Display Master: Key Ideas: Writing Proportions from Word Problems

- A proportion can be written to find a missing value from a situation that models a proportional relationship.
- When writing a proportion, using units or labels for the quantities being compared is essential to ensure that like ratios are compared.

Display Master: Lunchtime A

A school survey found that 20 out of 50 students eat lunch in the cafeteria. If the school has 1,500 students, how many students eat lunch in the cafeteria?

Display Master: Lunchtime B

A school survey found that 20 out of 50 students eat lunch in the cafeteria. If the school has 1,500 students how many students eat lunch in the cafeteria?

Display Master: Lunchtime C

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{\quad}{\quad}$	$= \frac{\quad}{\quad}$

Solve

What is the most efficient method to solve?

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime D

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$	$= \frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime E

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20 \times 30}{50 \times 30}$ =	$\frac{x}{1{,}500}$

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20 \times 30}{50 \times 30}$ =	$\frac{600}{1{,}500}$

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime F

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Total students}}{\text{Students eat in the cafeteria}}$	$\frac{50}{20}$ =	$\frac{1{,}500}{x}$

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime G

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$ =	$\frac{x}{1{,}500}$

Units	**Ratio 1**	**Ratio 2**
$\frac{\text{Total students}}{\text{Students eat in the cafeteria}}$	$\frac{50}{20}$ =	$\frac{1{,}500}{x}$

Units	**Ratio 1**	**Ratio 2**	**Units**
$\frac{\text{Students eat in the cafeteria}}{\text{Students eat in the cafeteria}}$	$\frac{20}{x}$ =	$\frac{50}{1{,}500}$	$\frac{\text{Total students}}{\text{Total students}}$

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime H

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$	=	$\frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$	=	$\frac{x}{1{,}500}$

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Total students}}{\text{Students eat in the cafeteria}}$	$\frac{50}{20}$	=	$\frac{1{,}500}{x}$

Units	**Ratio 1**		**Ratio 2**	**Units**
$\frac{\text{Students eat in the cafeteria}}{\text{Students eat in the cafeteria}}$	$\frac{20}{x}$	=	$\frac{50}{1{,}500}$	$\frac{\text{Total students}}{\text{Total students}}$

Units	**Ratio 1**		**Ratio 2**	**Units**
$\frac{\text{Students eat in the cafeteria}}{\text{Students eat in the cafeteria}}$	$\frac{x}{20}$	=	$\frac{1{,}500}{50}$	$\frac{\text{Total students}}{\text{Total students}}$

Check

Is my answer reasonable?

How do I know?

Display Master: Lunchtime I

Understand

What is the question?

How many students eat lunch in the cafeteria if there are 1,500 students in the school?

Plan

What quantities am I comparing?

Number of students eating in the cafeteria and total number of students

What do I know?

20 out of 50 students surveyed eat lunch in the cafeteria; there are 1,500 students in the school

What quantities go together?

20 students eat in the cafeteria and 50 total students; x students eat in the cafeteria and 1,500 total students in the school

What am I looking for?

The number of students who eat lunch in the cafeteria out of 1,500 students

How would I set this up? (use the format)

Units	Ratio 1		Ratio 2
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20}{50}$	=	$\frac{x}{1{,}500}$

Solve

What is the most efficient method to solve?

Units	Ratio 1		Ratio 2
$\frac{\text{Students eat in the cafeteria}}{\text{Total students}}$	$\frac{20 \times 30}{50 \times 30}$	=	$\frac{600}{1{,}500}$

Units	Ratio 1		Ratio 2
$\frac{\text{Total students}}{\text{Students eat in the cafeteria}}$	$\frac{50 \times 30}{20 \times 30}$	=	$\frac{1{,}500}{600}$

Units		Ratio 1		Ratio 2		Units
		30,000		50x		
$\frac{\text{Students eat in the cafeteria}}{\text{Students eat in the cafeteria}}$		$\frac{20}{x}$	=	$\frac{50}{1{,}500}$		$\frac{\text{Total students}}{\text{Total students}}$

Units		Ratio 1		Ratio 2		Units
		50x		30,000		
$\frac{\text{Students eat in the cafeteria}}{\text{Students eat in the cafeteria}}$		$\frac{x}{20}$	=	$\frac{1{,}500}{50}$		$\frac{\text{Total students}}{\text{Total students}}$

Check

Is my answer reasonable?

Yes

How do I know?

Ratio 1		Ratio 2
$\frac{20 \div 10}{50 \div 10}$	=	$\frac{600 \div 300}{1{,}500 \div 300}$

Ratio 1		Ratio 2
$\frac{2}{5}$	=	$\frac{2}{5}$

Display Master: Racecar A

A racecar traveled 16 miles in 4 minutes. At this rate, how far will the racecar travel in 12 minutes?

Display Master: Racecar B

A racecar traveled 16 miles in 4 minutes. At this rate, how far will the racecar travel in 12 minutes?

Display Master: Racecar C

Understand

What is the question?

How far will the racecar travel in 12 minutes?

Plan

What quantities am I comparing?

Miles traveled to number of minutes

What do I know?

16 miles in 4 minutes; 12 minutes have passed

What quantities go together?

16 miles and 4 minutes; x miles and 12 minutes

What am I looking for?

The number of miles traveled in 12 minutes

How would I set this up? (use the format)

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	____	=	____

Solve

What is the most efficient method to solve?

Check

Is my answer reasonable?

How do I know?

Display Master: Racecar D

Understand

What is the question?

How far will the racecar travel in 12 minutes?

Plan

What quantities am I comparing?

Miles traveled to number of minutes

What do I know?

16 miles in 4 minutes; 12 minutes have passed

What quantities go together?

16 miles and 4 minutes; x miles and 12 minutes

What am I looking for?

The number of miles traveled in 12 minutes

How would I set this up? (use the format)

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	$\frac{16}{4}$	=	$\frac{x}{12}$

Solve

What is the most efficient method to solve?

Check

Is my answer reasonable?

How do I know?

Display Master: Racecar E

Understand

What is the question?

How far will the racecar travel in 12 minutes?

Plan

What quantities am I comparing?

Miles traveled to number of minutes

What do I know?

16 miles in 4 minutes; 12 minutes have passed

What quantities go together?

16 miles and 4 minutes; x miles and 12 minutes

What am I looking for?

The number of miles traveled in 12 minutes

How would I set this up? (use the format)

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	$\frac{16}{4}$	=	$\frac{x}{12}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	$\frac{16 \times 3}{4 \times 3}$	=	$\frac{48}{12}$

Check

Is my answer reasonable?

How do I know?

Display Master: Racecar F

Understand

What is the question?

How far will the racecar travel in 12 minutes?

Plan

What quantities am I comparing?

Miles traveled to number of minutes

What do I know?

16 miles in 4 minutes; 12 minutes have passed

What quantities go together?

16 miles and 4 minutes; x miles and 12 minutes

What am I looking for?

The number of miles traveled in 12 minutes

How would I set this up? (use the format)

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	$\frac{16}{4}$	=	$\frac{x}{12}$

Solve

What is the most efficient method to solve?

Units	**Ratio 1**		**Ratio 2**
$\frac{\text{Miles}}{\text{Minutes}}$	$\frac{16 \times 3}{4 \times 3}$	=	$\frac{48}{12}$

Check

Is my answer reasonable?

Yes

How do I know?

Ratio 1		**Ratio 2**
$\frac{16 \div 4}{4 \div 4}$	=	$\frac{48 \div 12}{12 \div 12}$

Ratio 1		**Ratio 2**
$\frac{4}{1}$	=	$\frac{4}{1}$