Teacher___Mrs. Wood______ Subject _Math_____ Dates: Week 2 (April 27-May 1) **7-12 Weekly Planner**

Welcome to our Distance Learning Classroom! **Student Time Expectation per day: 30 minutes**

Content Area & Materials	Learning Objectives	Tasks	Check-in Opportunities	Submission of Work for Grades
7th Grade Math **PAPER PACKET:** **Digits 2-3** • **Lesson and examples** • **Close and Check** • **Homework worksheet** **Digits 2-4** • **Lesson and examples** • **Close and Check** • **Homework worksheet** **Review Worksheet - Subtracting Expressions** **ONLINE:** • **Digits 2-3 (lessons and homework)** • **Digits 2-4 (lessons and homework)** • **Review Worksheet - Subtracting Expressions**	**Essential Questions:** 1. What is a constant of proportionality and what does it tell you? 2. How do we know when an equation shows a proportional relationship? **Students will know...** 1. The constant of proportionality describes the relationship between two quantities that have a proportional relationship. It is the ratio y to x, or a unit rate. It tells you the constant multiple between the two quantities. 2. We know that we have a proportional relationship when an equation has a variable that is a constant multiple of the other variable.	**PAPER PACKET** with lesson, examples, "Close and Check," homework for Digits 2-3 and 2-4, review worksheet (subtracting expressions) -or- **ONLINE:** Please log on to pearsonrealize.com to work through each part of the lessons for Digits 2-3 and 2-4. The "Close and Check" page can be found by clicking on "Companion Page" at the bottom of the Close and Check screen for each lesson. The review worksheet will be sent by email. **Don't forget to click on Solution at the bottom of each example and "Got it?" to check your answer.**	Mrs. Wood is available during office hours at the times below by: • Meeting on Microsoft Teams. Access by logging in with student email and password to Office 365 at https://www.tracy.k12.ca.us/students • by email (cwood@tusd.net) • call/text (209-597-8652) **Email or call/text will get a response within 24 hours.**	Students are expected to submit: 1. 2-3 Homework 2. 2-4 Homework 3. Review Worksheet **If submitting the PAPER PACKET, label with:** Mrs. Wood Your full name class period **ONLINE:** Submit homework in Digits and email completed review worksheet (scanned document or cell phone picture).

Scheduled, *if possible*, **Shared Experience**	Teams meetings and phone calls can facilitate meaningful discussions.				
Scaffolds & Supports	Students working ONLINE should try out the Help functions in Digits. Notes for each lesson are included with the PAPER PACKETS.				
Teacher Office Hours Available by Teams, email, and call/text	**Monday** **10–11am**	**Tuesday** **11:30am–12:30pm**	**Wednesday** **10–11am**	**Thursday** **11:30am–12:30pm**	**Friday** **10–11am**

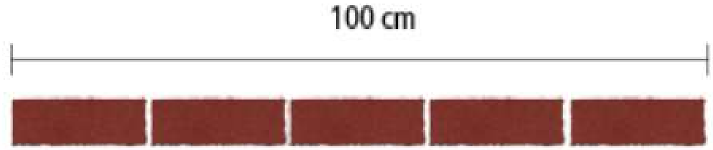
Key Concept

Key Concept

Recall that two quantities x and y have a proportional relationship if y is always a constant multiple of x. This constant multiple $\frac{y}{x}$ is called the **constant of proportionality**.

If x and y have different units, then the constant of proportionality can be written as a unit rate.

Each brick shown has a length of 20 cm. The proportion total length of one brick to the number of bricks is 20 to 1, so the unit rate is 20. The proportion remains the same as bricks are added. The final proportion is 100 to 5, so the unit rate is still 20.



Number of Bricks	1	2	3	4	5
Total Length (cm)	20	40	60	80	100

$\frac{\text{Total Length (cm)}}{\text{Number of Bricks}}$	$\frac{20}{1} = 20$	$\frac{40}{2} = 20$	$\frac{60}{3} = 20$	$\frac{80}{4} = 20$	$\frac{100}{5} = 20$

The constant of proportionality is 20 cm per brick.

Part 1: Finding Constants of Proportionality

Part 1

Example Finding Constants of Proportionality

The weight of the stack depends on the number of books in the stack. Identify the constant of proportionality for this situation. Then use the constant of proportionality to find the weight of 11 books.

