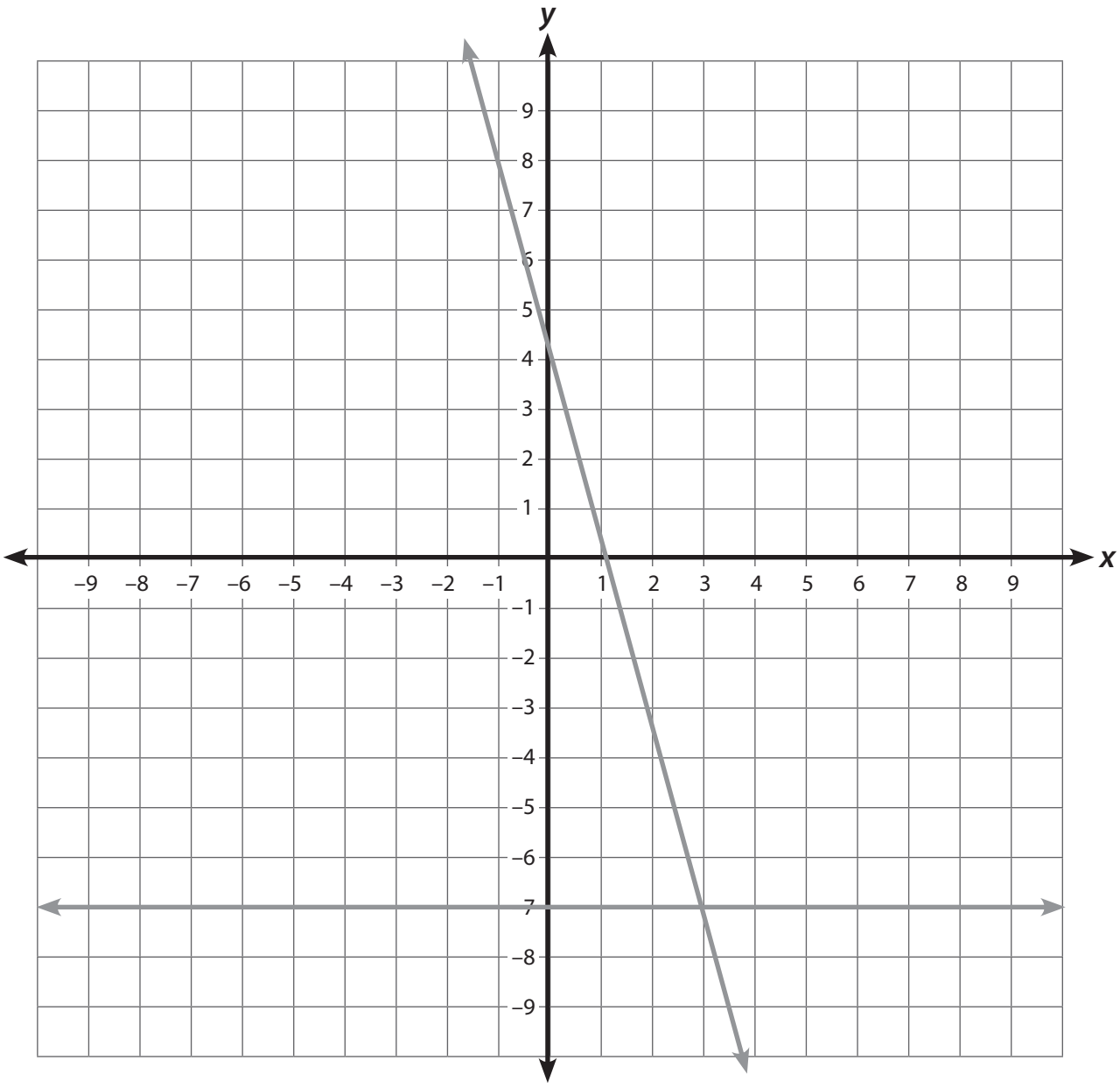
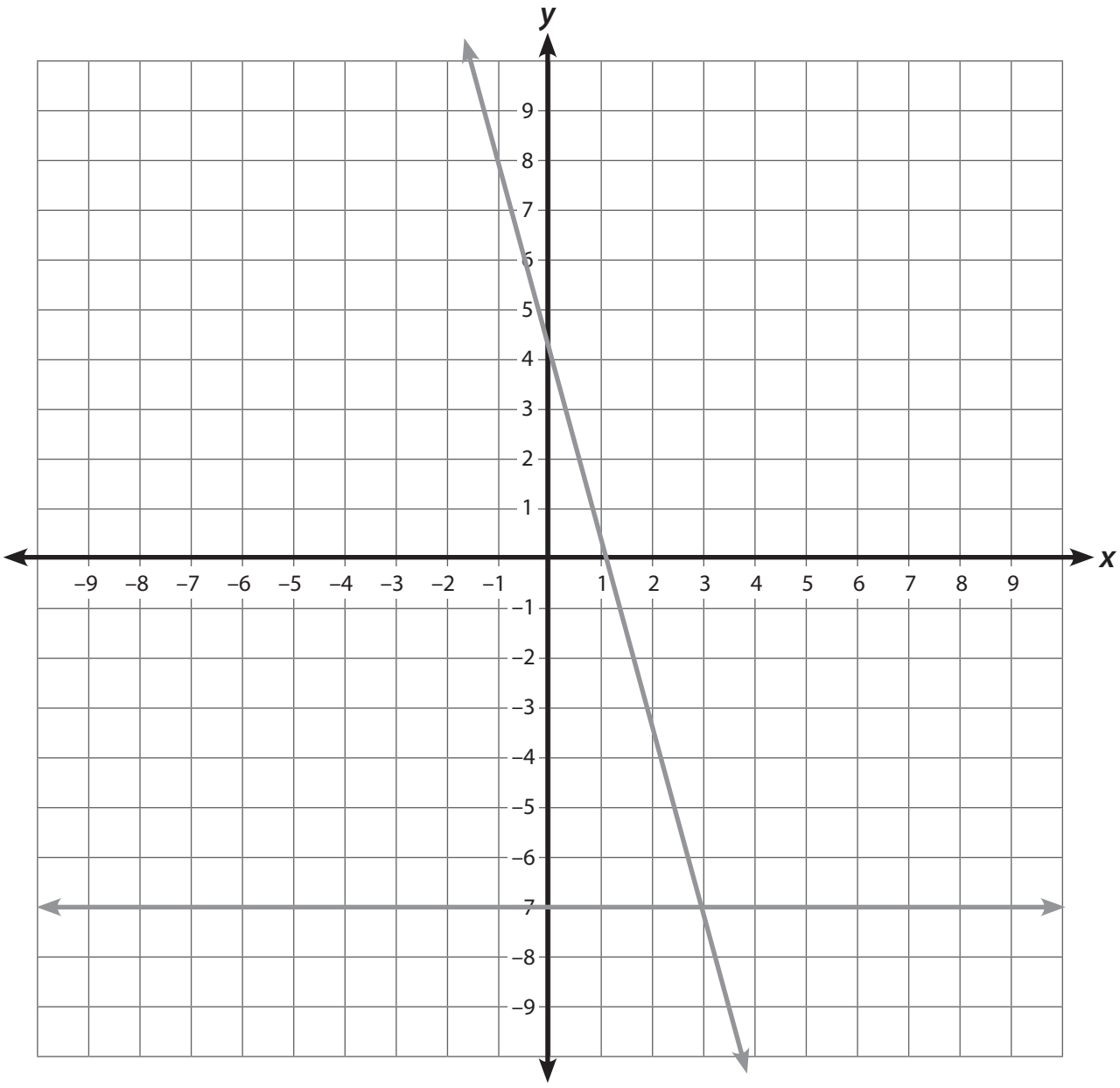


d.



4. What is the solution to the equation?

a. The solution is $g = 3$.

b. The solution is $g = -3$.

c. The solution is $g = 1$.

d. The solution is $g = -1$.

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a. The solution is $g = 3$.

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Wrapping It Up

By graphing a line for an equation, Sterling found the solution of an equation was 3. What might the equation be?

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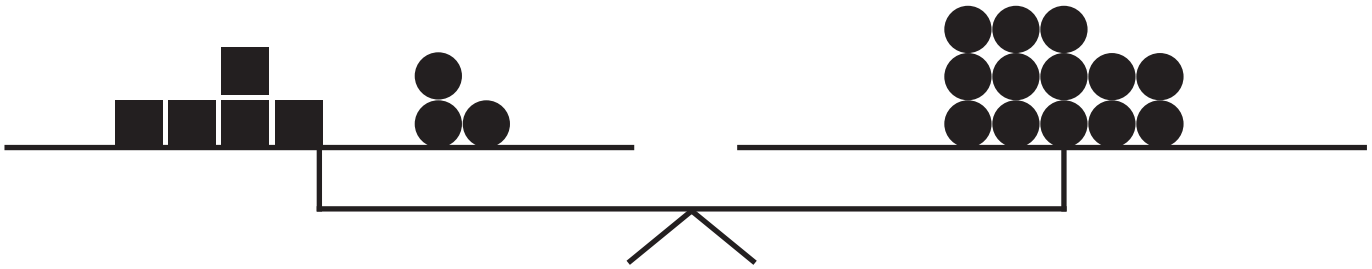
Answers will vary.

Possibilities: $2x - 4 = 2$, $3m - 7 = 2$, $x + 7 = 10$.

Warming Up:

1. Using the diagram of a scale below, determine how many circles are equal to a box. Remove boxes and circles until you have only 1 box on 1 side of the scale.

2. As you solve this problem, write the steps that you took. For example, for step 1, you could write, "I removed 3 circles from each side of the scale."



Steps:

1.

2.

3.

4.

5.

1 box = _____ circles

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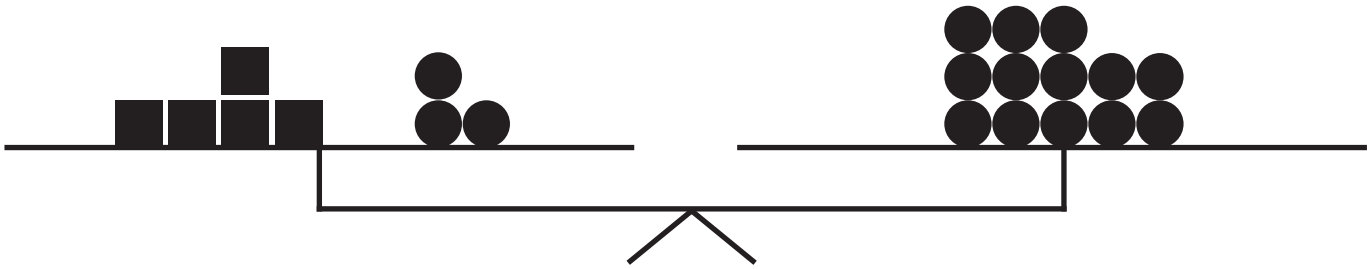


Steps:

1.

2.

3.

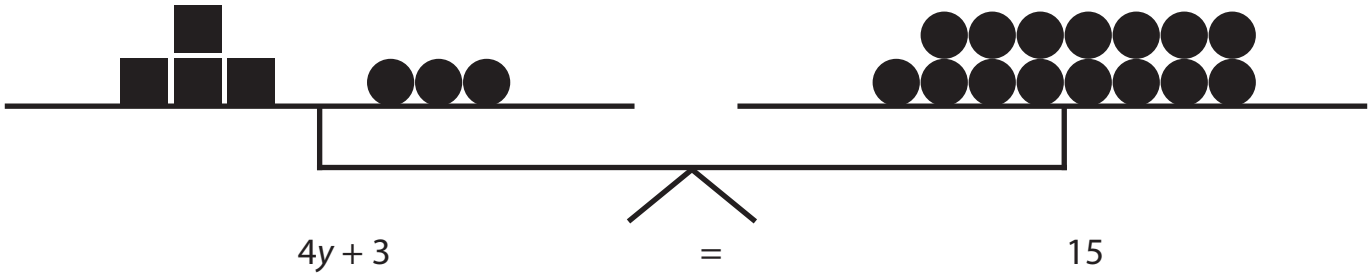
4.

5.

1 box = 2 circles

Learning to Solve:

$4y + 3 = 15$



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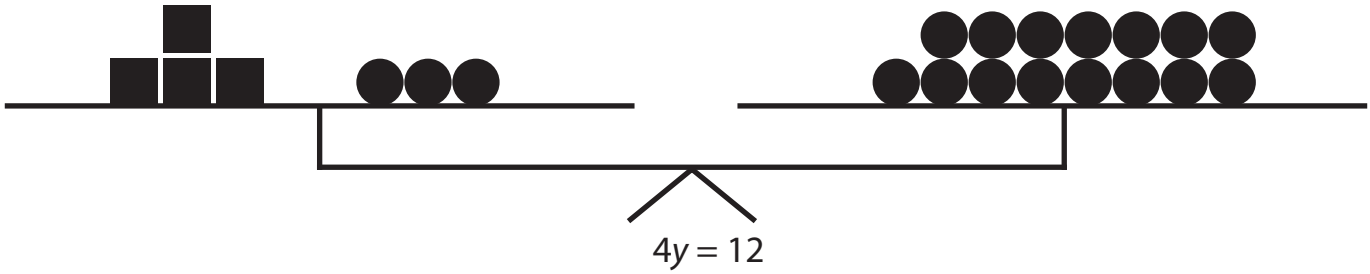
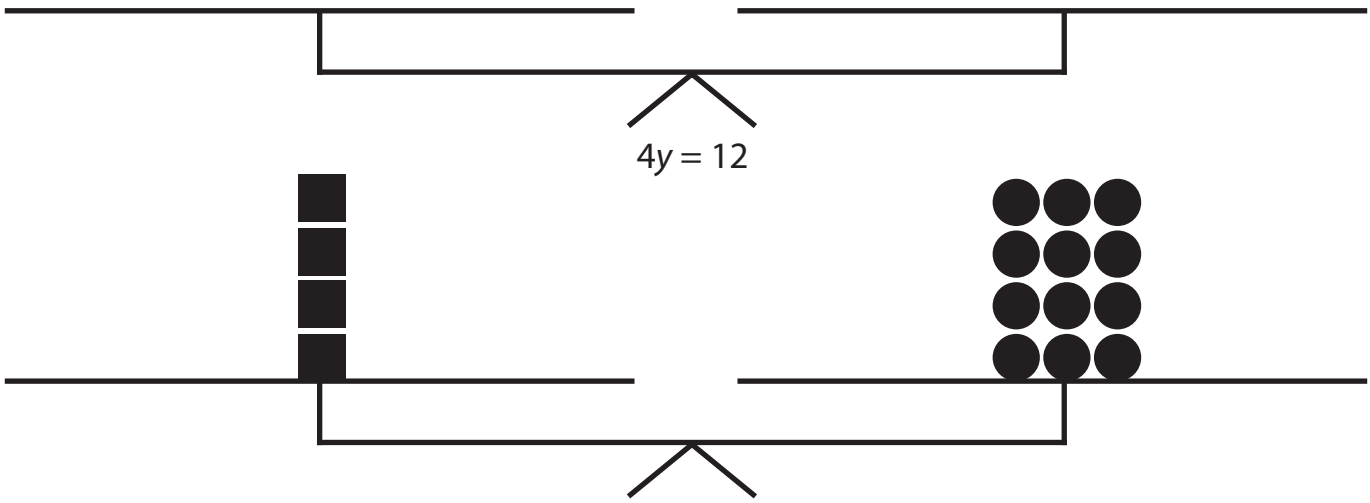


$4y = 12$

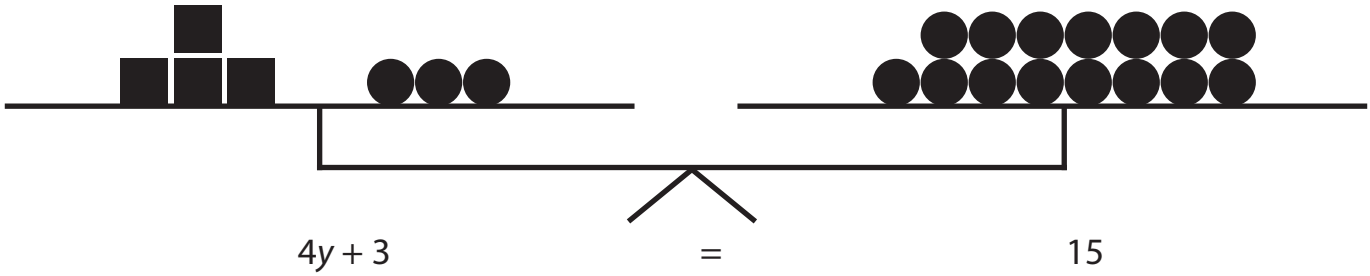
How could we find out how many circles are equal to 1 *y*?

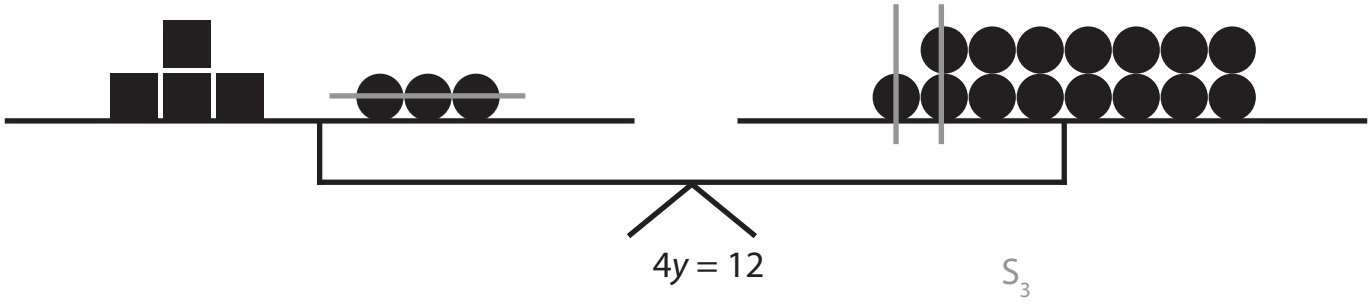


$4y = 12$

Learning to Solve:

$4y + 3 = 15$





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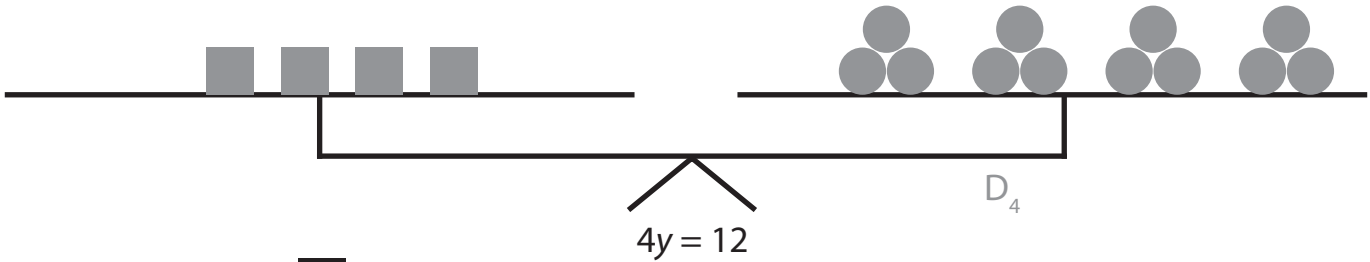

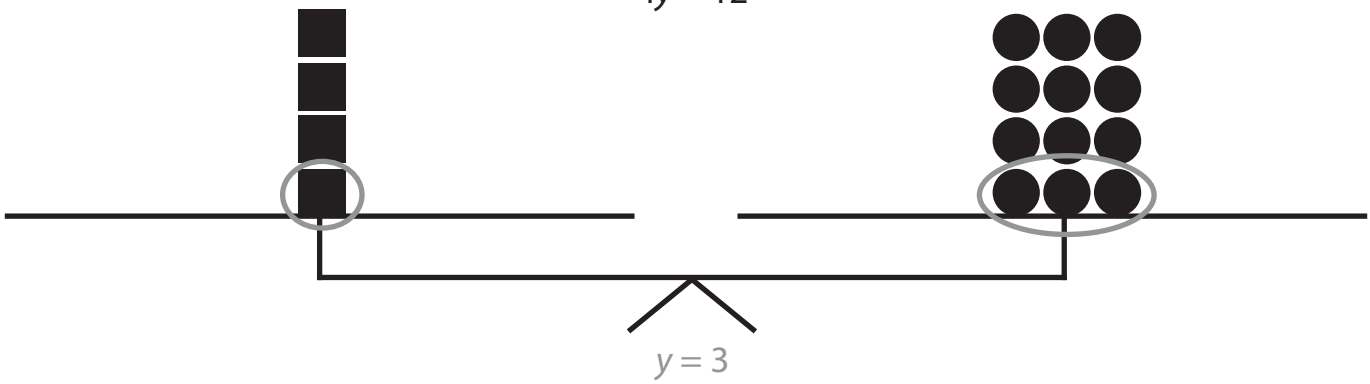

Symbol	Meaning
A_3	Add 3
S_3	Subtract 3
M_3	Multiply by 3
D_3	Divide by 3
DPMA	Distributive property of multiplication over addition

Practicing Together:

1. Draw squares to represent the variable and circles to represent the constant number in each expression of the equation.

2. Show each of your steps on the scale.

3. Write the symbolic representation of each step below the scales.

4. Solve for the variable.

$$7 + 2x = 19$$

Step 1:

Step 2:

Step 3:

Step 4:

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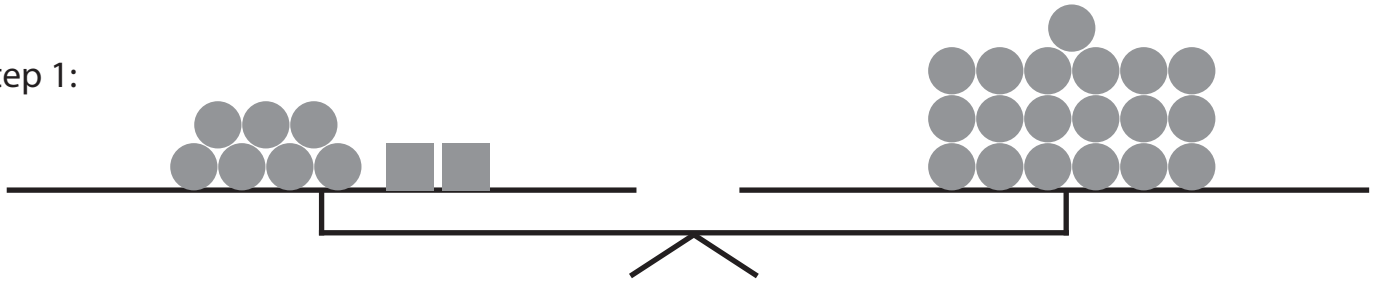
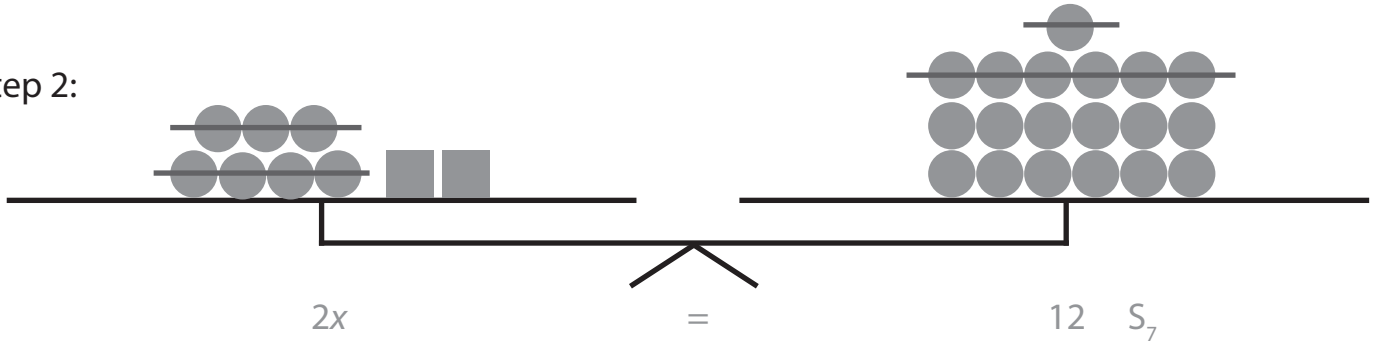


Step 2:



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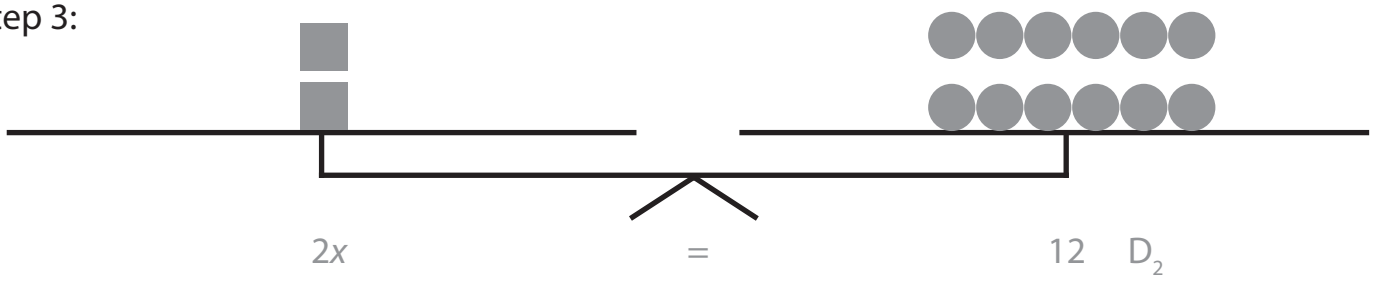
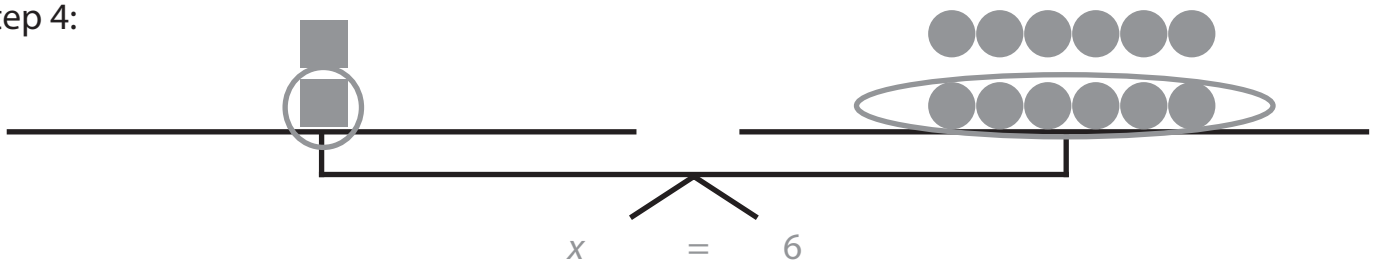


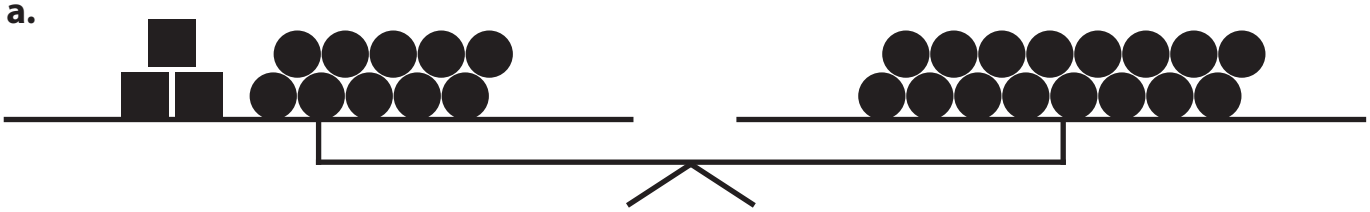
Step 4:



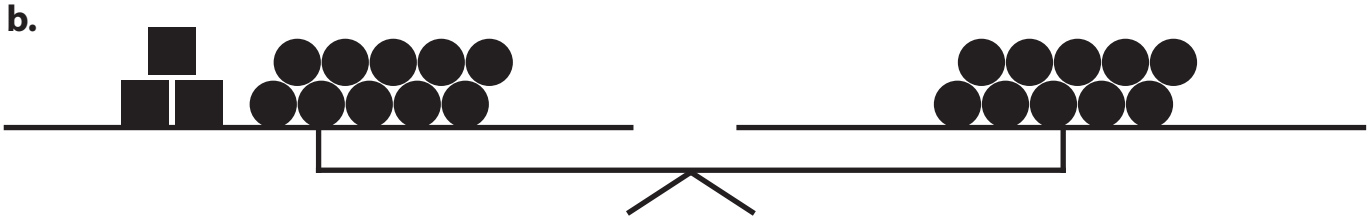
Trying It on Your Own

1. Which diagram could be used to solve the equation $3k + 10 = 16$?

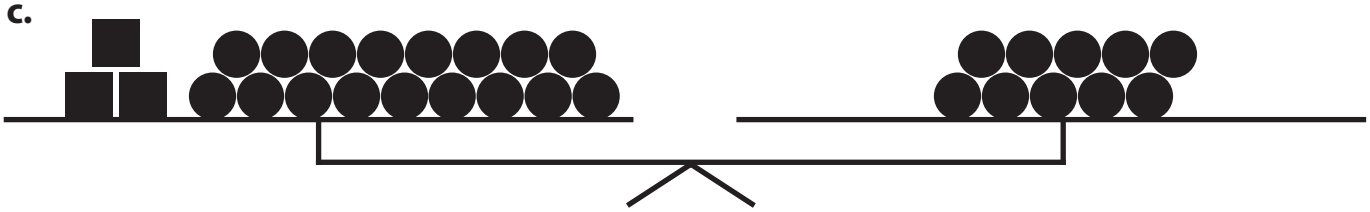
a.



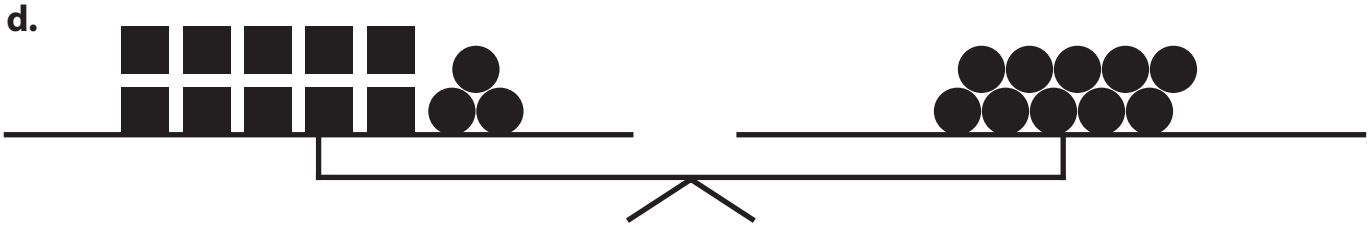
b.



c.



d.



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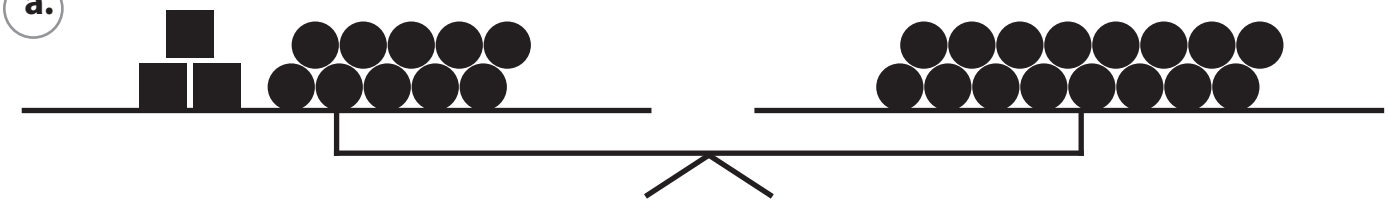
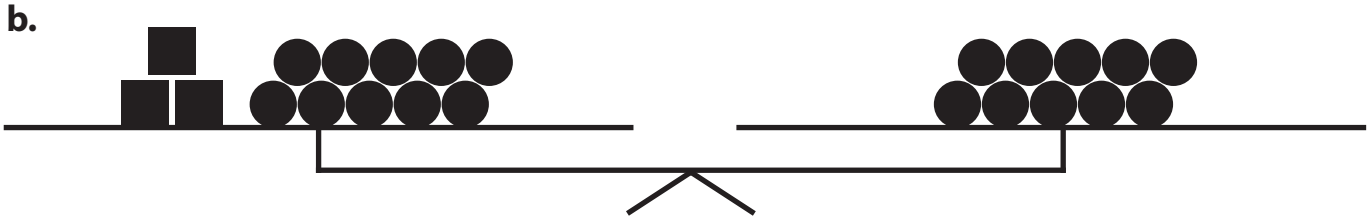


b.



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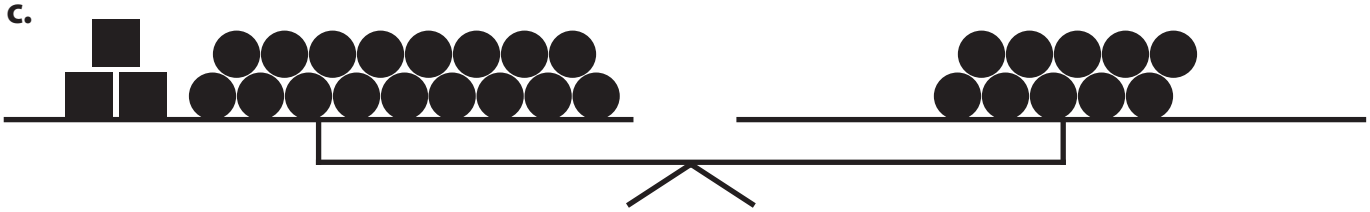
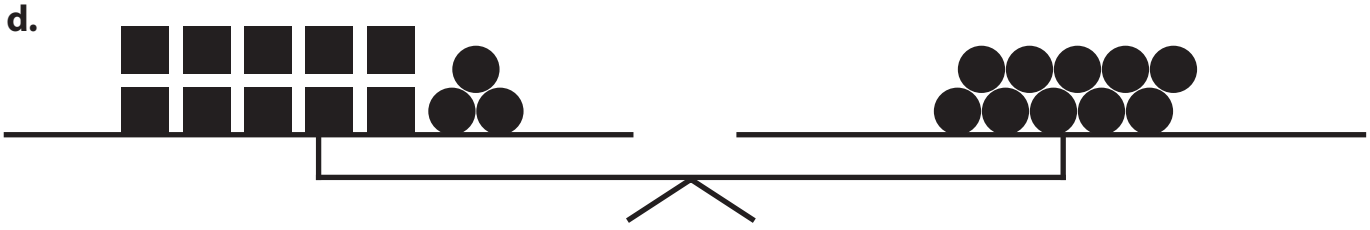


d.



Use the diagram selected for problem 1 to solve problems 2 through 4.

2. For the first step, Penny removed the constant from both sides of the diagram. Which of the following would show that step?

a. A_{10}

b. S_{10}

c. D_{10}

d. M_{10}

3. For the second step, Penny regrouped the symbols on the right side of the diagram. Which of the following would show that step?

a. A_3

b. S_3

c. M_3

d. D_3

Use the diagram selected for problem 1 to solve problems 2 through 4.

2. For the first step, Penny removed the constant from both sides of the diagram. Which of the following would show that step?

a. A_{10}

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d. M_{10}

3. For the second step, Penny regrouped the symbols on the right side of the diagram. Which of the following would show that step?

a. A_3

b. S_3

c. M_3

d. D_3

4. What is the solution to the equation?

a. The solution to the equation is $k = 16$.

b. The solution to the equation is $k = 10$.

c. The solution to the equation is $k = 3$.

d. The solution to the equation is $k = 2$.

4. What is the solution to the equation?

a. The solution to the equation is $k = 16$.

b. The solution to the equation is $k = 10$.

c. The solution to the equation is $k = 3$.

d. The solution to the equation is $k = 2$.

Wrapping It Up

Perform the operation indicated. Express your answer in simplified form.

1. Subtract 5 from $3n + 5$.

2. Add 7 to $2m$.

3. Subtract d from $4d - 9$.

Wrapping It Up

Perform the operation indicated. Express your answer in simplified form.

1. Subtract 5 from $3n + 5$.

$3n$

2. Add 7 to $2m$.

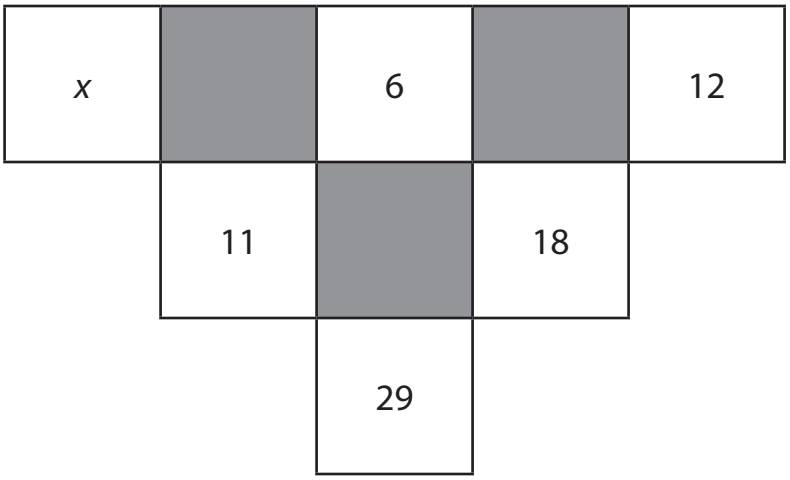
$2m + 7$

3. Subtract d from $4d - 9$.

$3d - 9$

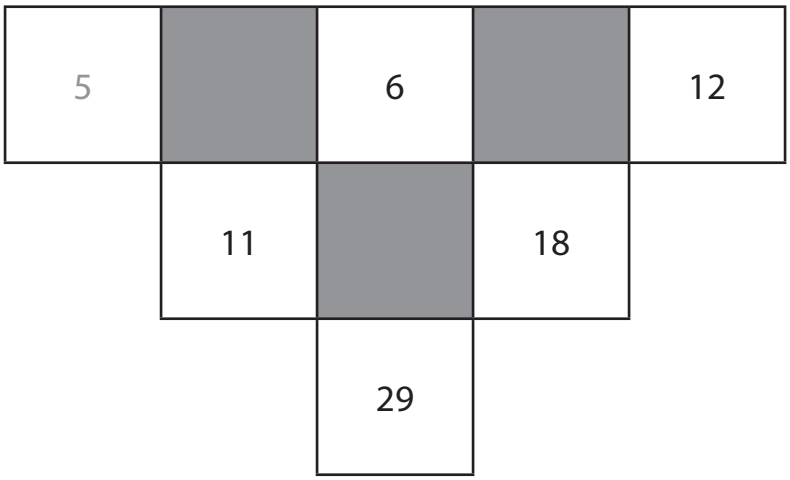
Warming Up:

In the pyramid below, the number in a box is the sum of the two numbers in white boxes above it. For example, 18 = 6 + 12. Fill in the blank in this pyramid.



Warming Up:

In the pyramid below, the number in a box is the sum of the two numbers in white boxes above it. For example, 18 = 6 + 12. Fill in the blank in this pyramid.



Learning to Solve:

2 less than the product of 9 times a number is equal to 16. What is the number?

1. Write an equation to help solve the problem.

2. Solve the equation by working backward.

To solve this equation, I will start with 16 and undo the operations.

Learning to Solve:

2 less than the product of 9 times a number is equal to 16. What is the number?

1. Write an equation to help solve the problem.

$9m - 2 = 16$

2. Solve the equation by working backward.

To solve this equation, I will start with 16 and undo the operations.

Because subtracting 2 from $9m$ equals 16, $9m$ must equal 18.

Since the product of 9 and a number m is equal to 18, m must equal 2.

$m = 2$

Practicing Together:

For each problem, complete the following 3 steps:

A. Write an equation to help solve the problem (if needed).

B. In the boxes, write the working backward steps you used to solve the problem.

C. Write the solution to the equation.

1. 3 added to 7 times a number is equal to 17.

A.

B.

C.

Practicing Together:

For each problem, complete the following 3 steps:

A. Write an equation to help solve the problem (if needed).

B. In the boxes, write the working backward steps you used to solve the problem.

C. Write the solution to the equation.

1. 3 added to 7 times a number is equal to 17.

A. $7f + 3 = 17$

B.

Answers may vary. For example, students may say, If 3 is added to $7f$ to get 17, then $7f$ must be 14.

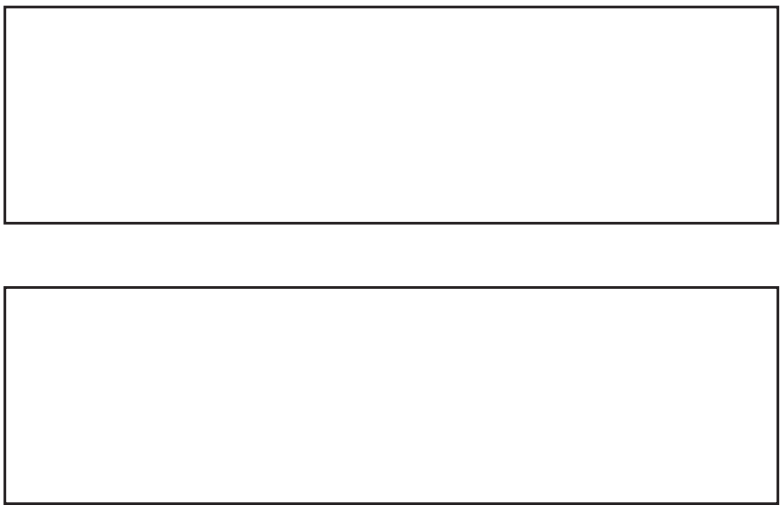
Answers may vary. For example, students may say that a number multiplied by 7 is 14, then that number must be 2.

C. $f = 2$

2. The difference between 3 times a number and 2 is 13.

A.

B.



C.

2. The difference between 3 times a number and 2 is 13.

A. $3r - 2 = 13$

B.

Answers may vary. For example, students may say that if 2 is subtracted from a number to get 13, the number must be 15.

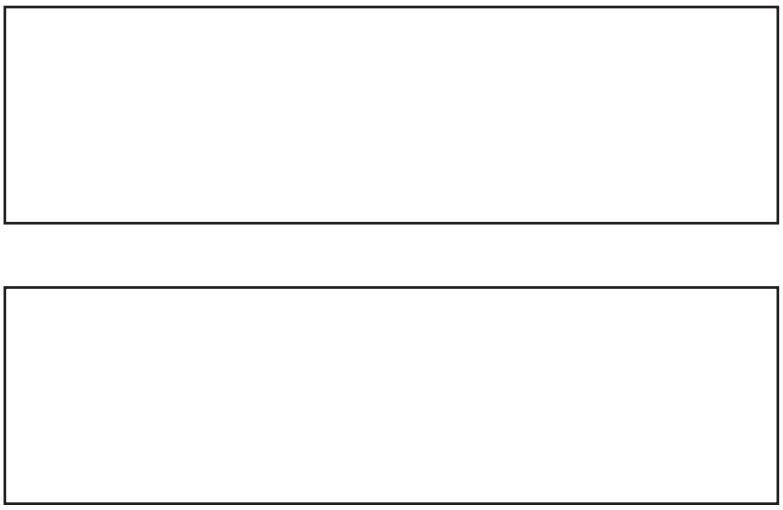
Answers may vary. For example, students may say that if a number is multiplied by 3 to get 15, then the number must be 5.

C. $r = 5$

3. 32 is 10 more than half a number.

A.

B.



C.

3. 32 is 10 more than half a number.

A. accept either $32 = \frac{1}{2}x + 10$ or $\frac{1}{2}x + 10 = 32$

B.

Answers may vary. For example, if 10 is added to a number to get 32, then the number must be 22.

Answers may vary. For example, if half of a number is 22, then the number must be 44.

C. $x = 44$

Trying It on Your Own

Solve the problems on your own.

1. The difference of 5 times a number and 6 is equal to 19. Which equation could be used to solve this problem?

a. $5m \div 6 = 19$

b. $5m - 6 = 19$

c. $5m + 6 = 19$

d. $5m \cdot 6 = 19$

2. Sam worked backward to solve the equation $45 = 4d + 9$. Which of the following could describe his thinking?

a. First, because 9 is added to $4d$, add 9 to 45. Then, divide the sum by 4 because $4d$ means multiplication.

b. First, because 9 is added to $4d$, subtract it from 45. Then, divide the difference by 4 because $4d$ means multiplication.

c. First, because 4 is multiplied by d, divide by 4. Then, because 9 is being added, subtract it from 45.

d. First, because 4 is multiplied by d, multiply 45 by 4. Then, because 9 is being added, add 9 to the product.

Trying It on Your Own

Solve the problems on your own.

1. The difference of 5 times a number and 6 is equal to 19. Which equation could be used to solve this problem?

a. $5m \div 6 = 19$

b. $5m - 6 = 19$

c. $5m + 6 = 19$

d. $5m \cdot 6 = 19$

2. Sam worked backward to solve the equation $45 = 4d + 9$. Which of the following could describe his thinking?

a. First, because 9 is added to $4d$, add 9 to 45. Then, divide the sum by 4 because $4d$ means multiplication.

b. First, because 9 is added to $4d$, subtract it from 45. Then, divide the difference by 4 because $4d$ means multiplication.

c. First, because 4 is multiplied by d, divide by 4. Then, because 9 is being added, subtract it from 45.

d. First, because 4 is multiplied by d, multiply 45 by 4. Then, because 9 is being added, add 9 to the product.

3. Solve by working backward: $8h + 3 = 27$.

a. First, add 3 to 27. Then, subtract 8 from 30. The solution is $h = 22$.

b. First, think that if 3 is added to $8h$, then subtract it from 27. Then, because 8 is multiplied by h, multiply it by 24. The solution is $h = 192$.

c. First, think that if 3 is added to $8h$, then subtract it from 27. Then, because 8 is multiplied by h, divide it into 24. The solution is $h = 3$.

d. First, think that if 8 is multiplied by h, divide $8h$ by 8. Then, subtract 3 from 27. The solution is $h = 24$.

4. Karen solved $6 = 3h - 15$. Which of the following might be the first step she used when working backward?

a. Think, if h is multiplied by 3, divide by 3.

b. Think, if h is multiplied by 3, multiply 6 by 3.

c. Think, if 15 is being subtracted, subtract it from 6.

d. Think, if 15 is being subtracted, add it to 6.

3. Solve by working backward: $8h + 3 = 27$.

a. First, add 3 to 27. Then, subtract 8 from 30. The solution is $h = 22$.

b. First, think that if 3 is added to $8h$, then subtract it from 27. Then, because 8 is multiplied by h, multiply it by 24. The solution is $h = 192$.

c. First, think that if 3 is added to $8h$, then subtract it from 27. Then, because 8 is multiplied by h, divide it into 24. The solution is $h = 3$.

d. First, think that if 8 is multiplied by h, divide $8h$ by 8. Then, subtract 3 from 27. The solution is $h = 24$.

4. Karen solved $6 = 3h - 15$. Which of the following might be the first step she used when working backward?

a. Think, if h is multiplied by 3, divide by 3.

b. Think, if h is multiplied by 3, multiply 6 by 3.

c. Think, if 15 is being subtracted, subtract it from 6.

d. Think, if 15 is being subtracted, add it to 6.

Wrapping It Up

I am thinking of a number. If I multiply the sum of my number and 6 by 3 and then add 9, the result is 33. What is my number?

Wrapping It Up

I am thinking of a number. If I multiply the sum of my number and 6 by 3 and then add 9, the result is 33. What is my number?

The number is 2.

Warming Up:

Solve each equation using any method you prefer.

1. $3m + 1 = 4$

2. $2 + 7x = 16$

3. $10 = 4r - 2$

4. $5g - 4 = 6$

5. $3 = 2h - 1$

Warming Up:

Solve each equation using any method you prefer.

1. $3m + 1 = 4$

$m = 1$

2. $2 + 7x = 16$

$x = 2$

3. $10 = 4r - 2$

$r = 3$

4. $5g - 4 = 6$

$g = 2$

5. $3 = 2h - 1$

$h = 2$

Learning to Solve:

We learned 5 different methods to solve equations:

1. Guess-and-test

2. Create a table

3. Draw a graph

4. Draw a diagram

5. Work backward

Use the method given to find the value of the variable that makes the equation true.

1. ***Method:*** Guess and test

$13 = 4p - 3$

2. ***Method:*** Create a table

$5 + 2j = -1$

j	$5 + 2j$

Learning to Solve:

We learned 5 different methods to solve equations:

1. Guess-and-test

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Use the method given to find the value of the variable that makes the equation true.