Part 1 (continued)	

Solution

The constant of proportionality is the ratio $\frac{y}{x}$ where x is the independent variable and y is the dependent variable.

Here the independent variable is the number of books and the dependent variable is the weight of the stack.

$$\text{constant of proportionality} = \frac{\text{weight of stack}}{\text{number of books}}$$

$$= \frac{15.75 \text{ lb}}{9 \text{ books}}$$

A stack of 9 books weighs 15.75 lb.

$$= 1.75 \text{ lb per book}$$

The constant of proportionality is 1.75 lb per book.

The constant of proportionality is a unit rate that gives the weight per book. So to find the weight of 11 books, multiply the constant of proportionality by 11.

$$\frac{1.75 \text{ lb}}{1 \text{ book}} \cdot 11 \text{ books} = \frac{1.75 \text{ lb}}{1 \cancel{\text{book}}} \cdot 11 \cancel{\text{books}}$$

$$= 19.25 \text{ lb}$$

The weight of 11 books is 19.25 lb.

Got It?

Each shoebox is the same height. The height of the display depends on the number of shoeboxes in one column of shoeboxes. What is the constant of proportionality for this situation?

Part 2: Comparing Constants of Proportionality

Part 2

Example Comparing Constants of Proportionality

You have a recipe that calls for 2 cups of flour to make 3 dozen cookies. Your friend has a cookie recipe that calls for 3 cups of flour to make 60 cookies. Are the constants of proportionality the same for the two recipes? Are the recipes for the same cookie? How do you know?

Part 2 (continued)

Solution

Since the number of cookies made depends on the amount of flour used, the constant proportionality is the ratio of the number of cookies to the amount of flour.

constant of proportionality $= \dfrac{\text{number of cookies}}{\text{amount of flour}}$

3 dozen = 36

You: constant of proportionality $= \dfrac{36 \text{ cookies}}{2 \text{ cups flour}}$

$= 18$ cookies per cup of flour

Your friend: constant of proportionality $= \dfrac{60 \text{ cookies}}{3 \text{ cups flour}}$

$= 20$ cookies per cup of flour

Your recipe has a constant of proportionality of 18 cookies per cup of flour. Your friend's recipe has a constant of proportionality of 20 cookies per cup of flour.

The recipes do *not* have the same constant of proportionality since each recipe makes a different number of cookies per cup of flour. This means the recipe are *not* for the same cookie.

Got It?

You run on a treadmill daily at a constant speed. On Monday, you ran 2.25 mi in 22.5 min. On Tuesday, you ran 2.35 mi in 25 min. Are the constants of proportionality the same for the two days? How do you know?

Part 3: Using Constants of Proportionality

Part 3

Example Using Constants of Proportionality

The table shows the amount of money raised based on the number of tickets sold for a charity concert.

a. Does the table show a constant of proportionality? If so, what is the constant of proportionality for this situation?

b. You can sell no more than 2,500 tickets for the concert. Find the maximum amount of money the fundraiser can raise.

Charity Fundraiser

Tickets Sold	Money Raised ($)
160	3,600
500	11,250
750	16,875
1,600	36,000

Part 3 (continued)

Solution

a. First determine if the table shows a proportional relationship between the amount of money raised and the number of tickets sold.

Charity Fundraiser

Tickets Sold	Money Raised ($)	$\frac{\text{Money Raised (\$)}}{\text{Tickets Sold}}$
160	3,600	$\frac{3{,}600}{160} = 22.50$
500	11,250	$\frac{11{,}250}{500} = 22.50$
750	16,875	$\frac{16{,}875}{750} = 22.50$
1,600	36,000	$\frac{36{,}000}{1{,}600} = 22.50$

The amount of money raised depends on the number of tickets sold.

For each row, the ratio of the money raised to tickets sold is $22.50 per ticket.

The table shows a proportional relationship between the amount of money raised and the number of tickets sold.

$$\text{constant of proportionality} = \frac{\text{Money Raised}}{\text{Tickets Sold}}$$
$$= \$22.50 \text{ per ticket}$$

The constant of proportionality is $22.50 per ticket.

b. The maximum number of tickets that can be sold is 2,500. To find the maximum amount of money that can be raised, multiply the constant of proportionality by 2,500.

$$\frac{\$22.50}{1\ \cancel{\text{ticket}}} \cdot 2{,}500\ \cancel{\text{tickets}} = \$56{,}250$$

The maximum amount of money that can be raised is $56,250.