1. ***Method:*** Guess and test

$13 = 4p - 3$

$p = 4$

2. ***Method:*** Create a table

$5 + 2j = -1$

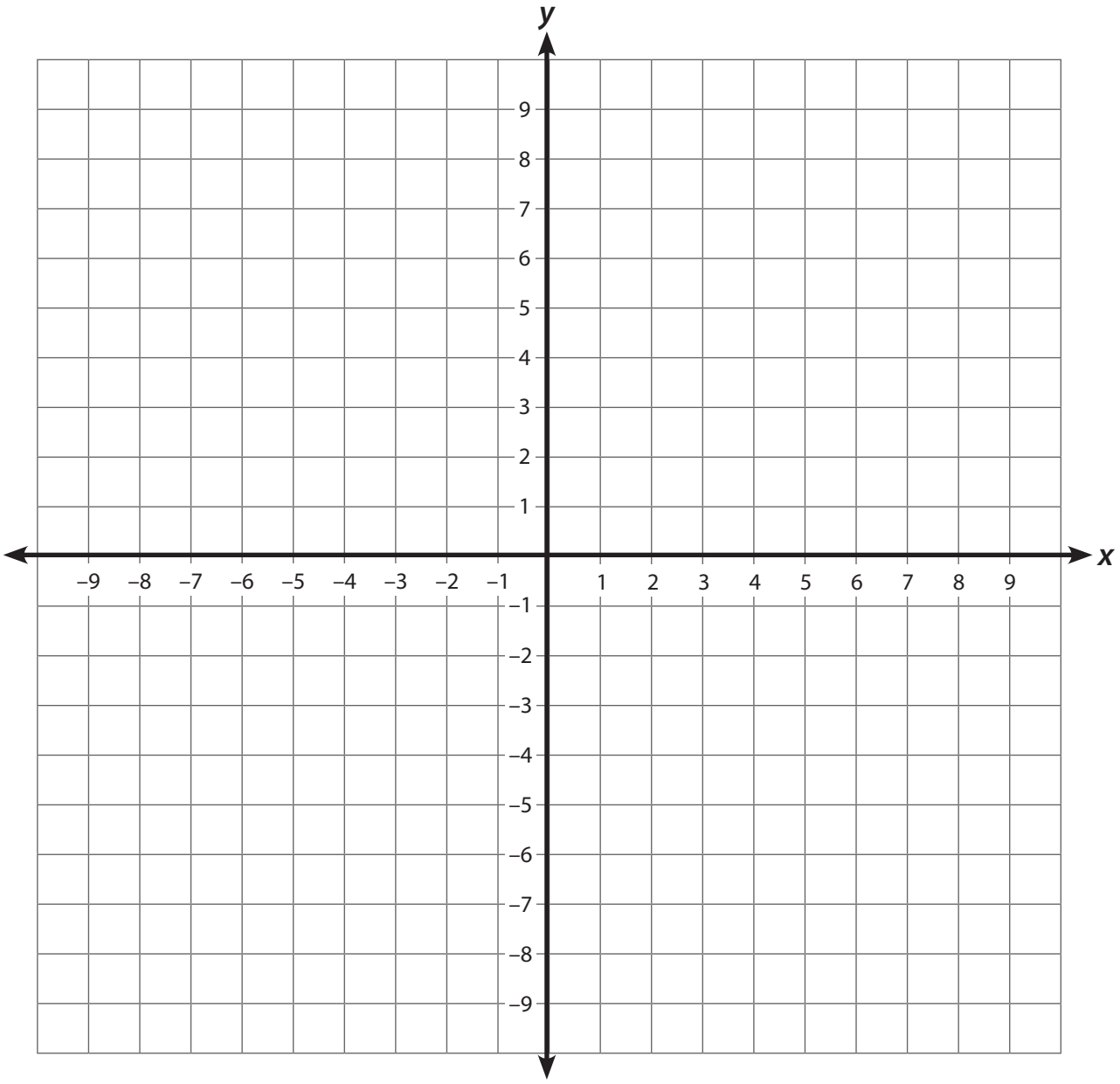
$j = -3$ Answers may vary in the table. Samples are included.

j	$5 + 2j$
0	5
–2	1
–3	–1

3. ***Method:*** Draw a graph

$5d + 3 = -7$

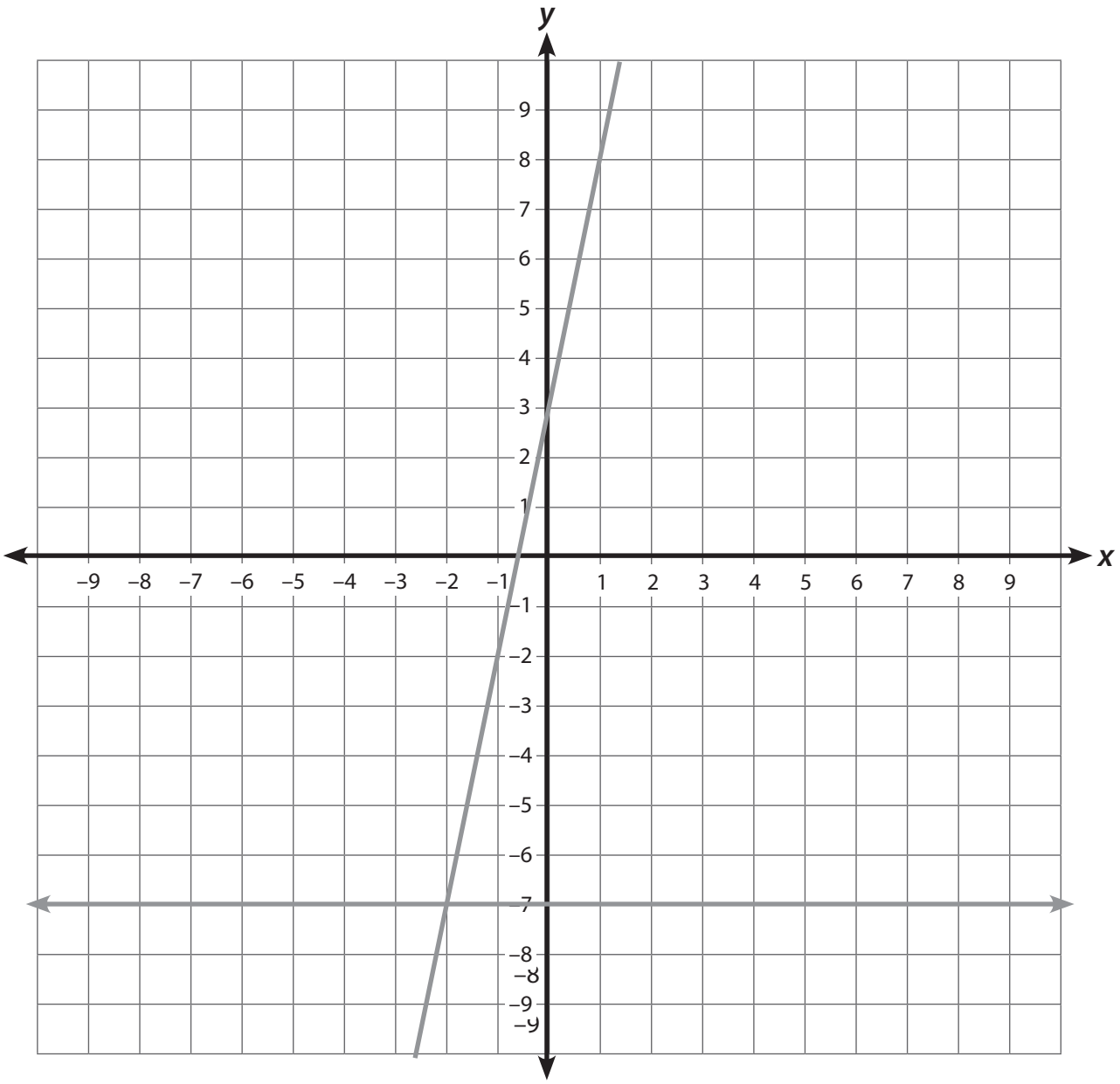
d	$5d + 3$	Ordered Pair



3. ***Method:*** Draw a graph

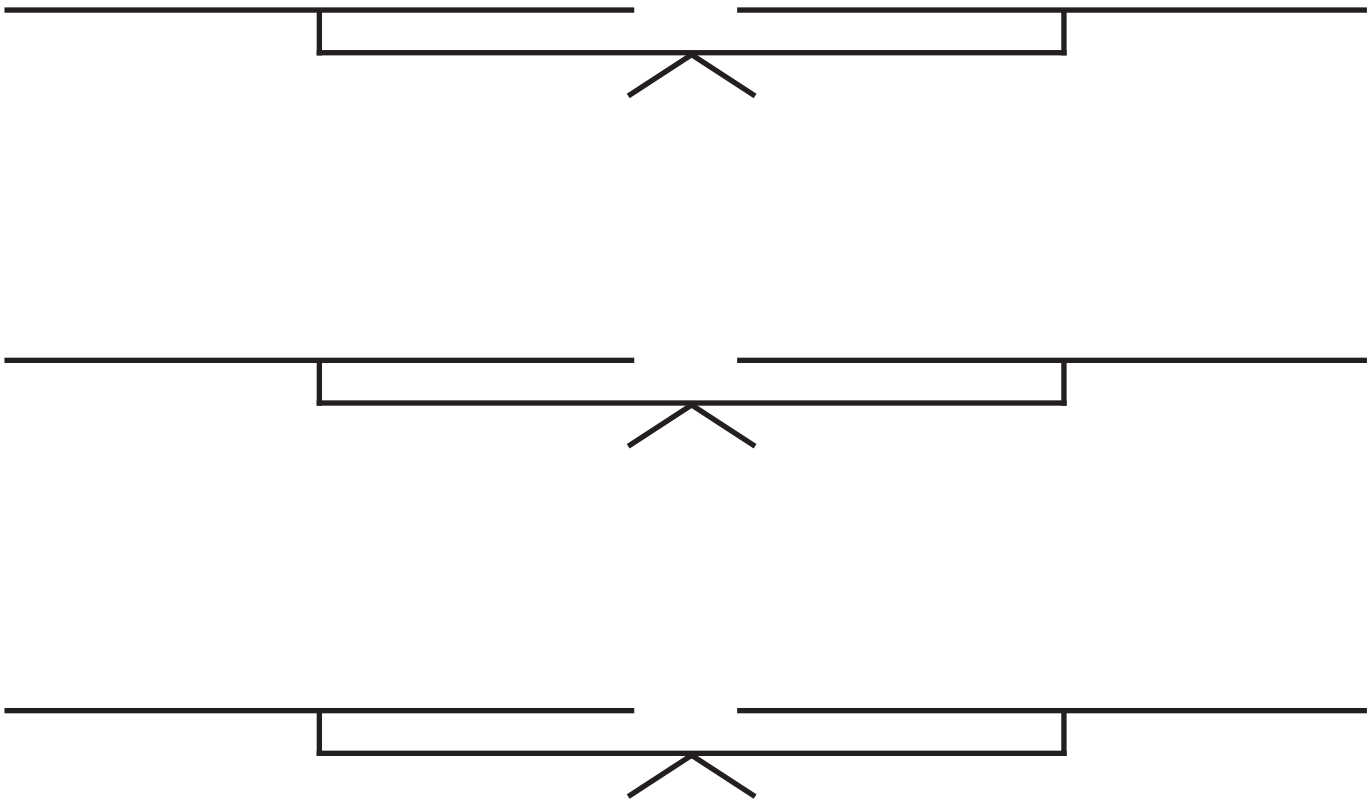
$5d + 3 = -7$ $d = -2$ Answers may vary in the table. Samples are provided.

d	$5d + 3$	Ordered Pair
1	8	(1, 8)
0	3	(0, 3)
–1	–2	(–1, –2)
–2	–7	(–2, –7)



4. ***Method:*** Draw a diagram

$3f + 2 = 17$

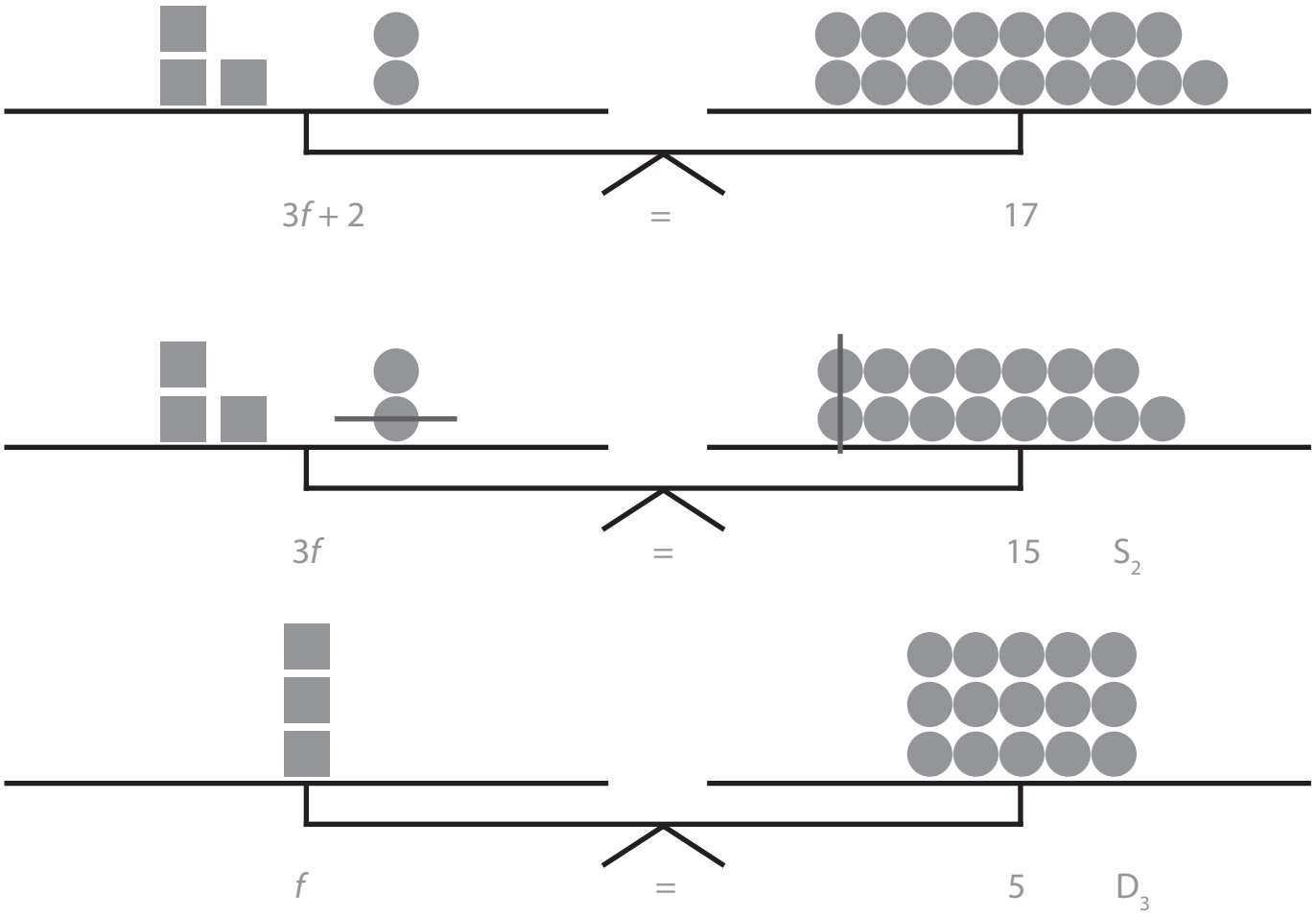


5. ***Method:*** Work backward

$9 = 8r - 7$

4. ***Method:*** Draw a diagram

$3f + 2 = 17$



5. ***Method:*** Work backward

$9 = 8r - 7$

$r = 2$

Trying It on Your Own

Work on your own to solve the problems.

1. Kim solved the equation $3n - 9 = -3$ by using a graph. What is the ordered pair that gives the solution to the equation?

a. (–3, 2)

b. (2, –3)

c. (3, –2)

d. (–2, –3)

2. Stephen solved the equation $-1 = 5u + 4$ by working backward. Which of the following could be Stephen's first step?

a. Because 4 is added on the right side, add 4 on the right side to undo the addition.

b. Because *u* is being multiplied by 5, divide it by 5 to undo the multiplication.

c. Because *u* is being multiplied by 5, divide –1 by 5 to undo undo the multiplication.

d. Because 4 is added on the right side, subtract 4 from –1 to undo the addition.

Trying It on Your Own

Work on your own to solve the problems.

1. Kim solved the equation $3n - 9 = -3$ by using a graph. What is the ordered pair that gives the solution to the equation?

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a. Because 4 is added on the right side, add 4 on the right side to undo the addition.
b. Because *u* is being multiplied by 5, divide it by 5 to undo the multiplication.
c. Because *u* is being multiplied by 5, divide –1 by 5 to undo undo the multiplication.
d. Because 4 is added on the right side, subtract 4 from –1 to undo the addition.

3. Carmen solved the equation $6 = 6y - 24$ by guess-and-test. Which of the following is the solution to the equation?

a. The solution is $y = 24$.

b. The solution is $y = 6$.

c. The solution is $y = 5$.

d. The solution is $y = 4$.

4. Ken solved the equation $12f - 6 = 0$ by using a table. What value of the variable would make the equation true?

a. 0

b. 0.5

c. $1\frac{1}{2}$

d. 2

3. Carmen solved the equation $6 = 6y - 24$ by guess-and-test. Which of the following is the solution to the equation?

a. The solution is $y = 24$.
b. The solution is $y = 6$.
c. The solution is $y = 5$.
d. The solution is $y = 4$.

4. Ken solved the equation $12f - 6 = 0$ by using a table. What value of the variable would make the equation true?

a. 0
b. 0.5
c. $1\frac{1}{2}$
d. 2

Wrapping It Up

Write an equation whose solution is 3.

Wrapping It Up

Write an equation whose solution is 3.

Answers will vary.

For example, $4a = 15 - a$; $5 - 2a = 2a - 7$

Warming Up:

Write an algebraic expression that can be simplified to $48 - 8x$.

Warming Up:

Write an algebraic expression that can be simplified to 48 – 8*x*.

Possible answers include:

8(6 – *x*) OR

4(12 – 2*x*) OR

4(10 – 2*x*) + 8

Learning to Solve:

The cost of a piece of nautical rope at Sam's Fish Shop is $5 for the first foot and then $2 per each foot after that. Sam will make a profit only if the total cost is greater than $17. How much rope will Sam need to sell to make a profit?

1. What is the problem asking us to find?

2. What expression would we write to represent the cost of rope at Sam's Fish Shop?

3. How would we write the relationship to show the number of feet that needs to be sold to make a profit?

Learning to Solve:

The cost of a piece of nautical rope at Sam's Fish Shop is $5 for the first foot and then $2 per each foot after that. Sam will make a profit only if the total cost is greater than $17. How much rope will Sam need to sell to make a profit?

1. What is the problem asking us to find?

The number of feet of rope that a customer must buy for Sam to make a profit

2. What expression would we write to represent the cost of rope at Sam's Fish Shop?

Let n + number of feet of rope, $2n + 5$

3. How would we write the relationship to show the number of feet that needs to be sold to make a profit?

$2n + 5 > 17$

4. Working with your partner, find values for n that make the inequality $2n + 5 > 17$ a true statement.

Values for *n* that make $2n + 5 > 17$ a true statement

5. Write the solution to the inequality.

4. Working with your partner, find values for n that make the inequality $2n + 5 > 17$ a true statement.

Values for *n* that make $2n + 5 > 17$ a true statement

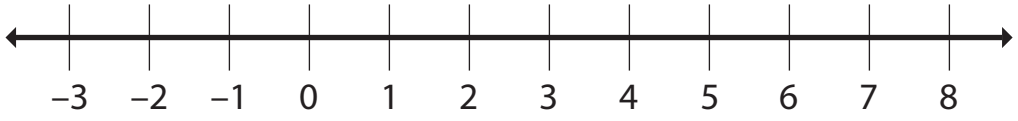
5. Write the solution to the inequality.

$n > 6$ or students may say that any value greater than 6 will make the inequality true.

6. Graph the solution on the number line.

How would the solution to the following inequality be different?

$2n + 5 \geq 17$



How are the solutions to these inequalities different from the solution to an equation?

6. Graph the solution on the number line.

How would the solution to the following inequality be different?

$2n + 5 \geq 17$

6 can be a solution or a value that would make the inequality true.

How are the solutions to these inequalities different from the solution to an equation?

Students should notice that the equations they have worked with thus far typically have 1 solution, and inequalities have many solutions.

Practicing Together:

Working with your partner, solve each problem by using any method you prefer.

Solve: $4 + 5g \leq 9$

1. Solve for the variable. Write the solution.

2. Represent the solution on a number line.

3. Select a value from your graph that makes the inequality true. Substitute it into the inequality to show that it makes the inequality true.

4. Select a value from your graph that makes the inequality false. Substitute it into the inequality to show that it makes the inequality false.

Practicing Together:

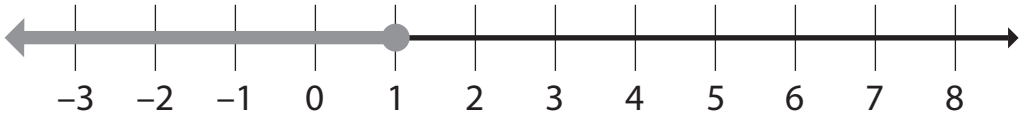
Working with your partner, solve each problem by using any method you prefer.

Solve: $4 + 5g \leq 9$

1. Solve for the variable. Write the solution.

$g \leq 1$

2. Represent the solution on a number line.



3. Select a value from your graph that makes the inequality true. Substitute it into the inequality to show that it makes the inequality true.

Answers will vary. For example: Let $g = 0$

$4 + 5g \leq 9$

$4 + 5(0) \leq 9$

$4 + 0 \leq 9$

$4 \leq 9$, which is a true statement

4. Select a value from your graph that makes the inequality false. Substitute it into the inequality to show that it makes the inequality false.

Answers will vary. For example: Let $g = 2$

$4 + 5g \leq 9$

$4 + 5(2) \leq 9$

$4 + 10 \leq 9$

$14 \leq 9$, which is a false statement

Solve: $7h - 6 > 15$

5. Solve for the variable. Write the solution.

6. Represent the solution on a number line.

7. Select a value from your graph that makes the inequality true. Substitute it into the inequality to show that it makes the inequality true.

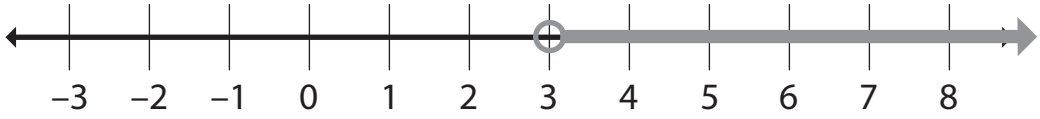
8. Select a value from your graph that makes the inequality false. Substitute it into the inequality to show that it makes the inequality false.

Solve: $7h - 6 > 15$

5. Solve for the variable. Write the solution.

$h > 3$

6. Represent the solution on a number line.



7. Select a value from your graph that makes the inequality true. Substitute it into the inequality to show that it makes the inequality true.

Answers will vary. For example: Let $h = 4$

$7h - 6 > 15$

$7(4) - 6 > 15$

$28 - 6 > 15$

$22 > 15$, which is a true statement

8. Select a value from your graph that makes the inequality false. Substitute it into the inequality to show that it makes the inequality false.

Answers will vary. For example: Let $h = 0$

$7h - 6 > 15$

$7(0) - 6 > 15$

$0 - 6 > 15$

$-6 > 15$, which is a false statement

Trying It on Your Own

1. Jessica solved the inequality $2k + 15 \geq 25$. Which of the following describes the solution to her inequality?

a. All values of k that are greater than or equal to 25 will make the inequality true.

b. All values of k that are greater than 10 will make the inequality true.

c. All values of k that are greater than or equal to 5 will make the inequality true.

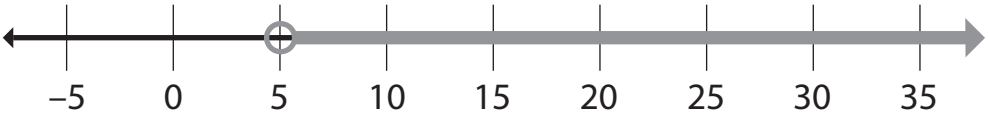
d. All the values of k that are greater than 5 will make the inequality true.