Got It?

The table shows the time it takes to pump gasoline based on the number of gallons pumped. What is the constant of proportionality for this situation?

Pump Rate

Gasoline (gal)	Time (s)
17	136
12	96
10.5	84
9.25	74

Part 4: Finding Constants of Proportionality from Graphs

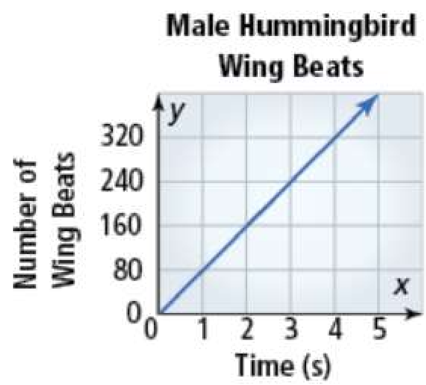
Part 4

Example Finding Constants of Proportionality From Graphs

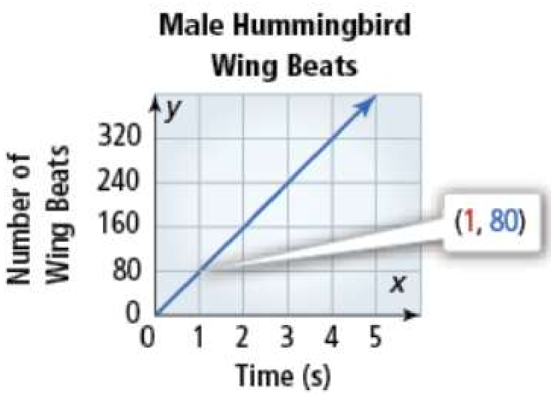
The graph shows the number of times a male hummingbird beats its wing based on time.

a. What is the constant of proportionality for this situation?

b. What does the point (1, 80) represent?



Solution



The graph shows a proportional relationship between time and the number of wing beats since the graph is a straight line passing through the origin.

a. The number of wing beats depends on time. To find the constant of proportionality, choose any point (x, y) on the graph except the origin and find the ratio $\frac{y}{x}$.

Use the point (1, 80).

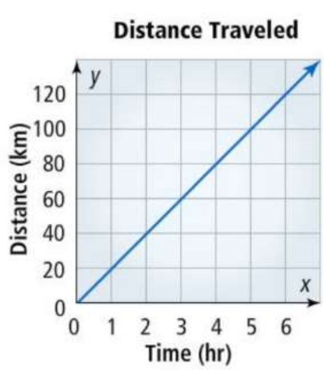
$$\text{constant of proportionality} = \frac{y}{x}$$
$$= \frac{80}{1}$$

The constant of proportionality is 80 wing beats per second.

b. The point (1, 80) represents 80 wing beats in 1 second. This point represents the unit rate, 80 wing beats per second. This point also represents the constant of proportionality.

Got It?

The graph shows the distance a cyclist traveled based on time. What is the constant of proportionality for this situation?



Got It? Solutions

Part 1: 9 in. per shoebox

Part 2: The constants of proportionality were not the same for the two days. The contstant of proportionality for Monday was 0.1 mi per minute and the constant of proportionality for Tuesday was 0.094 mi per minute.

Part 3: 8 seconds per gallon

Part 4: 20 km per hour

Close and Check

Focus Question

What is a constant of proportionality? What does the constant of proportionality tell you?

Do you know HOW?

1. Each bus carries 24 passengers. The number of buses needed for a field trip depends on the number of students going on the trip. What is the constant of proportionality for this situation?

   ___ per ___

2. Your class collects cans for a local food bank. On Monday, 7 students collect 63 cans. Using the constant of proportionality, find the number of students who collect 90 cans on Tuesday.

   ___ students

3. The table shows the number of concert tickets sold based on the number hours the tickets are available. What is the constant of proportionality for this situation?

Ticket Sales

Time (hr)	Tickets
3	240
5	400
9	720
15	1200

Do you UNDERSTAND?

4. **Writing** Which variable in Exercise 3 represents the independent variable and which represents the dependent variable? Explain.