2. Which of the following graphs shows the solution to Jessica's inequality $2k + 15 \geq 25$?

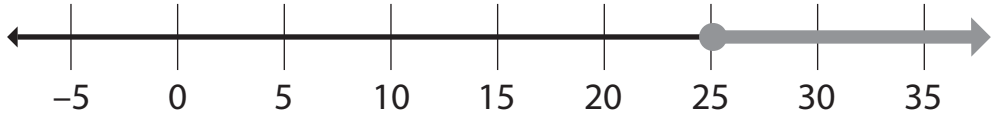
a.

b.

c.



d.



Trying It on Your Own

1. Jessica solved the inequality $2k + 15 \geq 25$. Which of the following describes the solution to her inequality?

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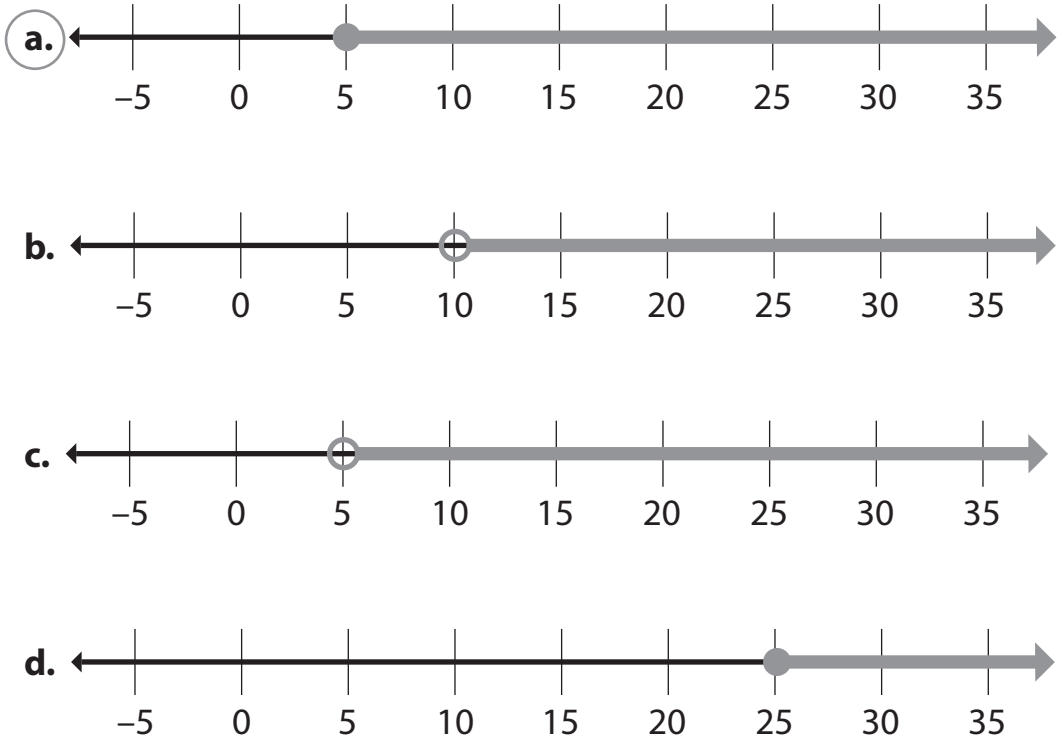
d. All the values of k that are greater than 5 will make the inequality true.

2. Which of the following graphs shows the solution to Jessica's inequality $2k + 15 \geq 25$?



3. Terry solved the inequality $4t - 3 < 13$. Which of the following describes the solution to her inequality?

a. All values of t that are greater than 4.

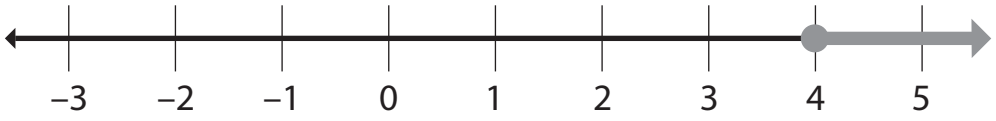
b. All values of t that are less than 4.

c. All values of t that are less than 13.

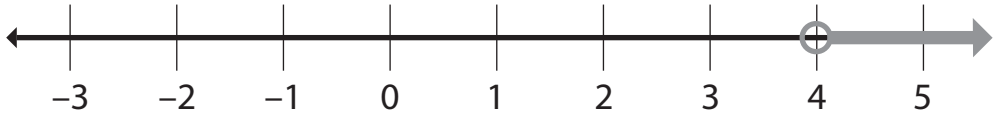
d. All values of t that are greater than –13.

4. Which of the following graphs shows the solution to the inequality $4t - 3 < 13$?

a.

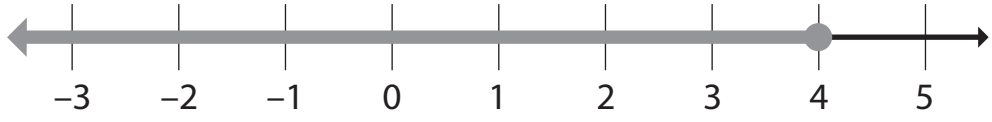


b.



c.

d.



3. Terry solved the inequality $4t - 3 < 13$. Which of the following describes the solution to her inequality?

a. All values of t that are greater than 4.

b. All values of t that are less than 4.

c. All values of t that are less than 13.

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4. Which of the following graphs shows the solution to the inequality $4t - 3 < 13$?

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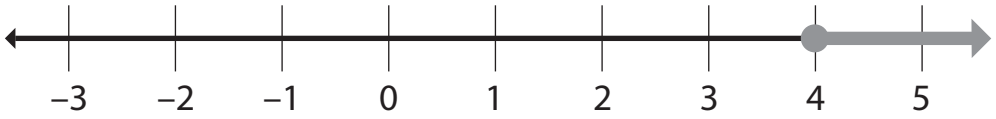
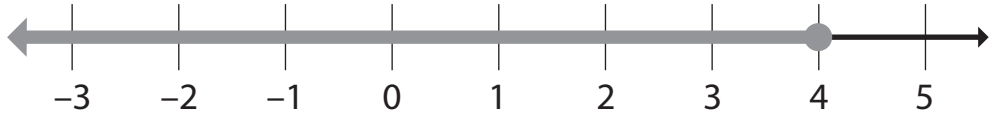


b.

c.

d.



Wrapping It Up

Oscar is thinking about selling custom-made T-shirts for $8 plus $3 for each word printed on the shirt. He wants to sell each T-shirt for $20 or more. He wants to know how many words have to be printed on the shirt to sell them for $20 or more.

He found an inequality to model the problem. He let x = the number of words. He wrote: $3x + 8 \geq 20$. He said that if $x \geq 4$, the inequity would be true. What does that mean?

Wrapping It Up

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He found an inequality to model the problem. He let x = the number of words. He wrote: $3x + 8 \geq 20$. He said that if $x \geq 4$, the inequity would be true. What does that mean?

It means that he has to print at least 4 words for the cost of the shirt to be $20 or more.

Warming Up:

Simplify each expression.

1. $3(x + 5)$

2. $4(m - 2)$

3. $-2(6p + 1)$

Warming Up:

Simplify each expression.

Accept any equivalent expression. Note that the term with the variable does not have to be the first term in the expression.

1. $3(x + 5)$

$3x + 15$

2. $4(m - 2)$

$4m - 8$

3. $-2(6p + 1)$

$-12p + (-2)$ OR $-12p - 2$

Learning to Solve:

$3(d + 2) = 12$

We will represent $d + 2$ as

Draw a representation of $3(d + 2) = 12$ on the scale.
Write "$3(d + 2)$," "=," and "12" below the appropriate section of the scale.

Looking at your model, what is another way that we can write $3(d + 2)$?
Write this expression below the $3(d + 2)$.

Learning to Solve:

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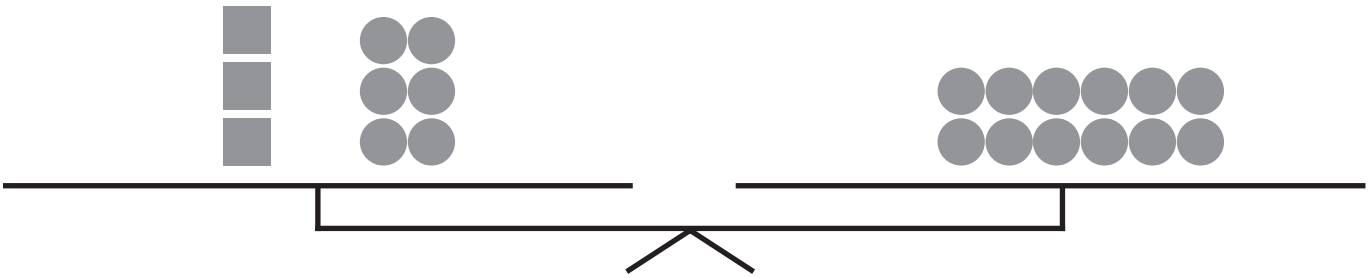
A possible representation is:



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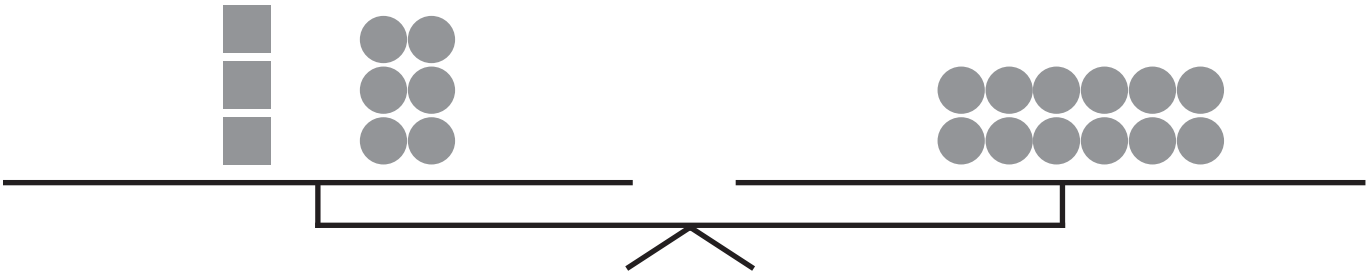
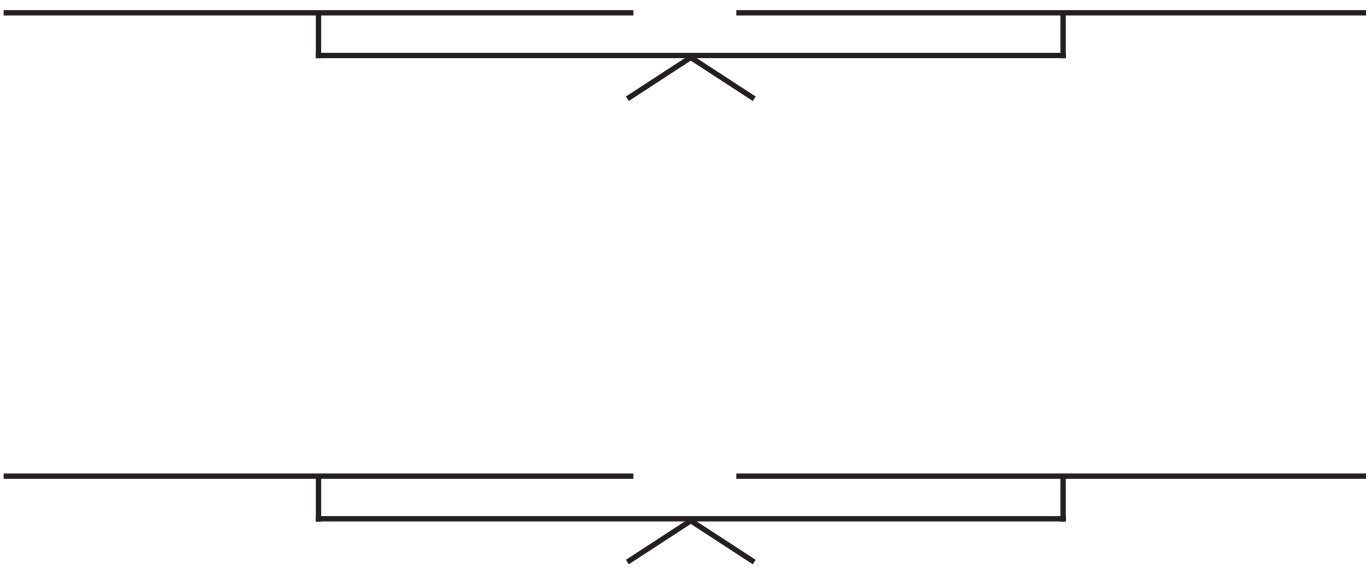


DPMA

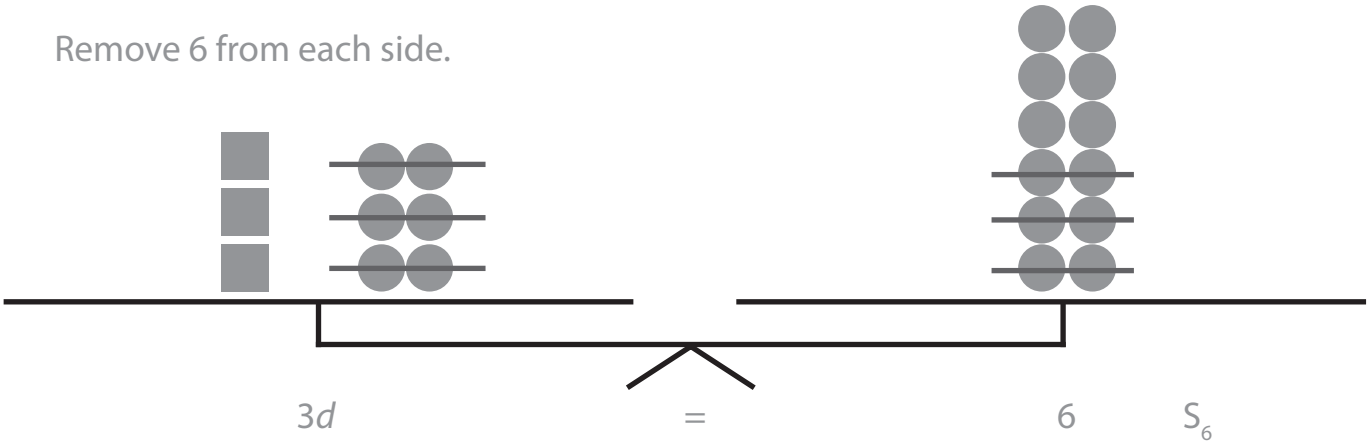
Use your diagram to find the value of d that makes the equation $3d + 6 = 12$ a true statement.



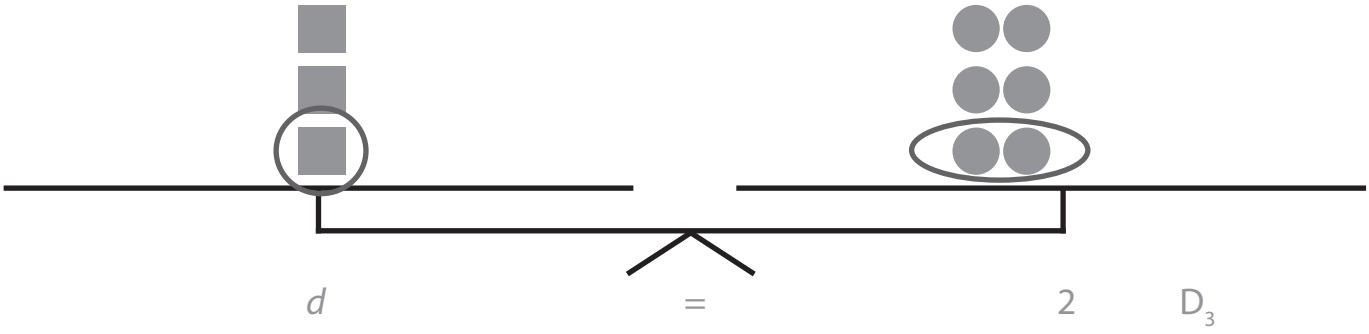
Use your diagram to find the value of *d* that makes the equation $3d + 6 = 12$ a true statement.

A possible representation is:

Remove 6 from each side.



1 *d* is equal to 2



$8 = 8(h - 4)$

Step 1: What is the first step?

What is the equation now?

Step 2: What is the next step?

Show this step:

What is the equation now?

Step 3: What is the next step?

What is the value of h?

$8 = 8(h - 4)$

Step 1: What is the first step?

Use the distributive property to simplify $8(h - 4)$

What is the equation now?

$8 = 8h - 32$

Step 2: What is the next step?

Add 32

Show this step:

$8 = 8h - 32$ A_{32}
$40 = 8h$

What is the equation now?

$40 = 8h$

Step 3: What is the next step?

Divide by 8

What is the value of h?

$40 = 8h$ D_8
$5 = h$

Practicing Together:

Working with your partner, solve each problem by using any method you prefer.

1. $4(m + 7) = 48$

2. $20 - 2(r - 6)$

3. $40 = 5(2h + 4)$

4. $-3(n - 1) = 9$

Practicing Together:

Working with your partner, solve each problem by using any method you prefer.

1. $4(m + 7) = 48$

$m = 5$

2. $20 - 2(r - 6)$

$r = 13$

3. $40 = 5(2h + 4)$

$2 = h$

4. $-3(n - 1) = 9$

$n = -2$

Trying It on Your Own

1. Damon solved the equation $3(2k + 1) = 21$. Which of the following describes accurate thinking about the solution process?

a. Because 21 is the product of 3 and some quantity, the quantity $2k + 1$ must be 7. Because some quantity plus 1 is 7, $2k$ must be 6. 2 times a number is 6, so k must be 3.

b. First, you have to multiply 3 by $2k$. Then, multiply 3 by 1. Next, you add 3 to 21 to get 24. $6k$ is 24, so k must be 4.

c. Because 21 is the product of 3 and some quantity, the quantity has to be 7. So k must be 7.

d. First, you multiply 3 by 1 by the distributive property. Then, you subtract 3 from 21 to get 18. $2k$ must be 18, so k is 9.

2. Keith solved the equation $-4(p - 9) = 40$. Which of the following describes accurate thinking about the solution process?

a. Keith used the distributive property to multiply –4 by p and 9. He got $4p - 36 = 40$. Then, he used the inverse of subtraction to add 36. $4p = 76$. Then, he used the inverse of multiplication to divide, so $p = 19$.

b. Keith used the distributive property to multiply 4 by p and 9. He got $4p + 36 = 40$. He used the inverse to add 36. He got $4p = 76$. He knows that p must be 19.

c. Keith rewrote the expression as $-4(p + (-9))$. Then, he used the distributive property to get $-4p + 36 = 40$. He used the inverse of addition to get $-4p = 4$. He used the inverse of multiplication to get $p = -1$.

d. Keith rewrote the expression as $4(p + 9)$. Then, he used the distributive property to get $4p + 36 = 40$. He used the inverse of addition to get $4p = 4$. Then, he knew that p must be 1.

Trying It on Your Own

1. Damon solved the equation $3(2k + 1) = 21$. Which of the following describes accurate thinking about the solution process?

a. Because 21 is the product of 3 and some quantity, the quantity $2k + 1$ must be 7. Because some quantity plus 1 is 7, $2k$ must be 6. 2 times a number is 6, so k must be 3.

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c. Because 21 is the product of 3 and some quantity, the quantity has to be 7. So k must be 7.

d. First, you multiply 3 by 1 by the distributive property. Then, you subtract 3 from 21 to get 18. $2k$ must be 18, so k is 9.

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d. Keith rewrote the expression as $4(p + 9)$. Then, he used the distributive property to get $4p + 36 = 40$. He used the inverse of addition to get $4p = 4$. Then, he knew that p must be 1.

3. Amy solved an equation and got a solution of $n = 3$. Which of the following equations could she have solved?

a. $3 = 3(n - 1)$

b. $3 = 3(3n + 3)$

c. $8 = 2(n + 1)$

d. $8 = -4(n - 1)$

4. Mari solved an equation and got a solution of $h = -2$. Which of the following equations could she have solved?

a. $2(h - 2) = -2$

b. $3(h - 3) = -15$

c. $5(h + 2) = -8$

d. $-2(h - 1) = -2$

3. Amy solved an equation and got a solution of $n = 3$. Which of the following equations could she have solved?

a. $3 = 3(n - 1)$
b. $3 = 3(3n + 3)$
c. $8 = 2(n + 1)$
d. $8 = -4(n - 1)$

4. Mari solved an equation and got a solution of $h = -2$. Which of the following equations could she have solved?

a. $2(h - 2) = -2$
b. $3(h - 3) = -15$
c. $5(h + 2) = -8$
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Wrapping It Up

After applying the distributive property, an expression is $8x + 36$. What might the expression have been before applying the distributive property?

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After applying the distributive property, an expression is $8x + 36$. What might the expression have been before applying the distributive property?

Possible solutions include:

$2(4x + 18)$ OR

$4(2x + 9)$

Warming Up:

1. The price to rent a roller-skating rink is a flat fee of $150, plus $4 per person invited. Shannon's parents are renting the rink to celebrate her 13th birthday. Write an expression for the total rental fee when *r* is the number of people invited.

Warming Up:

1. The price to rent a roller-skating rink is a flat fee of $150, plus $4 per person invited. Shannon's parents are renting the rink to celebrate her 13th birthday. Write an expression for the total rental fee when *r* is the number of people invited.

$4r + 150$

Learning to Solve:

Shannon wants to invite 10 people to her skating party. What will be the fee for the party?

The formula: $4r + 150 =$ cost of party

1. What does *r* represent?

2. What does *r* equal in this problem?

3. How you will solve this problem and calculate the rental fee?

Learning to Solve:

Shannon wants to invite 10 people to her skating party. What will be the fee for the party?

The formula: $4r + 150 =$ cost of party

1. What does *r* represent?

The number of people invited

2. What does *r* equal in this problem?

$r = 10$

3. How you will solve this problem and calculate the rental fee?

$4(10) + 150 = 40 + 150 = \$190$

Find the number of people invited to a roller-skating party if the total cost is $222.

The formula: cost of party = $4r + 150$

What is the problem asking us to find?

How is this represented in the formula?

What is the new equation?

Solution steps:

What does this value of *r* indicate?

Find the number of people invited to a roller-skating party if the total cost is $222.

The formula: cost of party = $4r + 150$

What is the problem asking us to find?

The number of people invited to the party

How is this represented in the formula?

r

What is the new equation?

$222 = 4r + 150$

Solution steps:

$222 = 4r + 150$ S_{150}

$72 = 4r$ D_4

$18 = r$

What does this value of r indicate?

There will be 18 people at a skating party if the cost of the party is $222.

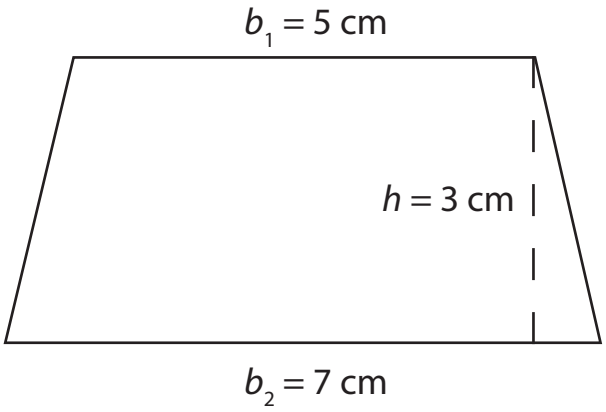
Practicing Together:

Working with your partner, solve each problem.

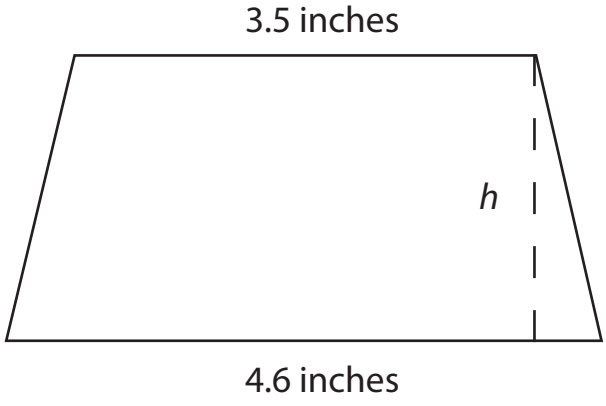
The formula for the area of a trapezoid is $A = \frac{h(b_1 + b_2)}{2}$ where h refers to the height of the trapezoid, b_1 refers to the length of 1 base, and b_2 refers to the length of the second base.

Use the formula to find the missing values.

1. Find the area of the trapezoid.



2. The area of this trapezoid is 8.505 square inches. Find the height.



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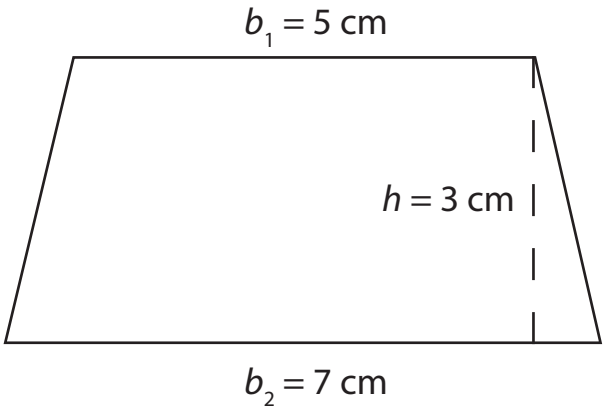
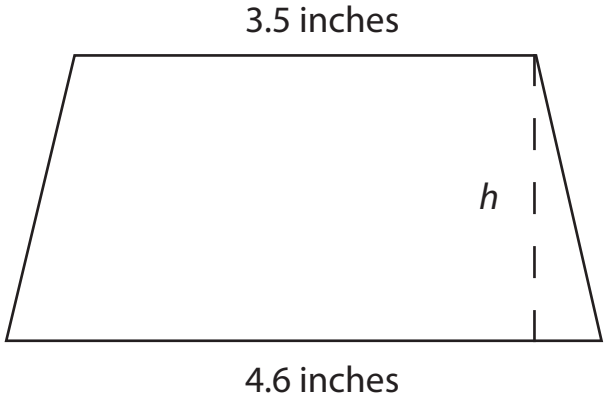


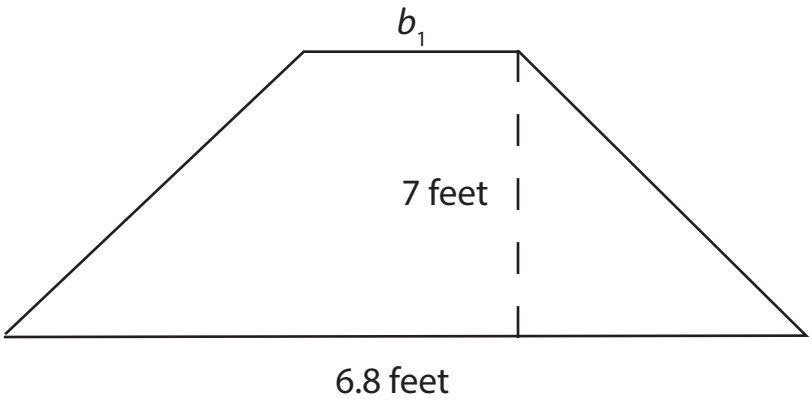
$A = 18 \text{ cm}^2$

2. The area of this trapezoid is 8.505 square inches. Find the height.



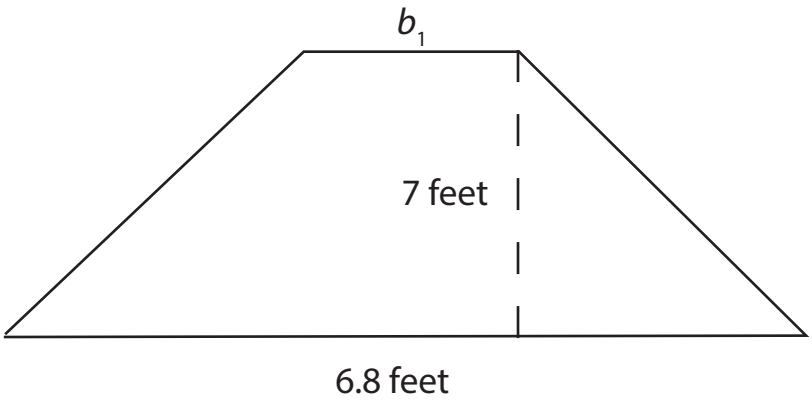
$h = 2.1$ inches

3. The area of this trapezoid is 30.8 square feet. Find the length of the base b_1.



4. Write a problem that someone could use this formula to solve: distance = (rate)(time) .

3. The area of this trapezoid is 30.8 square feet. Find the length of the base b_1.



$b_1 = 2$ feet

4. Write a problem that someone could use this formula to solve: distance = (rate)(time).

Answers will vary.

Sample: Mrs. Smith walks 3 miles each day. If it takes her 40 minutes to walk 3 miles, what is her rate of speed?

Trying It on Your Own

The formula for the volume of a rectangular prism is $V = lwh$ where l is the length, w is the width, and h is the height.

Volume is expressed in cubic units.

A cereal manufacturer wants to put a volume of 252 cubic inches of a new cereal in a box. The length of the box is 7 inches and the width is 3 inches. How tall must the box be?

1. Which of the following describes how you might solve the problem?

a. The formula says to multiply the length and the width. I would multiply 7 by 3 to find the height.

b. The formula says that the volume is the product of length, width, and height. I would multiply 7 by 3 by 252.

c. The formula says that the volume is the product of length, width, and height. I would multiply 7 by 3 and then divide 252 by that product to find the height.

d. The formula says to multiply the length and the width. I would multiply 7 by 3 to find the height and then use the inverse operation.

2. Which of the following gives the equation that could be used to solve the problem?

a. Let k = the height of the box in inches. $252 = 73k$.

b. Let k = the height of the box in inches. $252 = (7 \cdot 3)k$.

c. Let k = the height of the box in inches. $252 \cdot 7 \cdot 3 = k$.

d. Let k = the height of the box in inches. $7 \cdot 3 = 252k$.

Trying It on Your Own

The formula for the volume of a rectangular prism is V = *lwh* where *l* is the length, *w* is the width, and *h* is the height.

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c. Let k = the height of the box in inches. $252 \cdot 7 \cdot 3 = k$.

d. Let k = the height of the box in inches. $7 \cdot 3 = 252k$.

3. Which of the following gives the property you used to solve the equation you created?

a. Division property of equality

b. Commutative property of multiplication

c. Distributive property of multiplication over addition

d. Associative property of multiplication

4. Which of the following gives the solution to the problem?

a. $k = 3.45$ inches

b. $k = 5{,}292$ inches

c. $k = 0.08333$ inches

d. $k = 12$ inches

3. Which of the following gives the property you used to solve the equation you created?

a. Division property of equality

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4. Which of the following gives the solution to the problem?

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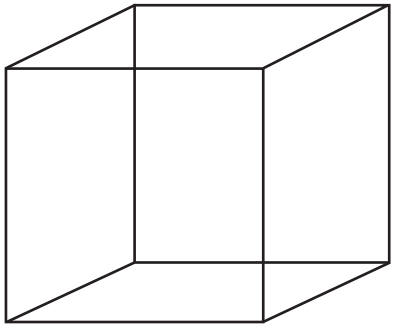
Wrapping It Up



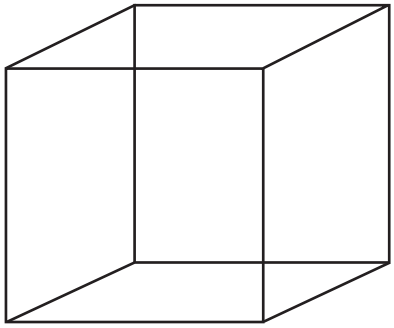
All edges of a cube are the same length. The formula for the volume of a cube is $V = lwh$, where V stands for volume, l stands for length, w stands for width, and h stands for height.

$V = lwh$

Solve this problem:

The edge of a cube measures 8 centimeters. What is the volume of the cube?

Wrapping It Up



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$V = lwh$

Solve this problem:

The edge of a cube measures 8 centimeters. What is the volume of the cube?

512 cm^3

You may have to remind students that the edges all measure the same length on a cube.

Warming Up:

Marcia is building a rectangular sandbox for her children. She wants the dimensions of the sandbox to be 8 feet by 6 feet. The height of the sandbox from the grass is 0.5 feet.

1. How many feet of lumber will she need to build the edges of the sandbox?

2. How much area of the yard will be covered by the sandbox?

3. How much sand will she need to buy to fill in the sandbox?

You may want to use the following formulas to help you solve these 3 problems:

Area of a rectangle = (length)(width)

Perimeter of a rectangle = 2(length) + 2(width)

Volume of a rectangle = (length)(width)(height)

Warming Up:

Marcia is building a rectangular sandbox for her children. She wants the dimensions of the sandbox to be 8 feet by 6 feet. The height of the sandbox from the grass is 0.5 feet.

1. How many feet of lumber will she need to build the edges of the sandbox?

28 feet

2. How much area of the yard will be covered by the sandbox?

48 square feet

3. How much sand will she need to buy to fill in the sandbox?

24 cubic feet

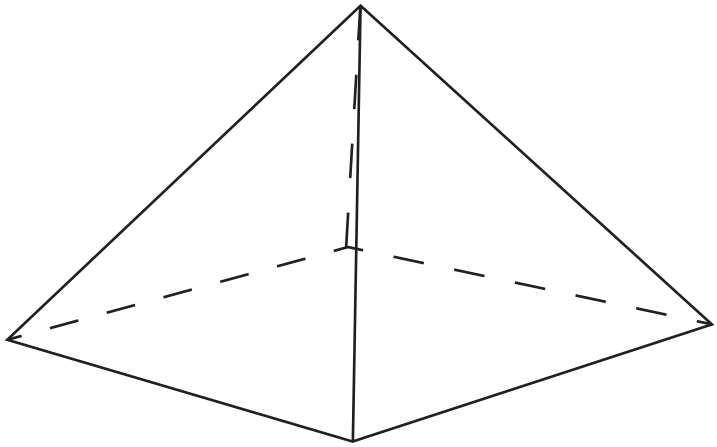
You may want to use the following formulas to help you solve these 3 problems:

Area of a rectangle = (length)(width)

Perimeter of a rectangle = 2(length) + 2(width)

Volume of a rectangle = (length)(width)(height)

Learning to Solve:



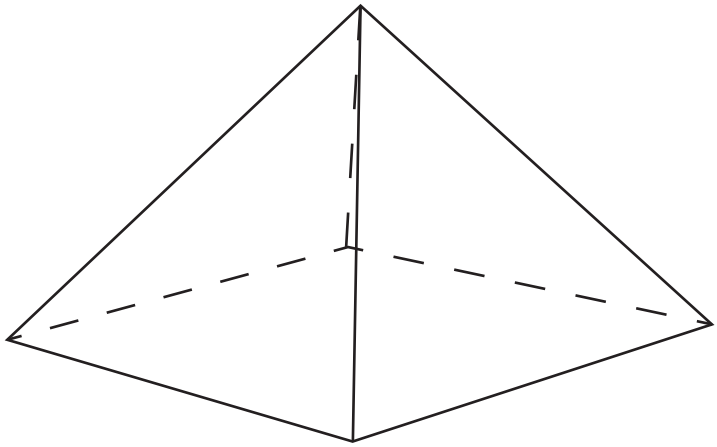
1. What do you think "total surface area" means?

2. How many surfaces make up this square pyramid?

3. What is the formula for the area of a square?

4. What is the formula for the area of a triangle?

Learning to Solve:



1. What do you think "total surface area" means?

The sum of the areas of all surfaces or faces

2. How many surfaces make up this square pyramid?

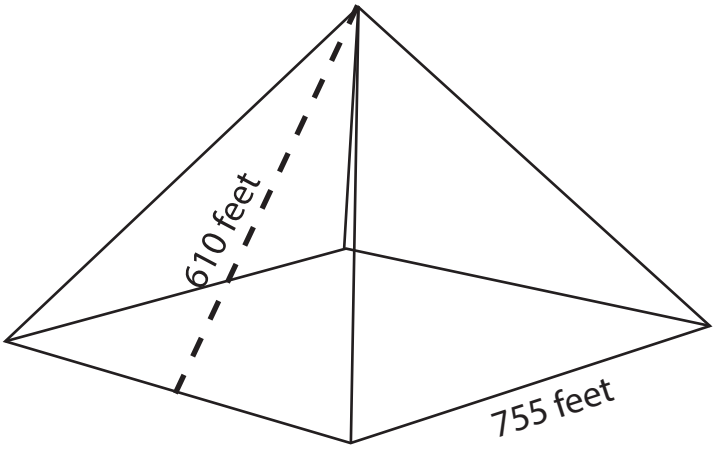
5 surfaces: 4 triangular surfaces and 1 square surface

3. What is the formula for the area of a square?

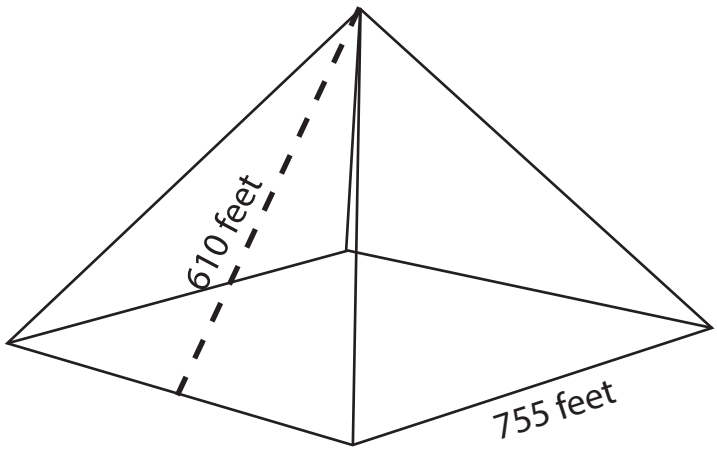
$A = s^2$ or $A = lw$

4. What is the formula for the area of a triangle?

$A = \frac{1}{2}bh$



5. Find the total surface area of this square pyramid.



5. Find the total surface area of this square pyramid.

$4((\frac{1}{2})(755)(610)) + (755)^2 = 4(230{,}275) + 570{,}025 = 1{,}491{,}125$ square feet

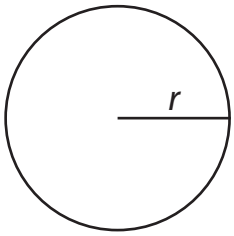
Practicing Together:

Solve each problem.
Round your answer to the hundredths place.

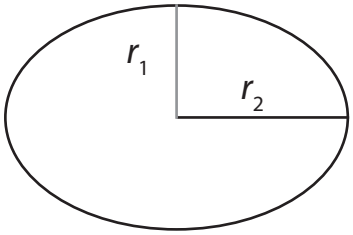
Formulas:

$\pi = 3.14$

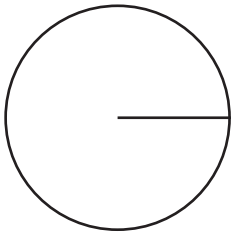
Area of a circle = πr^2 (r indicates the value of the radius of the circle)



Area of an ellipse = $\pi r_1 r_2$ (r_1 indicates the value of 1 radius and r_2 indicates the other radius)



1. Albert is installing a circular hot tub on his back deck. The hot tub will have a radius of 3.25 feet. What area of the deck will be covered by the hot tub?



Practicing Together:

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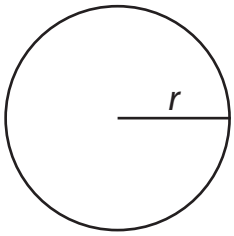

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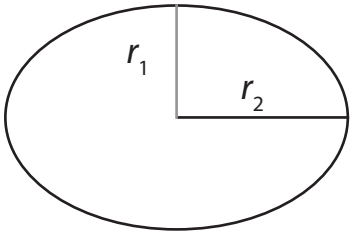

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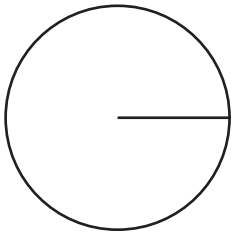
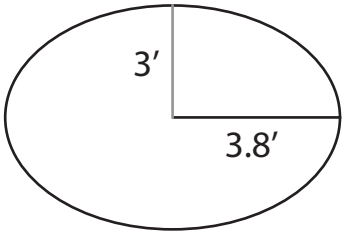


$A = 33.17 \text{ ft}^2$

2. Now Albert is thinking about installing an elliptical hot tub instead of a circular hot tub. Does the elliptical or circular hot tub have the larger area? By how much is the area larger?



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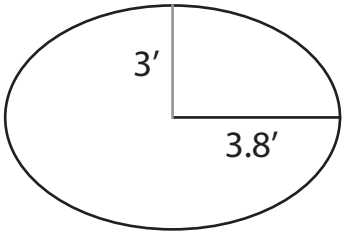


$A = 35.8\ ft^2$

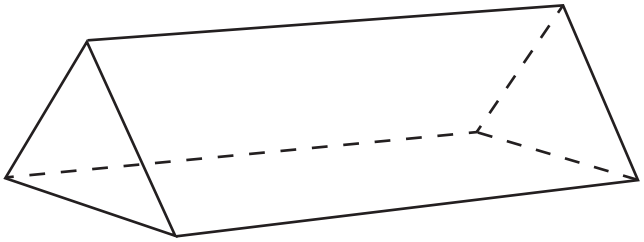
The elliptical hot tub

has the larger area by $2.63\ ft^2$

Trying It on Your Own

The formula for the volume of a triangular prism is $V = \frac{1}{2}bhl$ where b is the length of the triangle base, h is the height of the triangle base, and l is the length of the prism.

The volume of a triangular prism is 60 cubic centimeters. The length of the triangle base is 4 centimeters and the height is 3 centimeters. How long is the prism?



1. Which of the following describes how you might solve the problem?

a. The formula says to multiply the base and the height and the length by $\frac{1}{2}$.

I would multiply 4 by 3 by 60 by $\frac{1}{2}$ to find the length.

b. The formula says that the volume is the product of base, height, and length.

I would multiply 4 by 3 by 60.

c. The formula says that the volume is the product of $\frac{1}{2}$, base, height, and length.

I would multiply $\frac{1}{2}$ by 4 by 3 to find the length.

d. The formula says to multiply $\frac{1}{2}$ by the base by the height by the length. I would multiply $\frac{1}{2}$ by 4 by 3 and then divide 60 by the product to find the length.

Trying It on Your Own

The formula for the volume of a triangular prism is $V = \frac{1}{2}bhl$ where b is the length of the triangle base, h is the height of the triangle base, and l is the length of the prism.

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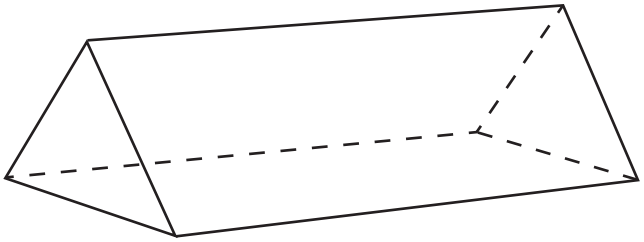

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I would multiply 4 by 3 by 60.

c. The formula says that the volume is the product of $\frac{1}{2}$, base, height, and length.
I would multiply $\frac{1}{2}$ by 4 by 3 to find the length.

d. The formula says to multiply $\frac{1}{2}$ by the base by the height by the length. I would multiply $\frac{1}{2}$ by 4 by 3 and then divide 60 by the product to find the length.

2. Which of the following gives the equation that could be used to solve the problem?

a. Let p = the length of the prism in centimeters. $60 = \frac{1}{2} \cdot 43 \cdot p$.

b. Let p = the length of the prism in centimeters. $\frac{1}{2} \cdot 4 \cdot 3 \cdot p = 60$.

c. Let p = the length of the prism in centimeters. $4 \cdot 3 \cdot 60 \cdot \frac{1}{2} = p$.

d. Let p = the length of the prism in centimeters. $\frac{1}{2} \cdot 4 \cdot 3 = p$.

3. Which of the following gives the solution to the problem?

a. $p = 10$ centimeters

b. $p = 6$ centimeters

c. $p = 360$ centimeters

d. $p = 2.8$ centimeters

2. Which of the following gives the equation that could be used to solve the problem?

a. Let p = the length of the prism in centimeters. $60 = \frac{1}{2} \cdot 43 \cdot p$.

b. Let p = the length of the prism in centimeters. $\frac{1}{2} \cdot 4 \cdot 3 \cdot p = 60$.

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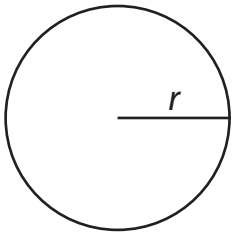
3. Which of the following gives the solution to the problem?

a. $p = 10$ centimeters
b. $p = 6$ centimeters
c. $p = 360$ centimeters
d. $p = 2.8$ centimeters

4. $\pi = 3.14$

Area of a circle = πr^2 (r indicates the value of the radius of the circle)



Jane was planning to make a circular garden. Her garden would have a radius of 4 ft. What would be the area of her garden?

a. 50.24 ft^2

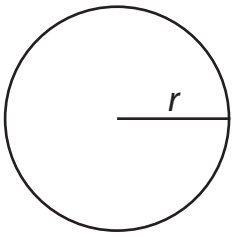
b. 6.28 ft^2

c. 25.12 ft^2

d. 12.56 ft^2

4. $\pi = 3.14$

Area of a circle = πr^2 (r indicates the value of the radius of the circle)



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a. 50.24 ft^2

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c. 25.12 ft^2

d. 12.56 ft^2

Appendices

Expressions and Equations 2

Warming Up:

Solve the problems.

1. Use order of operations to simplify $3(2 - 1) + 5$.

2. Use order of operations to simplify $5 - 2(3 + 4)$.

3. Evaluate the expression $5p - 4$ for $p = 2$.

4. Evaluate the expression $-3 - 4x$ for $x = -1$.

5. Plot these points on the number line: 3, –4, 5.5, and 8.

Warming Up:

Solve the problems.

1. Use order of operations to simplify $3(2 - 1) + 5$.

8

2. Use order of operations to simplify $5 - 2(3 + 4)$.

–9

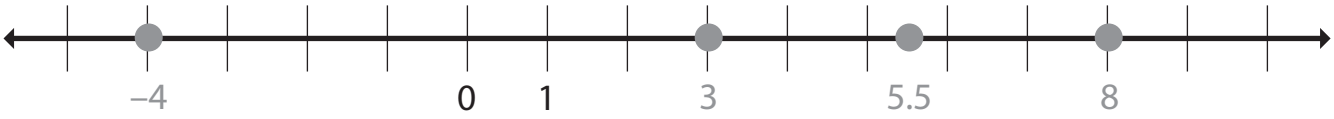
3. Evaluate the expression $5p - 4$ for $p = 2$.

6

4. Evaluate the expression $-3 - 4x$ for $x = -1$.

1

5. Plot these points on the number line: 3, –4, 5.5, and 8.



Learning to Solve:

7 + 2*e*	
Value of *e*	Value of 7 + 2*e*
6	
7	
8	
9	

Fill in the table by evaluating the expression 7 + 2e using the numbers 5, 10, 15, and 20.

7 + 2*e*	
Value of *e*	Value of 7 + 2*e*
5	
10	
15	
20	

Learning to Solve:

7 + 2*e*	
Value of *e*	Value of 7 + 2*e*
6	7 + 2(6) = 7 + 12 = 19
7	7 + 2(7) = 7 + 14 = 21
8	7 + 2(8) = 7 + 16 = 23
9	7 + 2(9) = 7 + 18 = 25

Fill in the table by evaluating the expression 7 + 2e using the numbers 5, 10, 15, and 20.

7 + 2*e*	
Value of *e*	Value of 7 + 2*e*
5	7 + 2(5) = 7 + 10 = 17
10	7 + 2(10) = 7 + 20 = 27
15	7 + 2(15) = 7 + 30 = 37
20	7 + 2(20) = 7 + 40 = 47

Practicing Together:

Working with your group, evaluate the expression in each table, using 1 of the sets of variable values provided, and describe the pattern.

Set A variable values: –2, 1, 4, and 7

- OR -

Set B variable values: –2, 0, 2, and 4

$5n + 9$	
Value of n	Value of $5n + 9$

Practicing Together:

Working with your group, evaluate the expression in each table, using 1 of the sets of variable values provided, and describe the pattern.