5. **Reasoning** How can you use the relationship between the independent and dependent variables to write a unit rate?

Close and Check

Focus Question

What is a constant of proportionality? What does the constant of proportionality tell you?

Sample: The constant of proportionality describes the relationship between two quantities that have a proportional relationship. It is the ratio y to x, or a unit rate. It tells you the constant multiple between the two quantities.

SAMPLE SOLUTIONS ARE SHOWN BELOW.

Do you know HOW?

1. Each bus carries 24 passengers. The number of buses needed for a field trip depends on the number of students going on the trip. What is the constant of proportionality for this situation?

24 students per bus

2. Your class collects cans for a local food bank. On Monday, 7 students collect 63 cans. Using the constant of proportionality, find the number of students who collect 90 cans on Tuesday.

10 students

3. The table shows the number of concert tickets sold based on the number hours the tickets are available. What is the constant of proportionality for this situation?

Ticket Sales

Time (hr)	Tickets
3	240
5	400
9	720
15	1200

80 tickets per hour

Do you UNDERSTAND?

4. Writing Which variable in Exercise 3 represents the independent variable and which represents the dependent variable? Explain.

Dependent variable: tickets

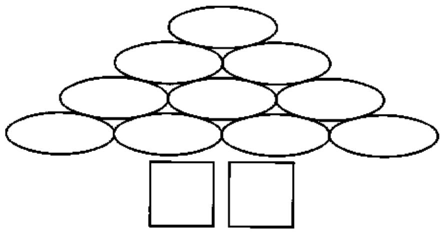
Independent variable: time

The number of tickets sold depends on how long they have been on sale.

5. Reasoning How can you use the relationship between the independent and dependent variables to write a unit rate?

A denominator of 1 represents the independent variable. The dependent variable is the numerator that shows the number of occurrences per unit.

1. The variable y is in a proportional relationship with x. The number of squares represents an x value. The number of ovals represents the corresponding y value. Identify the constant of proportionality.



2. Suppose the relationship between x and y is proportional. When x is 6, y is 78. Identify the constant of proportionality of y to x.

3. Since a middle school opened, the girls' basketball team has had the same record every season. The team has won a total of 169 games while losing only 13 games. Find the constant of proportionality of wins to losses.

4. Does the table show a proportional relationship? If so, what is the constant of proportionality of y to x?

x	5	6	7	8
y	90	108	126	144

5. The distance a jet aircraft flies has a proportional relationship with its number of hours in flight. The table shows the number of miles flown for a number of hours in flight.

Passenger Jet Travel

Hours	2	3	4	5
Miles	840	1,260	1,680	2,100

a. Find the constant of proportionality.

b. How long will the jet take to travel 4,620 miles?

6. The height of a stack of DVD cases is in a proportional relationship to the number of cases in the stack. A stack of 6 cases and its height are shown.

Golden Oldies, 2005
Golden Oldies, 2004
Golden Oldies, 2003
Golden Oldies, 2002
Golden Oldies, 2001
Golden Oldies, 2000

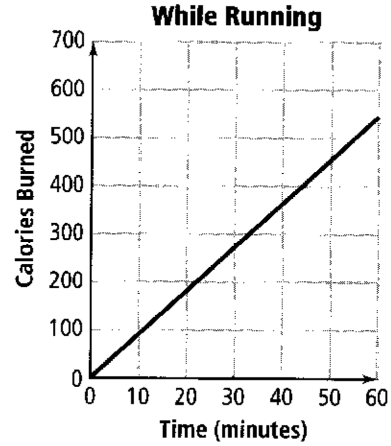
The height of 6 DVD cases is 114 mm.

a. What is the constant of proportionality in millimeters per DVD case?

b. What is the height of 13 DVD cases in millimeters?

7. Estimation The graph shows the number of calories burned while running. Estimate the constant of proportionality of calories burned to time spent running.

Calories Burned While Running



a. The constant of proportionality is about how many calories per minute?

b. What does the point (35, 315) represent?

A. 315 calories burned in 35 minutes

B. 35 calories burned in 315 minutes

C. 315 calories burned in 1 minute

Digits 2-4: Proportional Relationships and Equations

Key Concept	

Key Concept

You have used tables and graphs to represent proportional relationships. An equation can also describe a proportional relationship between two variables.

Recall that when there is a proportional relationship between x and y, y is a constant multiple of x. This constant multiple is the constant of proportionality.

$$y = mx$$

Constant of proportionality, $\frac{y}{x}$

Since the value of y depends on the value of x, y is the dependent variable and x is the independent variable.

Part 1: Understanding Equations Representing Proportional Relationships

Part 1

Example Understanding Equations Representing Proportional Relationships

Your friend uses the equation $y = 8.5x$ to calculate the total cost y in dollars for x movie tickets.

a. What is the constant of proportionality shown in the equation?
b. What does the constant of proportionality represent in this situation?
c. How much will 13 movie tickets cost?

Solution

a. $y = 8.5x$

$8.5 = \frac{y}{x}$

The constant of proportionality is $8.50 per ticket.

b. The constant of proportionality represents the unit cost, or the price, y, per movie ticket, x.

c. To find how much 13 movie tickets will cost, substitute 13 for x.

$$y = 8.5x$$

Substitute 13 for x. $= 8.5(13)$

Multiply. $= 110.5$

It will cost $110.50 for 13 movie tickets.

Part 1 (continued)	**Got It?** The equation $P = 4s$ represents the perimeter P of a square with side length s. What is the constant of proportionality? What is the perimeter of a square with side length 1.6 m?
Part 2: Identifying Equations of Proportional Relationships	see below

Part 2

Example Identifying Equations of Proportional Relationships

a. A certain vegetable dip contains 60 Calories per serving. What equation represents the number of Calories y in x servings of dip?

b. At a telethon, a volunteer can take 60 calls in 5 h. What equation represents the number of calls y a volunteer can take in x hours?

c. A machine can make 60 keys in 12 min. What equation represents the number of keys y made in x minutes?

Solution

Find each unit rate. Then use the unit rate to write an equation.

a. Let y = the number of Calories. Let x = the number of servings.
The unit rate is 60 Calories per serving.

$$y \text{ Calories} = \frac{60 \text{ Calories}}{1 \cancel{\text{ serving}}} \cdot x \cancel{\text{ servings}}$$

$$y \text{ Calories} = \frac{60 \text{ Calories}}{1} \cdot x$$

The label "Calories" appears on both sides of the equation.

$$y \cancel{\text{ Calories}} \cdot \frac{1}{\cancel{\text{Calories}}} = \frac{60 \cancel{\text{ Calories}}}{1} \cdot x \cdot \frac{1}{\cancel{\text{Calories}}}$$

$$y = 60 \cdot x$$

$$y = 60x$$

b. Let y = the number of calls. Let x = the number of hours.

$\frac{60 \text{ calls}}{5 \text{ hours}}$ = 12 calls per hour. The unit rate is 12 calls per hour.

$$y \text{ calls} = \frac{12 \text{ calls}}{1 \cancel{\text{ hour}}} \cdot x \cancel{\text{ hours}}$$

$$y \text{ calls} = \frac{12 \text{ calls}}{1} \cdot x$$

The label "calls" appears on both sides of the equation.

$$y \cancel{\text{ calls}} \cdot \frac{1}{\cancel{\text{calls}}} = \frac{12 \cancel{\text{ calls}}}{1} \cdot x \cdot \frac{1}{\cancel{\text{calls}}}$$

$$y = 12 \cdot x$$

$$y = 12x$$

Part 2 (continued)

c. Let y = the number of keys. Let x = the number of minutes.

$\frac{60 \text{ keys}}{12 \text{ min}}$ = 5 keys per minute. The unit rate is 5 keys per minute.

$$y \text{ keys} = \frac{5 \text{ keys}}{1 \cancel{\text{min}}} \cdot x \cancel{\text{min}}$$

$$y \text{ keys} = \frac{5 \text{ keys}}{1} \cdot x$$

The label "keys" appears on both sides of the equation.

$$y \cancel{\text{keys}} \cdot \frac{1}{\cancel{\text{keys}}} = \frac{5 \cancel{\text{keys}}}{1} \cdot x \cdot \frac{1}{\cancel{\text{keys}}}$$

$$y = 5 \cdot x$$

$$y = 5x$$

Got It?

You paid $2.50 for 5 apples. Write an equation to represent the total cost y of buying x apples.