Set A variable values: –2, 1, 4, and 7

- OR -

Set B variable values: –2, 0, 2, and 4

***5n* + 9**	
Value of *n*	Value of 5*n* + 9
–2	5(–2) + 9 = –10 + 9 = –1
1	5(1) + 9 = 5 + 9 = 14
4	5(4) + 9 = 20 + 9 = 29
7	5(7) + 9 = 35 + 9 = 44

***5n* + 9**	
Value of *n*	Value of 5*n* + 9
–2	5(–2) + 9 = –10 + 9 = –1
0	5(0) + 9 = 0 + 9 = 9
2	5(2) + 9 = 10 + 9 = 19
4	5(4) + 9 = 20 + 9 = 29

Set A variable values: –3, 0, 3, and 6

- OR -

Set B variable values: –3, –2, –1, and 0

4 – 3*a*	
Value of *a*	Value of 4 – 3*a*

Set A variable values: –3, 0, 3, and 6

- OR -

Set B variable values: –3, –2, –1, and 0

4 – 3*a*	
Value of *a*	Value of 4 – 3*a*
–3	4 – 3(–3) = 4 + 9 = 13
0	4 – 3(0) = 4 – 0 = 4
3	4 – 3(3) = 4 – 9 = –5
6	4 – 3(6) = 4 – 18 = –14

4 – 3*a*	
Value of *a*	Value of 4 – 3*a*
–3	4 – 3(–3) = 4 + 9 = 13
–2	4 – 3(–2) = 4 + 6 = 10
–1	4 – 3(–1) = 4 + 3 = 7
0	4 – 3(0) = 4 – 0 = 4

Trying It on Your Own

1. Using the values 1, 3, 5, and 7 for the values of the variable *f*, find the value of the expression 3*f* – 10.

a. 7, 1, –5, and –11

b. 13, 19, 25, and 31

c. –7, –1, 5, and 11

d. 3, 9, 15, and 21

2. By what value do the numbers 2, 7, 12, and 17 increase?

a. 2

b. 5

c. 10

d. –5

Trying It on Your Own

1. Using the values 1, 3, 5, and 7 for the values of the variable *f*, find the value of the expression 3*f* – 10.

a. 7, 1, –5, and –11
b. 13, 19, 25, and 31
c. –7, –1, 5, and 11
d. 3, 9, 15, and 21

2. By what value do the numbers 2, 7, 12, and 17 increase?

a. 2
b. 5
c. 10
d. –5

3. Using the values 2, 4, 6, and 8, the values of the expression $4h + 4$ are 12, 20, 28, and 36. What is the pattern?

a. As the value of the variable increases by 2, the value of the expression increases by 8.

b. If the value of the variable is even, the value of the expression increases by 8.

c. As the value of the variable increases by 2, the value of the expression increases by 4.

d. As the value of the variable is multiplied by 2, the value of the expression increases by 8.

4. Using the values 1, 2, 3, and 4 for the variable y, what is the pattern of the expression $5y + 2$?

a. As the value of the variable increases by 1, the expression increases by 2.

b. As the value of the variable increases by 1, the expression increases by 5.

c. As the value of the variable increases by 1, the expression increases by 7.

d. As the value of the variable increases by 1, the expression increases by 8.

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b. As the value of the variable increases by 1, the expression increases by 5.

c. As the value of the variable increases by 1, the expression increases by 7.

d. As the value of the variable increases by 1, the expression increases by 8.

Wrapping It Up

Find an expression whose value is 7 if the value of the variable x is 1.

?	
Value of *k*	Value of expression
1	7

Wrapping It Up

Find an expression whose value is 7 if the value of the variable x is 1.

?	
Value of *k*	Value of expression
1	7

Answers will vary. For example, $x + 6$, $2x + 5$ and so on.

Warming Up:

Translate the phrases into algebraic expressions.

1. The quotient of 22 and p.

2. 8 less than the product of z and 10.

3. The sum of 12 and a.

4. 5 more than twice d.

5. y decreased by 6.

Warming Up:

Translate the phrases into algebraic expressions.

1. The quotient of 22 and p.

$\frac{22}{p}$ or $22 \div p$

2. 8 less than the product of z and 10.

$10z - 8$

3. The sum of 12 and a.

$12 + a$

4. 5 more than twice d.

$2d + 5$

5. y decreased by 6.

$y - 6$

Learning to Solve:

1. Write the algebraic equation for each sentence in the table.

Sentence	Algebraic Equation
Twice a number is equal to 18.	
Marcia is *m* years old. In 14 years, she will be 30.	
32 is equivalent to 12 more than the product of 5 and *c*.	
A number divided by 6 is equal to 8.	
k decreased by 9 is equal to 17.	
12 is equal to 14 less than 4 times a number.	
A large pizza sliced into 18 pieces is equally shared among *x* people, so that each person gets 3 pieces.	
Allan made a withdrawal of *g* dollars from his savings account. He had $370 in his account and now he has $220.	

Learning to Solve:

1. Write the algebraic equation for each sentence in the table.

Sentence	Algebraic Equation
Twice a number is equal to 18.	$2x = 18$
Marcia is m years old. In 14 years, she will be 30.	$m + 14 = 30$
32 is equivalent to 12 more than the product of 5 and c.	$5c + 12 = 32$
A number divided by 6 is equal to 8.	$\frac{x}{6} = 8$
k decreased by 9 is equal to 17.	$k - 9 = 17$
12 is equal to 14 less than 4 times a number.	$12 = 4x - 14$
A large pizza sliced into 18 pieces is equally shared among x people, so that each person gets 3 pieces.	$\frac{18}{x} = 3$
Allan made a withdrawal of g dollars from his savings account. He had \$370 in his account and now he has \$220.	$370 - g = 220$

2. Write the inequality symbols in the table.

Inequalities	
Symbol	Meaning

3. Working with your partner, write the algebraic inequality for each sentence in the table.

Sentence	**Algebraic Inequality**
11 increased by twice a number is greater than 21.	
6 is less than or equal to the product of *f* and 2.	
The quotient of a number and 5 is less than 10.	
The difference of *r* and 13 is greater than or equal to 17.	
Mariella had $625 in her savings account. She withdrew *h* dollars from this account. The bank requires customers to keep more than $250 in their savings account.	

2. Write the inequality symbols in the table.

Inequalities	
Symbol	Meaning
<	less than
≤	less than or equal to
>	greater than
≥	greater than or equal to
≠	not equal to

3. Working with your partner, write the algebraic inequality for each sentence in the table.

Sentence	**Algebraic Inequality**
11 increased by twice a number is greater than 21.	$11 + 2x > 21$
6 is less than or equal to the product of f and 2.	$6 \leq 2f$ or $2f \geq 6$
The quotient of a number and 5 is less than 10.	$\frac{n}{5} < 10$
The difference of r and 13 is greater than or equal to 17.	$r - 13 \geq 17$
Mariella had \$625 in her savings account. She withdrew h dollars from this account. The bank requires customers to keep more than \$250 in their savings account.	$625 - h > 250$

Trying It on Your Own

1. Translate into an algebraic equation or inequality: *b* more than 3 is less than or equal to 16.

a. $b + 3 \leq 16$

b. $b - 3 \leq 16$

c. $3b \leq 16$

d. $16 \leq 3b$

2. Translate into an algebraic equation or inequality: The product of 6 and the sum of *c* and 7 is equal to 54.

a. $6c + 7 = 54$

b. $6(7c) = 54$

c. $6(c + 7) = 54$

d. $6 \times 7 + c = 54$

Trying It on Your Own

1. Translate into an algebraic equation or inequality: *b* more than 3 is less than or equal to 16.

a. $b + 3 \leq 16$
b. $b - 3 \leq 16$
c. $3b \leq 16$
d. $16 \leq 3b$

2. Translate into an algebraic equation or inequality: The product of 6 and the sum of *c* and 7 is equal to 54.

a. $6c + 7 = 54$
b. $6(7c) = 54$
c. $6(c + 7) = 54$
d. $6 \times 7 + c = 54$

3. Translate into an algebraic equation or inequality: Daria is renting a room for a meeting. She has $400 to spend on a rental fee of $75 plus $5 per an unknown number of people.

a. $400 = 75 + 5m$

b. $400 = 75 + 5 + m$

c. $75(5m) = 400$

d. $(75 + 5)m = 400$

4. Translate into an algebraic equation or inequality: 2 less than the quotient of n and 4 is greater than 18.

a. $2 - \frac{n}{4} > 18$

b. $2 < n \div 4 > 18$

c. $\frac{n}{4} - 2 < 18$

d. $\frac{n}{4} - 2 > 18$

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Wrapping It Up

On your whiteboard, write a sentence(s) that might be represented by the algebraic equation $2h - 7 = 13$.

Wrapping It Up

On your whiteboard, write a sentence(s) that might be represented by the algebraic equation $2h - 7 = 13$.

Answers may vary.

Possible answer may be 7 less than twice a number is 13.

Warming Up:

Evaluate the expressions for $m = -5$.

1. $m + 10$

2. $6m$

3. $-3 + m^2$

4. $\frac{20}{m}$

5. $2m + 3m$

Warming Up:

Evaluate the expressions for $m = -5$.

1. $m + 10$

$m + 10 = -5 + 10 = 5$

2. $6m$

$6m = 6(-5) = -30$

3. $-3 + m^2$

$-3 + m^2 = -3 + (-5)^2 = -3 + 25 = -28$

4. $\frac{20}{m}$

$\frac{20}{m} = \frac{20}{-5} = -4$

5. $2m + 3m$

$2m + 3m = 2(-5) + 3(-5) = -10 + (-15) = -25$

Learning to Solve:

The formula for the area of a circle is $A = \pi r^2$.

1. Find the area of a circle with a radius of 2.4 centimeters.

$\pi = 3.14$

2. The radius of a circular swimming pool is 25 feet. What is the area of the pool?

$\pi = 3.14$

Learning to Solve:

The formula for the area of a circle is $A = \pi r^2$.

1. Find the area of a circle with a radius of 2.4 centimeters.

$\pi = 3.14$

$A = \pi r^2$

$A = 3.14(2.4)^2$

$A = 3.14(5.76)$

$A = 18.09 \text{ cm}^2$

2. The radius of a circular swimming pool is 25 feet. What is the area of the pool?

$\pi = 3.14$

$A = \pi r^2$

$A = 3.14(25)^2$

$A = 3.14(625)$

$A = 1{,}962.5 \text{ ft}^2$

Practicing Together:

Working with your partner, fill in the missing values in the table.

Interest is the amount of money you earn or owe when investing or spending money.

Principal is the initial amount of money invested or spent.

Rate is the percentage of the principal that results in the interest.

Time is days, weeks, months, years, etc.

To find the amount of interest on money that you have invested, you multiply the amount of money invested by the rate and by the time.

The formula for determining the simple interest on an amount of money is interest = principal • rate • time, which is represented by $I = prt$.

Interest	Principal	Rate	Time	Formula/Equation $I = prt$
	\$2,000	5%	5 years	
\$540	\$18,000		$\frac{1}{2}$ year	
\$43.125	\$575	2.5%		
	\$135,500	4%	10 years	

Practicing Together:

Working with your partner, fill in the missing values in the table.

Interest is the amount of money you will earn or owe when investing or spending money.

Principal is the initial amount of money invested or spent.

Rate is the percentage of the principal that results in the interest.

Time is days, weeks, months, years, etc.

To find the amount of interest on money that you have invested, you multiply the amount of money invested by the rate and by the time.

The formula for determining the simple interest on an amount of money is interest = principal • rate • time, which is represented by $I = prt$.

Interest	Principal	Rate	Time	Formula/Equation $I = prt$
$500	$2,000	5%	5 years	$I = (2{,}000)(0.05)(5)$
$540	$18,000	6%	$\frac{1}{2}$ year	$540 = 18{,}000(r)(0.5)$
$43.125	$575	2.5%	3 years	$43.125 = (575)(0.025)(t)$
$54,200	$135,500	4%	10 years	$I = (135{,}500)(0.04)(10)$

Trying It on Your Own

1. Distance traveled is calculated by multiplying the rate of speed by the time spent traveling. Select the person who wrote the correct formula to represent this calculation.

a. Alex wrote the formula $d = rt$ to represent the calculation.

b. Mariah wrote the formula $dr = t$ to represent the calculation.

c. Madison wrote the formula $d = \frac{r}{t}$ to represent the calculation.

d. Frank wrote the formula drt to represent the calculation.

2. Dylan drove 66 miles per hour for 3 hours. How far did he travel?

a. 132 miles
b. 22 miles
c. 198 miles
d. 68 miles

Trying It on Your Own

1. Distance traveled is calculated by multiplying the rate of speed by the time spent traveling. Select the person who wrote the correct formula to represent this calculation.

a. Alex wrote the formula $d = rt$ to represent the calculation.

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d. Frank wrote the formula drt to represent the calculation.

2. Dylan drove 66 miles per hour for 3 hours. How far did he travel?

a. 132 miles
b. 22 miles
c. 198 miles
d. 68 miles

3. Calculate the speed at which an airplane flies if it travels 2,100 miles in 3.5 hours.

a. 7,350 mph

b. 700 mph

c. 600 mph

d. 60 mph

4. Ray said that $d = rt$ is the same as $d = tr$. Arthur disagrees. Who do you agree with, Ray or Arthur?

a. Arthur, because you cannot switch the variables around.

b. Arthur, because rate is found by multiplying the distance by the time.

c. Ray, because distance is rate divided by time.

d. Ray, because to find the distance, you multiply the rate by the time.

3. Calculate the speed at which an airplane flies if it travels 2,100 miles in 3.5 hours.

a. 7,350 mph
b. 700 mph
c. 600 mph
d. 60 mph

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b. Arthur, because rate is found by multiplying the distance by the time.
c. Ray, because distance is rate divided by time.
d. Ray, because to find the distance, you multiply the rate by the time.

Wrapping It Up

You are given the formula:

$$F = C(\frac{9}{5}) + 32$$

This formula converts a Celsius temperature to a Fahrenheit temperature. Write the process you would follow to convert a temperature of 16°C to Fahrenheit.

Wrapping It Up

You are given the formula:

$$F = C(\frac{9}{5}) + 32$$

This formula converts a Celsius temperature to a Fahrenheit temperature. Write the process you would follow to convert a temperature of 16°C to Fahrenheit.

$$F = 16(\frac{9}{5}) + 32 = 60.8°C$$

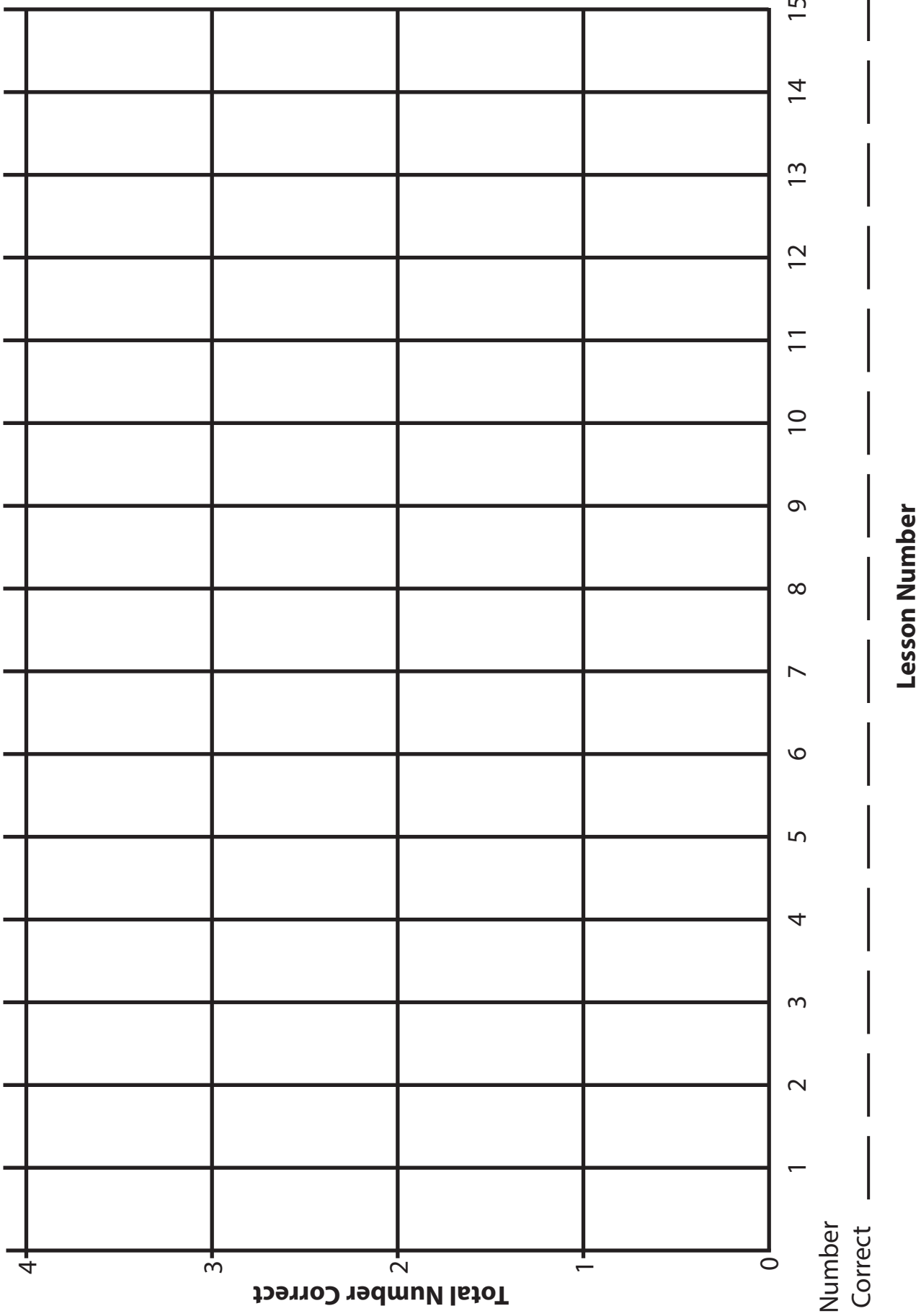
Notes

Expressions and Equations 2

Example											
Picture											
Generalizations											

Name _____

Graph Your Progress



Expressions and Equations 2

Extra Practice

The Meadows Center for Preventing Educational Risk—Mathematics Institute
The University of Texas at Austin

Additional Practice

Simplify each expression.

1. $6(3 + 2k)$

2. $8(2a - 5)$

3. $6(5 - 4h)$

4. $7(1 + (-2y))$

Additional Practice

Simplify each expression.

1. $6(3 + 2k)$

$18 + 12k$ or $12k + 18$

2. $8(2a - 5)$

$16a - 40$ or $-40 + 16a$ or $16a + (-40)$

3. $6(5 - 4h)$

$30 - 24h$ or $30 + (-24h)$

4. $7(1 + (-2y))$

$7 + (-14y)$ or $7 - 14y$

Additional Practice

Simplify each expression.

1. Cynthia took 2 of her friends to the movies. All 3 of them wanted a fruit snack that cost $3.25 each and a water that cost $1.75 each. How much did they spend altogether on their drinks and popcorn? Write the expression or equation that you could use to find the answer or solve.

2. Jason wanted to find the area of the rectangle below. Find 2 ways that he could use. Find the area.

Additional Practice

Simplify each expression.

1. Cynthia took 2 of her friends to the movies. All 3 of them wanted a fruit snack that cost $3.25 each and a water that cost $1.75 each. How much did they spend altogether on their drinks and popcorn? Write the expression or equation you will use to find the answer. Solve.

3(3.25 + 1.75) = $15.00
3(3.25) + 3(1.75) = $15.00

2. Jason wanted to find the area of the rectangle below. Find 2 ways that he could use. Find the area.

3(7 + 15) = 66 sq cm
3(7) + 3(15) = 66 sq cm

3. Josh simplified a problem.

$$40(15 + 7)$$

$$15(40) + 7(40)$$

$$600 + 280$$

$$880$$

Do you agree with Josh's work? Why or why not?

4. Simplify: $(15 + 8)20$

3. Josh simplified a problem.

$$40(15 + 7)$$

$$15(40) + 7(40)$$

$$600 + 280$$

$$880$$

Do you agree with Josh's work? Why or why not?

Yes, he correctly multiplied 40 times both numbers in the parentheses using the distributive property of multiplication over addition.

4. Simplify: $(15 + 8)20$

460

Additional Practice

Evaluate each expression for the given value of the variable.

	$x = 4$	$x = 0$	$x = -3$	$x = -1$
$4(x + 3) - 2x$				
$\frac{6(3 - x)}{2} + x$				
$7x - 2(x - 5)$				
$\frac{4x}{2} + \frac{2(3x - 1)}{2}$				
$12 - 3x + \frac{6x}{3}$				

Additional Practice

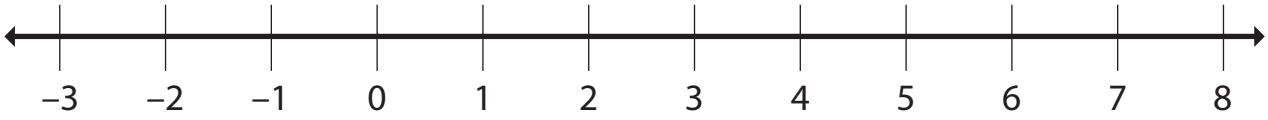
Evaluate each expression for the given value of the variable.

	$x = 4$	$x = 0$	$x = -3$	$x = -1$
$4(x + 3) - 2x$	20	12	6	10
$\frac{6(3 - x)}{2} + x$	1	9	15	11
$7x - 2(x - 5)$	30	10	–5	5
$\frac{4x}{2} + \frac{2(3x - 1)}{2}$	19	–1	–16	–6
$12 - 3x + \frac{6x}{3}$	8	12	15	13

Additional Practice

1. Graph the solution to the inequality on the number line: $n + 2 < 8$

2. Graph the solution to the inequality on the number line: $18 + 7x \geq 32$



Additional Practice

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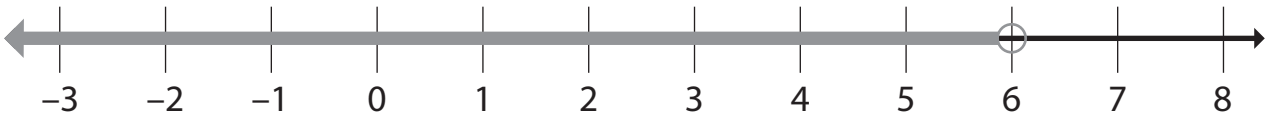
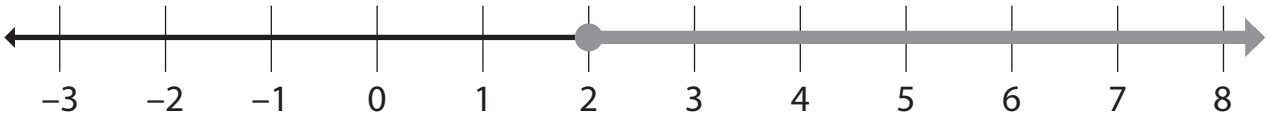


2. Graph the solution to the inequality on the number line: $18 + 7x \geq 32$

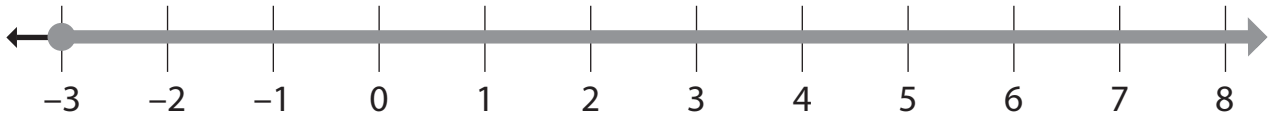


3. Graph the solution to the inequality on the number line: $5x - 12 > 8$

4. Graph the solution to the inequality on the number line: $\frac{3x + 2}{2} \geq -3.5$

3. Graph the solution to the inequality on the number line: $5x - 12 > 8$

4. Graph the solution to the inequality on the number line: $\frac{3x + 2}{2} \geq -3.5$



Additional Practice

Solve each equation.

1. $6y + 14 = 11$

2. $16 = \frac{1}{2}(h + 24)$

3. $4 = 4(k + 5)$

4. $3(4 - x) = 36$

Additional Practice

Solve each equation.

1. $6y + 14 = 11$

$y = -\frac{1}{2}$

2. $16 = \frac{1}{2}(h + 24)$

$h = 8$

3. $4 = 4(k + 5)$

$k = -4$

4. $3(4 - x) = 36$

$x = -8$

Additional Practice

The formula for the volume of a rectangular prism is $V = lwh$, where l = length, w = width, h = height. Use the formula to solve problems 1 and 2.