Part 3: Writing Equations for Proportional Relationships

Part 3

Intro

When you travel to another country, you often need to exchange U.S. dollars for the local currency. When you exchange money, you receive the equivalent amount in local currency based on the exchange rate. An exchange rate is an example of a constant of proportionality.

Recently, the exchange rate for U.S. dollars to Indian rupees was 1 dollar = 45 rupees. The constant of proportionality is 45 rupees per dollar.

Example Writing Equations for Proportional Relationships

You are going on a trip to Spain. When you ask for the exchange rate, your bank shows you the table. Write an equation you can use to find how many euros y you will receive in exchange for x U.S. dollars.

Currency Exchange

U.S. Dollars($)	Euros(€)
50	37.50
100	75
120	90
175	131.25

Part 3 (continued)

Solution

The number of euros, y, you receive depends on the number of U.S. dollars, x, you exchange.

Currency Exchange

U.S. Dollars ($)	Euros (€)	$\frac{\text{Euros}}{\text{U.S. Dollars}}$
50	37.50	$\frac{37.50}{50} = 0.75$
100	75	$\frac{75}{100} = 0.75$
120	90	$\frac{90}{120} = 0.75$
175	131.25	$\frac{131.25}{175} = 0.75$

Each row shows the unit rate of 0.75 euros per U.S. dollar.

There is a proportional relationship between U.S. dollars and euros.

The constant of proportionality is the unit rate of euros per U.S. dollar, or 0.75.

The equation is $y = 0.75x$.

Check

In the equation, x represents the number of U.S. dollars and y represents the number of euros.

Let $x = 50$.
$y = 0.75(50)$
$= 37.50$ ✓

Let $x = 100$.
$y = 0.75(100)$
$= 75$ ✓

Let $x = 120$.
$y = 0.75(120)$
$= 90$ ✓

Let $x = 175$.
$y = 0.75(175)$
$= 131.25$ ✓

Got It?

You have returned from your trip with euros leftover. Use the table to write an equation you can use to find about how many U.S. dollars y you will receive in exchange for x euros.

Currency Exchange

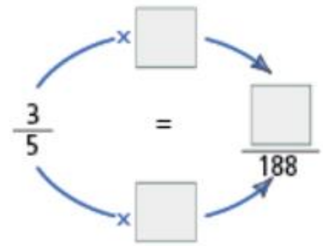
U.S. Dollars($)	Euros(€)
50	37.50
100	75
120	90
175	131.25

Part 4: Solving Proportion Problems

Part 4

Intro

A **proportion** is an equation stating that two ratios are equal. You can use a proportion to solve a problem. Solving a proportion is similar to finding an equivalent ratio.



In the average adult male, for each 5 lb of body weight about 3 lb is water. How much of a 188-lb adult male is water?

Set up a proportion. $\frac{3}{5} = \frac{w}{188}$ ← Water (lb), ← Body Weight (lb)

Multiply each side of the equation by 188. $\frac{3}{5}(188) = \frac{w}{188}(188)$

Simplify. $\frac{564}{5} = w$

$112.8 = w$

About 112.8 lb of a 188-lb adult male is water.

Example Solving Proportion Problems

In a local soccer league, the ratio of goalies to the total number of players on a team is about 2 to 30. If the league has 915 players, about how many goalies are there?

Solution

Method 1 Use a proportion. Let x = the total number of goalies in the league.

Use the ratio $\frac{\text{number of goalies}}{\text{total number of players}}$. $\frac{2}{30} = \frac{x}{915}$

Multiply each side by 915. $\frac{2}{30} \cdot (915) = \frac{x}{915} \cdot (915)$

Simplify. $\frac{1{,}830}{30} = x$

$61 = x$

There are about 61 goalies in the league.

Method 2 Use an equivalent ratio.

Find an equivalent ratio $\frac{2}{30}$ with a denominator of 915.

Part 4 (continued)

First divide the numerator and denominator by 2.

Then multiply the numerator and denominator by 61.

$$\frac{2}{30} \xrightarrow{\div 2} \frac{1}{15} \xrightarrow{\times 61} \frac{61}{915}$$

$$\frac{2}{30} = \frac{1}{15} = \frac{61}{915}$$

The ratio $\frac{61}{915}$ is equivalent to $\frac{2}{30}$.

There are about 61 goalies in the league.