1. A rectangular prism has a volume of 360 cubic inches. The length is 2 inches and the height is 15 inches. What is the measure of the width?

2. A rectangular prism has a volume of 800 cubic feet. The width is 8 feet and the height is 10 feet. What is the measure of the length?

Additional Practice

The formula for the volume of a rectangular prism is $V = lwh$, where l = length, w = width, h = height. Use the formula to solve problems 1 and 2.

1. A rectangular prism has a volume of 360 cubic inches. The length is 2 inches and the height is 15 inches. What is the measure of the width?

$w = 12$ inches

2. A rectangular prism has a volume of 800 cubic feet. The width is 8 feet and the height is 10 feet. What is the measure of the length?

$l = 10$ feet

The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)$h where b_1 and b_2 = the two bases and h = height. Use the formula to solve problems 3 and 4.

3. A trapezoid has $b_1 = 3$ inches and $b_2 = 5$ inches. The area is 24 square inches. What is the measure of the height?

4. The area of a trapezoid is 50 square centimeters. The height is 5 centimeters and b1 is 8 centimeters. What is the measure of the other base (b_2)?

The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)$h where b_1 and b_2 = the two bases and h = height. Use the formula to solve problems 3 and 4.

3. A trapezoid has $b_1 = 3$ inches and $b_2 = 5$ inches. The area is 24 square inches. What is the measure of the height?

$h = 6$ inches

4. The area of a trapezoid is 50 square centimeters. The height is 5 centimeters and b1 is 8 centimeters. What is the measure of the other base (b_2)?

$b_2 = 12$ centimeters

Multiplication and Division

Timed Practice

Name _____

Teacher _____

Period _____

Multiplication and Division Facts: *Information*

Timed Fact Practice

Timed Fact Practice is a component of each module for students to practice developing automaticity with the facts. Research recommends that students spend about 10 minutes a day practicing facts to build automaticity. Three sets of facts are provided: Multiplication, Division, and Mixed Facts.

Content

This module contains 10 multiplication fact practice sheets, 10 division fact practice sheets, and 10 mixed fact practice sheets; answers are also included. The same set of facts must be used for the duration of the module to provide accurate data on students' progress.

Graphing

Have students practice the multiplication facts for 5 days (sheets 1 – 5; there are extra sheets if more practice is needed). Give students 1 minute to complete one sheet of 20 problems. Then, display the answers for the sheet and have students correct their work and put the number correct at the top of the sheet. Have students use the Facts Practice Graph to plot their number correct on each practice sheet. Repeat this procedure for division facts and then for mixed facts. Students can plot their number correct for each operation across 15 days: 5 days for multiplication, 5 days for division, and 5 days for mixed facts.

Motivation and Self-Regulation

By the middle grades, students with chronically low mathematics performance benefit from motivational strategies to keep them interested in learning or relearning mathematical ideas. Self-regulation, such as monitoring one's own performance, can be a powerful strategy for improving motivation for learning. Having students chart their own performance is a motivational strategy that can help to improve their mathematics performance.

Multiplication and Division Facts: *Common Misconceptions and How to Prevent Them*

Misconceptions	Examples for Preventing or Correcting
Some students believe repeated addition is the only definition of multiplication.	Teach students that repeated addition is only 1 way to represent multiplication. Explain to students that if A and B are nonnegative numbers, then A × B is the total of A groups of B.[1]
Some students universally believe multiplication can be used when adding groups.	Teach students that repeated addition of the same number of objects is 1 way of thinking of multiplication. Teach students that multiplication cannot be used when the number of objects in each group is not the same. Present examples and nonexamples (e.g., 5 + 5 + 5, 4 + 5 + 3). Demonstrate and have students differentiate between equal and unequal groups as well as identify when multiplication can and cannot be used.[3]
Some students believe that 4 × 3 and 3 × 4 have different answers.	Illustrate the commutative property of multiplication, using array models to prove the total (product) is the same.[2]
Some students may believe that 30 = 5 × 6 is written incorrectly because the product (30) must follow the equal sign.	Teach students the meaning of the equal sign and explain that the equal sign means "equals" or "is equal to" and that the expressions on each side of the equal sign have the same value.[2]
Some students do not connect the rows with the columns in a multiplication table.	Draw attention to the row as each column is completed. Provide additional instruction on the commutative property of multiplication and the multiplication table's design as needed.
Some students believe that performing a strategy, such as doubling, changes the total number in the array.	Teach students that the doubling strategy changes how the arrays look but not the total number. Use visualizations and manipulatives as needed.
Students may assume that the commutative property also holds for division—for example, assuming that 15 ÷ 3 = 5, so 3 ÷ 15 = 5.	Demonstrate an example, such as the following. Have 15 sheets of paper to share among 3 people. Ask students, "How many sheets of paper does each person get?" (5) Have 3 sheets of paper to share among 15 people. Ask students, "How many sheets of paper does each person get?" ($\frac{1}{5}$) For each demonstration, write the equation on the board. Draw attention to the quotients, which are different.

Some students may confuse fact families with the set of a number and all its factors (12: 1, 2, 3, 4, 6, 12).	Teach students that a family of facts consists of 3 numbers, 2 of which are the factors that when multiplied equal the product.
Some students may believe a family of facts consists of any 2 factors of a product and the product.	Emphasize that the equation constructed with these numbers must be true. For example, if students offer 5, 10, and 20, ask what the equation is ($5 \times 10 = 20$) and whether it is true.
Some students may need a more concrete model showing how multiplying by powers of 10 works.	If so, use base-ten blocks to show 10, 100, and 1,000, as well as 20, 200, and 2,000. Show students how, in each place, the number in the second group is 2 times larger than the number in the first group: 2 is 2 times larger than 1, 20 is 2 times larger than 10, etc. The factor is always 2, and the number of 0s represents the other factor: 10, 100, or 1,000.

1. Beckman, S. (2011). *Mathematics for elementary teachers with activity manual* (3rd ed.). Boston, MA: Addison-Wesley.
2. National Council of Teachers of Mathematics. (2009). *Focus in grade 3: Teaching with curriculum focal points.* Reston, VA: Author.
3. Scott Foresman & Addison Wesley. (2009). *enVision math Texas: Grade 5.* Glenview: IL: Pearson Education.

Name: _____

Multiplication Timed Practice Sheet 1

Number Correct: _____

1	8 × 2	**2**	1 × 7	**3**	5 × 8	**4**	6 × 3
5	7 × 4	**6**	6 × 6	**7**	2 × 12	**8**	4 × 5
9	7 × 6	**10**	3 × 9	**11**	11 × 5	**12**	3 × 3
13	8 × 9	**14**	2 × 4	**15**	6 × 9	**16**	4 × 12
17	9 × 6	**18**	10 × 8	**19**	2 × 9	**20**	8 × 3

Multiplication Timed Practice Sheet 1

1	8 × 2 = 16	**2**	1 × 7 = 7	**3**	5 × 8 = 40	**4**	6 × 3 = 18
5	7 × 4 = 28	**6**	6 × 6 = 36	**7**	2 × 12 = 24	**8**	4 × 5 = 20
9	7 × 6 = 42	**10**	3 × 9 = 27	**11**	11 × 5 = 55	**12**	3 × 3 = 9
13	8 × 9 = 72	**14**	2 × 4 = 8	**15**	6 × 9 = 54	**16**	4 × 12 = 48
17	9 × 6 = 54	**18**	10 × 8 = 80	**19**	2 × 9 = 18	**20**	8 × 3 = 24

Name: _____

Multiplication Timed Practice Sheet 2

Number Correct: _____

1	7 × 2	**2**	5 × 5	**3**	9 × 1	**4**	7 × 11
5	5 × 6	**6**	10 × 3	**7**	7 × 5	**8**	3 × 4
9	4 × 9	**10**	4 × 7	**11**	12 × 6	**12**	7 × 8
13	7 × 10	**14**	8 × 6	**15**	6 × 7	**16**	5 × 3
17	9 × 8	**18**	6 × 4	**19**	9 × 4	**20**	8 × 4

Multiplication Timed Practice Sheet 2

1	7 × 2 = 14	**2**	5 × 5 = 25	**3**	9 × 1 = 9	**4**	7 × 11 = 77
5	5 × 6 = 30	**6**	10 × 3 = 30	**7**	7 × 5 = 35	**8**	3 × 4 = 12
9	4 × 9 = 36	**10**	4 × 7 = 28	**11**	12 × 6 = 72	**12**	7 × 8 = 56
13	7 × 10 = 70	**14**	8 × 6 = 48	**15**	6 × 7 = 42	**16**	5 × 3 = 15
17	9 × 8 = 72	**18**	6 × 4 = 24	**19**	9 × 4 = 36	**20**	8 × 4 = 32

Name: _____

Multiplication Timed Practice Sheet 3

Number Correct: _____

1 1 × 12	**2** 4 × 3	**3** 5 × 2	**4** 10 × 7
5 10 × 2	**6** 4 × 8	**7** 3 × 7	**8** 12 × 7
9 11 × 6	**10** 3 × 12	**11** 4 × 6	**12** 5 × 9
13 8 × 7	**14** 7 × 3	**15** 8 × 8	**16** 5 × 10
17 5 × 4	**18** 9 × 2	**19** 3 × 11	**20** 9 × 7

Multiplication Timed Practice Sheet 3

1	1 × 12 = 12	**2**	4 × 3 = 12	**3**	5 × 2 = 10	**4**	10 × 7 = 70
5	10 × 2 = 20	**6**	4 × 8 = 32	**7**	3 × 7 = 21	**8**	12 × 7 = 84
9	11 × 6 = 66	**10**	3 × 12 = 36	**11**	4 × 6 = 24	**12**	5 × 9 = 45
13	8 × 7 = 56	**14**	7 × 3 = 21	**15**	8 × 8 = 64	**16**	5 × 10 = 50
17	5 × 4 = 20	**18**	9 × 2 = 18	**19**	3 × 11 = 33	**20**	9 × 7 = 63

Name: _____

Multiplication Timed Practice Sheet 4

Number Correct: _____

1	2 × 8	**2**	3 × 6	**3**	8 × 5	**4**	2 × 7
5	11 × 9	**6**	4 × 4	**7**	9 × 4	**8**	3 × 10
9	5 × 9	**10**	5 × 12	**11**	7 × 3	**12**	1 × 5
13	3 × 2	**14**	6 × 8	**15**	9 × 11	**16**	4 × 5
17	12 × 5	**18**	4 × 2	**19**	7 × 7	**20**	10 × 10

Multiplication Timed Practice Sheet 4

1	2 × 8 = 16	**2**	3 × 6 = 18	**3**	8 × 5 = 40	**4**	2 × 7 = 14
5	11 × 9 = 99	**6**	4 × 4 = 16	**7**	9 × 4 = 36	**8**	3 × 10 = 30
9	5 × 9 = 45	**10**	5 × 12 = 60	**11**	7 × 3 = 21	**12**	1 × 5 = 5
13	3 × 2 = 6	**14**	6 × 8 = 48	**15**	9 × 11 = 99	**16**	4 × 5 = 20
17	12 × 5 = 60	**18**	4 × 2 = 8	**19**	7 × 7 = 49	**20**	10 × 10 = 100

Name: _____

Multiplication Timed Practice Sheet 5

Number Correct: _____

1	4 × 6	**2**	9 × 3	**3**	5 × 11	**4**	10 × 5
5	5 × 7	**6**	2 × 10	**7**	3 × 1	**8**	12 × 5
9	8 × 6	**10**	6 × 12	**11**	6 × 2	**12**	7 × 7
13	4 × 7	**14**	5 × 3	**15**	3 × 8	**16**	12 × 2
17	9 × 3	**18**	11 × 4	**19**	7 × 4	**20**	9 × 10

Multiplication Timed Practice Sheet 5

1	4 × 6 = 24	**2**	9 × 3 = 27	**3**	5 × 11 = 55	**4**	10 × 5 = 50
5	5 × 7 = 35	**6**	2 × 10 = 20	**7**	3 × 1 = 3	**8**	12 × 5 = 60
9	8 × 6 = 48	**10**	6 × 12 = 72	**11**	6 × 2 = 12	**12**	7 × 7 = 49
13	4 × 7 = 28	**14**	5 × 3 = 15	**15**	3 × 8 = 24	**16**	12 × 2 = 24
17	9 × 3 = 27	**18**	11 × 4 = 44	**19**	7 × 4 = 28	**20**	9 × 10 = 90

Name: _____

Multiplication Timed Practice Sheet 6

Number Correct: _____

1	4 × 3	**2**	3 × 6	**3**	7 × 5	**4**	6 × 4
5	8 × 10	**6**	2 × 2	**7**	11 × 2	**8**	5 × 5
9	3 × 5	**10**	4 × 8	**11**	7 × 9	**12**	8 × 12
13	2 × 10	**14**	1 × 8	**15**	6 × 11	**16**	11 × 12
17	12 × 8	**18**	10 × 6	**19**	2 × 5	**20**	9 × 7

Multiplication Timed Practice Sheet 6

1	4 × 3 = 12	**2**	3 × 6 = 18	**3**	7 × 5 = 35	**4**	6 × 4 = 24
5	8 × 10 = 80	**6**	2 × 2 = 4	**7**	11 × 2 = 22	**8**	5 × 5 = 25
9	3 × 5 = 15	**10**	4 × 8 = 32	**11**	7 × 9 = 63	**12**	8 × 12 = 96
13	2 × 10 = 20	**14**	1 × 8 = 8	**15**	6 × 11 = 66	**16**	11 × 12 = 132
17	12 × 8 = 96	**18**	10 × 6 = 60	**19**	2 × 5 = 10	**20**	9 × 7 = 63

Name: _____

Multiplication Timed Practice Sheet 7

Number Correct: _____

1	5 × 8	**2**	4 × 4	**3**	5 × 7	**4**	9 × 2
5	8 × 11	**6**	3 × 7	**7**	2 × 6	**8**	3 × 5
9	3 × 4	**10**	9 × 12	**11**	6 × 10	**12**	8 × 3
13	12 × 11	**14**	8 × 8	**15**	5 × 4	**16**	1 × 11
17	6 × 7	**18**	7 × 6	**19**	10 × 9	**20**	6 × 5

Multiplication Timed Practice Sheet 7

1	5 × 8 = 40	**2**	4 × 4 = 16	**3**	5 × 7 = 35	**4**	9 × 2 = 18
5	8 × 11 = 88	**6**	3 × 7 = 21	**7**	2 × 6 = 12	**8**	3 × 5 = 15
9	3 × 4 = 12	**10**	9 × 12 = 108	**11**	6 × 10 = 60	**12**	8 × 3 = 24
13	12 × 11 = 132	**14**	8 × 8 = 64	**15**	5 × 4 = 20	**16**	1 × 11 = 11
17	6 × 7 = 42	**18**	7 × 6 = 42	**19**	10 × 9 = 90	**20**	6 × 5 = 30

Name: _____

Multiplication Timed Practice Sheet 8

Number Correct: _____

1 3 × 10	**2** 9 × 6	**3** 11 × 2	**4** 6 × 10
5 7 × 9	**6** 8 × 7	**7** 5 × 2	**8** 4 × 11
9 4 × 1	**10** 6 × 9	**11** 6 × 5	**12** 8 × 5
13 10 × 3	**14** 11 × 7	**15** 2 × 12	**16** 9 × 9
17 6 × 8	**18** 2 × 3	**19** 7 × 12	**20** 4 × 2

Multiplication Timed Practice Sheet 8

1	3 × 10 = 30	**2**	9 × 6 = 54	**3**	11 × 2 = 22	**4**	6 × 10 = 60
5	7 × 9 = 63	**6**	8 × 7 = 56	**7**	5 × 2 = 10	**8**	4 × 11 = 44
9	4 × 1 = 4	**10**	6 × 9 = 54	**11**	6 × 5 = 30	**12**	8 × 5 = 40
13	10 × 3 = 30	**14**	11 × 7 = 77	**15**	2 × 12 = 24	**16**	9 × 9 = 81
17	6 × 8 = 48	**18**	2 × 3 = 6	**19**	7 × 12 = 84	**20**	4 × 2 = 8

Name: _____

Multiplication Timed Practice Sheet 9

Number Correct: _____

1 6 × 2	**2** 9 × 5	**3** 11 × 8	**4** 2 × 6
5 5 × 6	**6** 8 × 9	**7** 9 × 8	**8** 10 × 4
9 12 × 3	**10** 11 × 11	**11** 4 × 10	**12** 7 × 8
13 3 × 9	**14** 4 × 9	**15** 8 × 2	**16** 12 × 9
17 11 × 3	**18** 10 × 7	**19** 1 × 6	**20** 2 × 8

Multiplication Timed Practice Sheet 9

1	6 × 2 = 12	**2**	9 × 5 = 45	**3**	11 × 8 = 88	**4**	2 × 6 = 12
5	5 × 6 = 30	**6**	8 × 9 = 72	**7**	9 × 8 = 72	**8**	10 × 4 = 40
9	12 × 3 = 36	**10**	11 × 11 = 121	**11**	4 × 10 = 40	**12**	7 × 8 = 56
13	3 × 9 = 27	**14**	4 × 9 = 36	**15**	8 × 2 = 16	**16**	12 × 9 = 108
17	11 × 3 = 33	**18**	10 × 7 = 70	**19**	1 × 6 = 6	**20**	2 × 8 = 16

Name: _____

Multiplication Timed Practice Sheet 10

Number Correct: _____

1	3 × 8	**2**	6 × 3	**3**	3 × 3	**4**	10 × 1
5	2 × 5	**6**	2 × 11	**7**	9 × 9	**8**	9 × 5
9	2 × 9	**10**	6 × 6	**11**	2 × 3	**12**	12 × 3
13	2 × 7	**14**	12 × 10	**15**	8 × 4	**16**	11 × 8
17	11 × 4	**18**	5 × 5	**19**	10 × 11	**20**	7 × 2

Multiplication Timed Practice Sheet 10

1	3 × 8 = 24	**2**	6 × 3 = 18	**3**	3 × 3 = 9	**4**	10 × 1 = 10
5	2 × 5 = 10	**6**	2 × 11 = 22	**7**	9 × 9 = 81	**8**	9 × 5 = 45
9	2 × 9 = 18	**10**	6 × 6 = 36	**11**	2 × 3 = 6	**12**	12 × 3 = 36
13	2 × 7 = 14	**14**	12 × 10 = 120	**15**	8 × 4 = 32	**16**	11 × 8 = 88
17	11 × 4 = 44	**18**	5 × 5 = 25	**19**	10 × 11 = 110	**20**	7 × 2 = 14

Name: _____

Division Timed Practice Sheet 1

Number Correct: _____

1	$7\overline{)21}$	**2**	$5\overline{)10}$	**3**	$2\overline{)14}$	**4**	$9\overline{)27}$
5	$6\overline{)24}$	**6**	$10\overline{)70}$	**7**	$8\overline{)32}$	**8**	$6\overline{)36}$
9	$3\overline{)9}$	**10**	$5\overline{)35}$	**11**	$1\overline{)8}$	**12**	$12\overline{)24}$
13	$2\overline{)20}$	**14**	$8\overline{)40}$	**15**	$3\overline{)15}$	**16**	$4\overline{)32}$
17	$4\overline{)28}$	**18**	$7\overline{)42}$	**19**	$9\overline{)63}$	**20**	$6\overline{)66}$

Division Timed Practice Sheet 1

1	$7\overline{)21}$	**2**	$5\overline{)10}$	**3**	$2\overline{)14}$	**4**	$9\overline{)27}$
5	$6\overline{)24}$	**6**	$10\overline{)70}$	**7**	$8\overline{)32}$	**8**	$6\overline{)36}$
9	$3\overline{)9}$	**10**	$5\overline{)35}$	**11**	$1\overline{)8}$	**12**	$12\overline{)24}$
13	$2\overline{)20}$	**14**	$8\overline{)40}$	**15**	$3\overline{)15}$	**16**	$4\overline{)32}$
17	$4\overline{)28}$	**18**	$7\overline{)42}$	**19**	$9\overline{)63}$	**20**	$6\overline{)66}$

Name: _____

Division Timed Practice Sheet 2

Number Correct: _____

1	$2\overline{)10}$	**2**	$3\overline{)27}$	**3**	$3\overline{)21}$	**4**	$7\overline{)14}$
5	$6\overline{)30}$	**6**	$1\overline{)6}$	**7**	$6\overline{)54}$	**8**	$12\overline{)60}$
9	$3\overline{)36}$	**10**	$4\overline{)24}$	**11**	$5\overline{)25}$	**12**	$10\overline{)80}$
13	$8\overline{)16}$	**14**	$11\overline{)44}$	**15**	$8\overline{)24}$	**16**	$5\overline{)30}$
17	$9\overline{)54}$	**18**	$6\overline{)60}$	**19**	$8\overline{)72}$	**20**	$7\overline{)56}$

Division Timed Practice Sheet 2

1	$2\overline{)10}$	**2**	$3\overline{)27}$	**3**	$3\overline{)21}$	**4**	$7\overline{)14}$
5	$6\overline{)30}$	**6**	$1\overline{)6}$	**7**	$6\overline{)54}$	**8**	$12\overline{)60}$
9	$3\overline{)36}$	**10**	$4\overline{)24}$	**11**	$5\overline{)25}$	**12**	$10\overline{)80}$
13	$8\overline{)16}$	**14**	$11\overline{)44}$	**15**	$8\overline{)24}$	**16**	$5\overline{)30}$
17	$9\overline{)54}$	**18**	$6\overline{)60}$	**19**	$8\overline{)72}$	**20**	$7\overline{)56}$

Name: _____

Division Timed Practice Sheet 3

Number Correct: _____

1	$11\overline{)66}$	**2**	$2\overline{)18}$	**3**	$6\overline{)42}$	**4**	$7\overline{)63}$
5	$5\overline{)45}$	**6**	$3\overline{)24}$	**7**	$9\overline{)36}$	**8**	$1\overline{)12}$
9	$4\overline{)20}$	**10**	$10\overline{)30}$	**11**	$9\overline{)36}$	**12**	$9\overline{)90}$
13	$8\overline{)80}$	**14**	$3\overline{)18}$	**15**	$8\overline{)24}$	**16**	$4\overline{)16}$
17	$7\overline{)35}$	**18**	$6\overline{)18}$	**19**	$9\overline{)99}$	**20**	$12\overline{)120}$

Division Timed Practice Sheet 3

1	$11\overline{)66}$ = 6	**2**	$2\overline{)18}$ = 9	**3**	$6\overline{)42}$ = 7	**4**	$7\overline{)63}$ = 9
5	$5\overline{)45}$ = 9	**6**	$3\overline{)24}$ = 8	**7**	$9\overline{)36}$ = 4	**8**	$1\overline{)12}$ = 12
9	$4\overline{)20}$ = 5	**10**	$10\overline{)30}$ = 3	**11**	$9\overline{)36}$ = 4	**12**	$9\overline{)90}$ = 10
13	$8\overline{)80}$ = 10	**14**	$3\overline{)18}$ = 6	**15**	$8\overline{)24}$ = 3	**16**	$4\overline{)16}$ = 4
17	$7\overline{)35}$ = 5	**18**	$6\overline{)18}$ = 3	**19**	$9\overline{)99}$ = 11	**20**	$12\overline{)120}$ = 10

Name: _____

Division Timed Practice Sheet 4

Number Correct: _____

1	$5\overline{)15}$	**2**	$11\overline{)55}$	**3**	$4\overline{)12}$	**4**	$9\overline{)45}$
5	$7\overline{)28}$	**6**	$4\overline{)36}$	**7**	$1\overline{)7}$	**8**	$10\overline{)60}$
9	$2\overline{)16}$	**10**	$5\overline{)40}$	**11**	$8\overline{)56}$	**12**	$2\overline{)24}$
13	$9\overline{)18}$	**14**	$11\overline{)88}$	**15**	$12\overline{)48}$	**16**	$7\overline{)49}$
17	$7\overline{)56}$	**18**	$3\overline{)6}$	**19**	$4\overline{)40}$	**20**	$6\overline{)30}$

Division Timed Practice Sheet 4

1	$5\overline{)15}$	**2**	$11\overline{)55}$	**3**	$4\overline{)12}$	**4**	$9\overline{)45}$
5	$7\overline{)28}$	**6**	$4\overline{)36}$	**7**	$1\overline{)7}$	**8**	$10\overline{)60}$
9	$2\overline{)16}$	**10**	$5\overline{)40}$	**11**	$8\overline{)56}$	**12**	$2\overline{)24}$
13	$9\overline{)18}$	**14**	$11\overline{)88}$	**15**	$12\overline{)48}$	**16**	$7\overline{)49}$
17	$7\overline{)56}$	**18**	$3\overline{)6}$	**19**	$4\overline{)40}$	**20**	$6\overline{)30}$

Name: _____

Division Timed Practice Sheet 5

Number Correct: _____

1	$3\overline{)21}$	**2**	$6\overline{)12}$	**3**	$3\overline{)36}$	**4**	$3\overline{)15}$
5	$9\overline{)36}$	**6**	$8\overline{)48}$	**7**	$3\overline{)12}$	**8**	$10\overline{)90}$
9	$4\overline{)24}$	**10**	$5\overline{)60}$	**11**	$11\overline{)33}$	**12**	$8\overline{)64}$
13	$1\overline{)4}$	**14**	$4\overline{)28}$	**15**	$6\overline{)48}$	**16**	$5\overline{)55}$
17	$12\overline{)24}$	**18**	$7\overline{)70}$	**19**	$9\overline{)27}$	**20**	$12\overline{)96}$

Division Timed Practice Sheet 5

1	$3\overline{)21}$ = 7	**2**	$6\overline{)12}$ = 2	**3**	$3\overline{)36}$ = 12	**4**	$3\overline{)15}$ = 5
5	$9\overline{)36}$ = 4	**6**	$8\overline{)48}$ = 6	**7**	$3\overline{)12}$ = 4	**8**	$10\overline{)90}$ = 9
9	$4\overline{)24}$ = 6	**10**	$5\overline{)60}$ = 12	**11**	$11\overline{)33}$ = 3	**12**	$8\overline{)64}$ = 8
13	$1\overline{)4}$ = 4	**14**	$4\overline{)28}$ = 7	**15**	$6\overline{)48}$ = 8	**16**	$5\overline{)55}$ = 11
17	$12\overline{)24}$ = 2	**18**	$7\overline{)70}$ = 10	**19**	$9\overline{)27}$ = 3	**20**	$12\overline{)96}$ = 8

Name: _____

Division Timed Practice Sheet 6

Number Correct: _____

1	$2\overline{)20}$	**2**	$8\overline{)16}$	**3**	$5\overline{)20}$	**4**	$1\overline{)3}$
5	$5\overline{)35}$	**6**	$4\overline{)44}$	**7**	$6\overline{)48}$	**8**	$11\overline{)110}$
9	$3\overline{)18}$	**10**	$2\overline{)4}$	**11**	$3\overline{)27}$	**12**	$6\overline{)72}$
13	$9\overline{)81}$	**14**	$3\overline{)24}$	**15**	$10\overline{)20}$	**16**	$4\overline{)48}$
17	$6\overline{)30}$	**18**	$10\overline{)110}$	**19**	$9\overline{)54}$	**20**	$7\overline{)28}$

Division Timed Practice Sheet 6

1	$2\overline{)20}$ = 10	**2**	$8\overline{)16}$ = 2	**3**	$5\overline{)20}$ = 4	**4**	$1\overline{)3}$ = 3
5	$5\overline{)35}$ = 7	**6**	$4\overline{)44}$ = 11	**7**	$6\overline{)48}$ = 8	**8**	$11\overline{)110}$ = 10
9	$3\overline{)18}$ = 6	**10**	$2\overline{)4}$ = 2	**11**	$3\overline{)27}$ = 9	**12**	$6\overline{)72}$ = 12
13	$9\overline{)81}$ = 9	**14**	$3\overline{)24}$ = 8	**15**	$10\overline{)20}$ = 2	**16**	$4\overline{)48}$ = 12
17	$6\overline{)30}$ = 5	**18**	$10\overline{)110}$ = 11	**19**	$9\overline{)54}$ = 6	**20**	$7\overline{)28}$ = 4

Name: _____

Division Timed Practice Sheet 7

Number Correct: _____

1	$2\overline{)10}$	**2**	$8\overline{)40}$	**3**	$3\overline{)9}$	**4**	$11\overline{)55}$
5	$8\overline{)56}$	**6**	$8\overline{)32}$	**7**	$7\overline{)63}$	**8**	$2\overline{)22}$
9	$4\overline{)36}$	**10**	$10\overline{)80}$	**11**	$8\overline{)64}$	**12**	$12\overline{)72}$
13	$5\overline{)15}$	**14**	$9\overline{)63}$	**15**	$7\overline{)77}$	**16**	$6\overline{)18}$
17	$5\overline{)50}$	**18**	$6\overline{)36}$	**19**	$6\overline{)24}$	**20**	$1\overline{)9}$

Division Timed Practice Sheet 7

1	$2\overline{)10}$ = 5	**2**	$8\overline{)40}$ = 5	**3**	$3\overline{)9}$ = 3	**4**	$11\overline{)55}$ = 5
5	$8\overline{)56}$ = 7	**6**	$8\overline{)32}$ = 4	**7**	$7\overline{)63}$ = 9	**8**	$2\overline{)22}$ = 11
9	$4\overline{)36}$ = 9	**10**	$10\overline{)80}$ = 8	**11**	$8\overline{)64}$ = 8	**12**	$12\overline{)72}$ = 6
13	$5\overline{)15}$ = 3	**14**	$9\overline{)63}$ = 7	**15**	$7\overline{)77}$ = 11	**16**	$6\overline{)18}$ = 3
17	$5\overline{)50}$ = 10	**18**	$6\overline{)36}$ = 6	**19**	$6\overline{)24}$ = 4	**20**	$1\overline{)9}$ = 9

Name: _____

Division Timed Practice Sheet 8

Number Correct: _____

1	$9\overline{)45}$	**2**	$11\overline{)66}$	**3**	$2\overline{)4}$	**4**	$2\overline{)12}$
5	$1\overline{)5}$	**6**	$12\overline{)108}$	**7**	$5\overline{)55}$	**8**	$7\overline{)49}$
9	$5\overline{)60}$	**10**	$4\overline{)8}$	**11**	$4\overline{)32}$	**12**	$10\overline{)40}$
13	$7\overline{)84}$	**14**	$7\overline{)21}$	**15**	$12\overline{)144}$	**16**	$6\overline{)54}$
17	$9\overline{)81}$	**18**	$11\overline{)99}$	**19**	$4\overline{)40}$	**20**	$5\overline{)50}$

Division Timed Practice Sheet 8

1	$9\overline{)45}$ = 5	**2**	$11\overline{)66}$ = 6	**3**	$2\overline{)4}$ = 2	**4**	$2\overline{)12}$ = 6
5	$1\overline{)5}$ = 5	**6**	$12\overline{)108}$ = 9	**7**	$5\overline{)55}$ = 11	**8**	$7\overline{)49}$ = 7
9	$5\overline{)60}$ = 12	**10**	$4\overline{)8}$ = 2	**11**	$4\overline{)32}$ = 8	**12**	$10\overline{)40}$ = 4
13	$7\overline{)84}$ = 12	**14**	$7\overline{)21}$ = 3	**15**	$12\overline{)144}$ = 12	**16**	$6\overline{)54}$ = 9
17	$9\overline{)81}$ = 9	**18**	$11\overline{)99}$ = 9	**19**	$4\overline{)40}$ = 10	**20**	$5\overline{)50}$ = 10

Name: _____

Division Timed Practice Sheet 9

Number Correct: _____

1	$11\overline{)22}$	**2**	$4\overline{)12}$	**3**	$6\overline{)66}$	**4**	$5\overline{)30}$
5	$4\overline{)16}$	**6**	$2\overline{)6}$	**7**	$5\overline{)45}$	**8**	$10\overline{)120}$
9	$10\overline{)40}$	**10**	$8\overline{)88}$	**11**	$8\overline{)72}$	**12**	$12\overline{)36}$
13	$2\overline{)14}$	**14**	$11\overline{)121}$	**15**	$7\overline{)35}$	**16**	$1\overline{)10}$
17	$4\overline{)48}$	**18**	$9\overline{)72}$	**19**	$12\overline{)84}$	**20**	$3\overline{)33}$

Division Timed Practice Sheet 9

1	$11\overline{)22}$	**2**	$4\overline{)12}$	**3**	$6\overline{)66}$	**4**	$5\overline{)30}$
5	$4\overline{)16}$	**6**	$2\overline{)6}$	**7**	$5\overline{)45}$	**8**	$10\overline{)120}$
9	$10\overline{)40}$	**10**	$8\overline{)88}$	**11**	$8\overline{)72}$	**12**	$12\overline{)36}$
13	$2\overline{)14}$	**14**	$11\overline{)121}$	**15**	$7\overline{)35}$	**16**	$1\overline{)10}$
17	$4\overline{)48}$	**18**	$9\overline{)72}$	**19**	$12\overline{)84}$	**20**	$3\overline{)33}$

Name: _____

Division Timed Practice Sheet 10

Number Correct: _____

1	$10\overline{)70}$	**2**	$6\overline{)12}$	**3**	$2\overline{)8}$	**4**	$3\overline{)12}$
5	$5\overline{)25}$	**6**	$6\overline{)42}$	**7**	$5\overline{)20}$	**8**	$3\overline{)30}$
9	$2\overline{)18}$	**10**	$10\overline{)100}$	**11**	$4\overline{)12}$	**12**	$8\overline{)48}$
13	$7\overline{)42}$	**14**	$12\overline{)36}$	**15**	$4\overline{)48}$	**16**	$11\overline{)77}$
17	$9\overline{)72}$	**18**	$1\overline{)11}$	**19**	$3\overline{)33}$	**20**	$5\overline{)10}$

Division Timed Practice Sheet 10

1	$10\overline{)70}$ = 7	**2**	$6\overline{)12}$ = 2	**3**	$2\overline{)8}$ = 4	**4**	$3\overline{)12}$ = 4
5	$5\overline{)25}$ = 5	**6**	$6\overline{)42}$ = 7	**7**	$5\overline{)20}$ = 4	**8**	$3\overline{)30}$ = 10
9	$2\overline{)18}$ = 9	**10**	$10\overline{)100}$ = 10	**11**	$4\overline{)12}$ = 3	**12**	$8\overline{)48}$ = 6
13	$7\overline{)42}$ = 6	**14**	$12\overline{)36}$ = 3	**15**	$4\overline{)48}$ = 12	**16**	$11\overline{)77}$ = 7
17	$9\overline{)72}$ = 8	**18**	$1\overline{)11}$ = 11	**19**	$3\overline{)33}$ = 11	**20**	$5\overline{)10}$ = 2

Name: _____

Mixed Facts Timed Practice Sheet 1

Number Correct: _____

1	4×7	**2**	$2\overline{)16}$	**3**	4×5	**4**	$7\overline{)21}$
5	11×1	**6**	$7\overline{)56}$	**7**	8×8	**8**	3×4
9	$4\overline{)36}$	**10**	$3\overline{)18}$	**11**	$8\overline{)64}$	**12**	3×12
13	$9\overline{)45}$	**14**	$7\overline{)70}$	**15**	7×6	**16**	10×6
17	8×2	**18**	9×6	**19**	$5\overline{)20}$	**20**	$5\overline{)55}$

Mixed Facts Timed Practice Sheet 1

1 $4 \times 7 = 28$

2 $16 \div 2 = 8$

3 $4 \times 5 = 20$

4 $21 \div 7 = 3$

5 $11 \times 1 = 11$

6 $56 \div 7 = 8$

7 $8 \times 8 = 64$

8 $3 \times 4 = 12$

9 $36 \div 4 = 9$

10 $18 \div 3 = 6$

11 $64 \div 8 = 8$

12 $3 \times 12 = 36$

13 $45 \div 9 = 5$

14 $70 \div 7 = 10$

15 $7 \times 6 = 42$

16 $10 \times 6 = 60$

17 $8 \times 2 = 16$

18 $9 \times 6 = 54$

19 $20 \div 5 = 4$

20 $55 \div 5 = 11$

Name: _____

Mixed Facts Timed Practice Sheet 2

Number Correct: _____

1	2×9	**2**	5×10	**3**	$2\overline{)12}$	**4**	5×7
5	$6\overline{)42}$	**6**	11×4	**7**	7×8	**8**	$8\overline{)32}$
9	$6\overline{)54}$	**10**	$3\overline{)33}$	**11**	5×12	**12**	$1\overline{)12}$
13	12×2	**14**	$4\overline{)16}$	**15**	6×9	**16**	3×6
17	$12\overline{)24}$	**18**	3×8	**19**	$10\overline{)20}$	**20**	$4\overline{)8}$

Mixed Facts Timed Practice Sheet 2

1 $2 \times 9 = 18$

2 $5 \times 10 = 50$

3 $2\overline{)12} = 6$

4 $5 \times 7 = 35$

5 $6\overline{)42} = 7$

6 $11 \times 4 = 44$

7 $7 \times 8 = 56$

8 $8\overline{)32} = 4$

9 $6\overline{)54} = 9$

10 $3\overline{)33} = 11$

11 $5 \times 12 = 60$

12 $1\overline{)12} = 12$

13 $12 \times 2 = 24$

14 $4\overline{)16} = 4$

15 $6 \times 9 = 54$

16 $3 \times 6 = 18$

17 $12\overline{)24} = 2$

18 $3 \times 8 = 24$

19 $10\overline{)20} = 2$

20 $4\overline{)8} = 2$

Name: _____

Mixed Facts Timed Practice Sheet 3

Number Correct: _____

1	8×5	**2**	$3\overline{)12}$	**3**	4×8	**4**	$8\overline{)56}$
5	7×7	**6**	$10\overline{)60}$	**7**	$4\overline{)8}$	**8**	6×1
9	$10\overline{)100}$	**10**	9×2	**11**	$9\overline{)99}$	**12**	3×5
13	10×11	**14**	5×2	**15**	$3\overline{)27}$	**16**	12×4
17	$8\overline{)40}$	**18**	7×9	**19**	$5\overline{)35}$	**20**	$12\overline{)36}$

Mixed Facts Timed Practice Sheet 3

1 $8 \times 5 = 40$

2 $12 \div 3 = 4$

3 $4 \times 8 = 32$

4 $56 \div 8 = 7$

5 $7 \times 7 = 49$

6 $60 \div 10 = 6$

7 $8 \div 4 = 2$

8 $6 \times 1 = 6$

9 $100 \div 10 = 10$

10 $9 \times 2 = 18$

11 $99 \div 9 = 11$

12 $3 \times 5 = 15$

13 $10 \times 11 = 110$

14 $5 \times 2 = 10$

15 $27 \div 3 = 9$

16 $12 \times 4 = 48$

17 $40 \div 8 = 5$

18 $7 \times 9 = 63$

19 $35 \div 5 = 7$

20 $36 \div 12 = 3$

Name: _____

Mixed Facts Timed Practice Sheet 4

Number Correct: _____

1	4×6	**2**	$5\overline{)40}$	**3**	2×11	**4**	$3\overline{)21}$
5	$1\overline{)7}$	**6**	12×6	**7**	$4\overline{)12}$	**8**	2×10
9	6×8	**10**	$5\overline{)50}$	**11**	3×3	**12**	$9\overline{)72}$
13	8×10	**14**	7×4	**15**	$11\overline{)99}$	**16**	5×9
17	$12\overline{)60}$	**18**	$6\overline{)36}$	**19**	3×5	**20**	$7\overline{)28}$

Mixed Facts Timed Practice Sheet 4

1 $4 \times 6 = 24$

2 $40 \div 5 = 8$

3 $2 \times 11 = 22$

4 $21 \div 3 = 7$

5 $7 \div 1 = 7$

6 $12 \times 6 = 72$

7 $12 \div 4 = 3$

8 $2 \times 10 = 20$

9 $6 \times 8 = 48$

10 $50 \div 5 = 10$

11 $3 \times 3 = 9$

12 $72 \div 9 = 8$

13 $8 \times 10 = 80$

14 $7 \times 4 = 28$

15 $99 \div 11 = 9$

16 $5 \times 9 = 45$

17 $60 \div 12 = 5$

18 $36 \div 6 = 6$

19 $3 \times 5 = 15$

20 $28 \div 7 = 4$

Name: _____

Mixed Facts Timed Practice Sheet 5

Number Correct: _____

1	10×2	**2**	3×11	**3**	$3\overline{)15}$	**4**	$11\overline{)55}$
5	$12\overline{)24}$	**6**	7×5	**7**	9×1	**8**	9×7
9	8×4	**10**	11×7	**11**	$3\overline{)12}$	**12**	$4\overline{)20}$
13	$7\overline{)35}$	**14**	$9\overline{)36}$	**15**	12×10	**16**	8×9
17	9×9	**18**	$8\overline{)48}$	**19**	$6\overline{)60}$	**20**	$4\overline{)24}$

Mixed Facts Timed Practice Sheet 5

1 $10 \times 2 = 20$

2 $3 \times 11 = 33$

3 $3\overline{)15} = 5$

4 $11\overline{)55} = 5$

5 $12\overline{)24} = 2$

6 $7 \times 5 = 35$

7 $9 \times 1 = 9$

8 $9 \times 7 = 63$

9 $8 \times 4 = 32$

10 $11 \times 7 = 77$

11 $3\overline{)12} = 4$

12 $4\overline{)20} = 5$

13 $7\overline{)35} = 5$

14 $9\overline{)36} = 4$

15 $12 \times 10 = 120$

16 $8 \times 9 = 72$

17 $9 \times 9 = 81$

18 $8\overline{)48} = 6$

19 $6\overline{)60} = 10$

20 $4\overline{)24} = 6$

Name: _____

Mixed Facts Timed Practice Sheet 6

Number Correct: _____

1	3×9	**2**	$5\overline{)30}$	**3**	$4\overline{)28}$	**4**	10×8
5	8×7	**6**	7×3	**7**	$2\overline{)20}$	**8**	$5\overline{)25}$
9	$6\overline{)24}$	**10**	2×12	**11**	11×2	**12**	$12\overline{)48}$
13	$1\overline{)11}$	**14**	$11\overline{)44}$	**15**	9×9	**16**	5×3
17	$5\overline{)15}$	**18**	9×4	**19**	$6\overline{)48}$	**20**	3×10

Mixed Facts Timed Practice Sheet 6

1 $3 \times 9 = 27$

2 $5\overline{)30} = 6$

3 $4\overline{)28} = 7$

4 $10 \times 8 = 80$

5 $8 \times 7 = 56$

6 $7 \times 3 = 21$

7 $2\overline{)20} = 10$

8 $5\overline{)25} = 5$

9 $6\overline{)24} = 4$

10 $2 \times 12 = 24$

11 $11 \times 2 = 22$

12 $12\overline{)48} = 4$

13 $1\overline{)11} = 11$

14 $11\overline{)44} = 4$

15 $9 \times 9 = 81$

16 $5 \times 3 = 15$

17 $5\overline{)15} = 3$

18 $9 \times 4 = 36$

19 $6\overline{)48} = 8$

20 $3 \times 10 = 30$

Name: _____

Mixed Facts Timed Practice Sheet 7

Number Correct: _____

1	5×4	**2**	$4\overline{)32}$	**3**	8×3	**4**	$7\overline{)14}$
5	$3\overline{)30}$	**6**	$7\overline{)42}$	**7**	$6\overline{)30}$	**8**	6×7
9	6×4	**10**	$4\overline{)40}$	**11**	7×1	**12**	5×8
13	$9\overline{)81}$	**14**	10×12	**15**	$9\overline{)63}$	**16**	4×9
17	6×2	**18**	11×3	**19**	$11\overline{)22}$	**20**	$10\overline{)70}$

Mixed Facts Timed Practice Sheet 7

1 $5 \times 4 = 20$

2 $32 \div 4 = 8$

3 $8 \times 3 = 24$

4 $14 \div 7 = 2$

5 $30 \div 3 = 10$

6 $42 \div 7 = 6$

7 $30 \div 6 = 5$

8 $6 \times 7 = 42$

9 $6 \times 4 = 24$

10 $40 \div 4 = 10$

11 $7 \times 1 = 7$

12 $5 \times 8 = 40$

13 $81 \div 9 = 9$

14 $10 \times 12 = 120$

15 $63 \div 9 = 7$

16 $4 \times 9 = 36$

17 $6 \times 2 = 12$

18 $11 \times 3 = 33$

19 $22 \div 11 = 2$

20 $70 \div 10 = 7$

Name: _____

Mixed Facts Timed Practice Sheet 8

Number Correct: _____

1	10×4	**2**	$3\overline{)24}$	**3**	$5\overline{)45}$	**4**	9×3
5	6×11	**6**	6×5	**7**	$10\overline{)40}$	**8**	$1\overline{)5}$
9	$8\overline{)24}$	**10**	$3\overline{)36}$	**11**	11×9	**12**	$6\overline{)18}$
13	$12\overline{)72}$	**14**	9×8	**15**	$9\overline{)54}$	**16**	8×6
17	$7\overline{)14}$	**18**	6×7	**19**	7×12	**20**	5×5

Mixed Facts Timed Practice Sheet 8

1 $10 \times 4 = 40$

2 $3\overline{)24} = 8$

3 $5\overline{)45} = 9$

4 $9 \times 3 = 27$

5 $6 \times 11 = 66$

6 $6 \times 5 = 30$

7 $10\overline{)40} = 4$

8 $1\overline{)5} = 5$

9 $8\overline{)24} = 3$

10 $3\overline{)36} = 12$

11 $11 \times 9 = 99$

12 $6\overline{)18} = 3$

13 $12\overline{)72} = 6$

14 $9 \times 8 = 72$

15 $9\overline{)54} = 6$

16 $8 \times 6 = 48$

17 $7\overline{)14} = 2$

18 $6 \times 7 = 42$

19 $7 \times 12 = 84$

20 $5 \times 5 = 25$

Name: _____

Mixed Facts Timed Practice Sheet 9

Number Correct: _____

1	4×4	**2**	$9\overline{)18}$	**3**	9×5	**4**	$3\overline{)12}$
5	$9\overline{)27}$	**6**	11×11	**7**	$5\overline{)60}$	**8**	$6\overline{)12}$
9	$6\overline{)60}$	**10**	5×6	**11**	12×8	**12**	8×1
13	$7\overline{)49}$	**14**	6×2	**15**	11×10	**16**	$7\overline{)77}$
17	7×10	**18**	$11\overline{)121}$	**19**	$8\overline{)16}$	**20**	4×12

Mixed Facts Timed Practice Sheet 9

1 $4 \times 4 = 16$

2 $9\overline{)18} = 2$

3 $9 \times 5 = 45$

4 $3\overline{)12} = 4$

5 $9\overline{)27} = 3$

6 $11 \times 11 = 121$

7 $5\overline{)60} = 12$

8 $6\overline{)12} = 2$

9 $6\overline{)60} = 10$

10 $5 \times 6 = 30$

11 $12 \times 8 = 96$

12 $8 \times 1 = 8$

13 $7\overline{)49} = 7$

14 $6 \times 2 = 12$

15 $11 \times 10 = 110$

16 $7\overline{)77} = 11$

17 $7 \times 10 = 70$

18 $11\overline{)121} = 11$

19 $8\overline{)16} = 2$

20 $4 \times 12 = 48$

Name: _____

Mixed Facts Timed Practice Sheet 10

Number Correct: _____

1	3×6	**2**	10×7	**3**	$2\overline{)18}$	**4**	$11\overline{)88}$
5	7×2	**6**	$4\overline{)48}$	**7**	9×10	**8**	$8\overline{)72}$
9	4×3	**10**	$7\overline{)63}$	**11**	3×7	**12**	11×6
13	$3\overline{)9}$	**14**	$12\overline{)96}$	**15**	$1\overline{)10}$	**16**	$5\overline{)15}$
17	$10\overline{)90}$	**18**	9×12	**19**	2×5	**20**	11×12

Mixed Facts Timed Practice Sheet 10

1 $3 \times 6 = 18$

2 $10 \times 7 = 70$

3 $2\overline{)18} = 9$

4 $11\overline{)88} = 8$

5 $7 \times 2 = 14$

6 $4\overline{)48} = 12$

7 $9 \times 10 = 90$

8 $8\overline{)72} = 9$

9 $4 \times 3 = 12$

10 $7\overline{)63} = 9$

11 $3 \times 7 = 21$

12 $11 \times 6 = 66$

13 $3\overline{)9} = 3$

14 $12\overline{)96} = 8$

15 $1\overline{)10} = 10$

16 $5\overline{)15} = 3$

17 $10\overline{)90} = 9$

18 $9 \times 12 = 108$

19 $2 \times 5 = 10$

20 $11 \times 12 = 132$

Name _____

Fact Practice Graph