Got It?

The ratio of defensive players to the total number of players in a different soccer league is about 9 to 30. If the league has 890 players, about how many defensive players are in the league?

Got It? Solutions

Part 1: 6.4m
Part 2: y=0.5x
Part 3: y-1.33x
Part 4: about 267 defensive players

Close and Check

Focus Question

How can you tell if an equation shows a proportional relationship between two quantities? How can you identify the constant of proportionality in an equation that represents a proportional relationship?

Do you know **HOW?**

1. The equation $q = 12c$ represents the quantity q of t-shirts in any number of cartons c.

a. What is the constant of proportionality?

b. How many shirts are in 8 cartons?

shirts

2. A car manufacturer completes 81 cars every 180 seconds. Write an equation to represent the total number of cars y for x seconds of production.

3. Use the table to write an equation to find how much money y is received for x ounces of silver on the open market.

Silver Exchange Rate

Silver (oz)	5	9	12
Price ($)	151.35	272.43	363.24

Do you **UNDERSTAND?**

4. Writing Can setting up a proportion help you find the constant of proportionality in a relationship? Explain.

5. Error Analysis Assume 130 out of 150 students buy lunch each day. There are 180 school days in a year. A classmate writes an equation to find how many lunches will be sold in one school year. Is he correct? Explain.

$$\frac{130}{150} = \frac{x}{180}$$

Close and Check

Focus Question

How can you tell if an equation shows a proportional relationship between two quantities? How can you identify the constant of proportionality in an equation that represents a proportional relationship?

Sample: An equation shows a proportional relationship between two quantities if it can be written in the form $y = mx$. The constant of proportionality is the coefficient of x in the equation $y = mx$.

SAMPLE SOLUTIONS ARE SHOWN BELOW.

Do you know HOW?

1. The equation $q = 12c$ represents the quantity q of t-shirts in any number of cartons c.

a. What is the constant of proportionality?

12

b. How many shirts are in 8 cartons?

96 shirts

2. A car manufacturer completes 81 cars every 180 seconds. Write an equation to represent the total number of cars y for x seconds of production.

$y = 0.45x$

3. Use the table to write an equation to find how much money y is received for x ounces of silver on the open market.

Silver Exchange Rate

Silver (oz)	5	9	12
Price ($)	151.35	272.43	363.24

$y = 30.27x$

Do you UNDERSTAND?

4. Writing Can setting up a proportion help you find the constant of proportionality in a relationship? Explain.

Yes. Set a proportional relationship equal to $\frac{x}{1}$. The solution is the constant of proportionality.

5. Error Analysis Assume 130 out of 150 students buy lunch each day. There are 180 school days in a year. A classmate writes an equation to find how many lunches will be sold in one school year. Is he correct? Explain.

$$\frac{130}{150} = \frac{x}{180}$$

No. The ratio is 130 student in 1 day = x number of students in 180 days. He should have written $\frac{130}{1} = \frac{x}{180}$.

1. The equation $y = \frac{5}{7}x$ describes a proportional relationship between x and y. What is the constant of proportionality?
2. The equation $P = 3s$ represents the perimeter P of an equilateral triangle with side length s. What is the perimeter of an equilateral triangle with side length 4 ft?
3. You bike 11.2 miles in 1.4 hours at a steady rate. What equation represents the proportional relationship between the x hours you bike and the distance y in miles that you travel?
4. Marco needs to buy some cat food. At the nearest store, 3 bags of cat food cost $15.75. How much would Marco spend on 5 bags of cat food?
5. An arts and crafts store sells sheets of stickers. Use the table to write an equation you can use to find the total cost y in dollars for x sheets of stickers.

Costs of Stickers

Number of Sheets (x)	Cost in Dollars (y)
3	6.15
5	10.25
13	26.65
19	38.95

6. Jane likes to exercise daily. The table shows the number of calories y she burns by exercising steadily for x minutes. How many calories would she burn by exercising for 29 minutes?

Calories Burned

Time in Minutes (x)	Calories Burned (y)
20	220
25	275
30	330
40	440

7. Solve the proportion $\frac{22}{24} = \frac{t}{84}$.
8. In a certain chemical, the ratio of zinc to copper is 3 to 16. A jar of the chemical contains 320 grams of copper. How many grams of zinc does it contain?
9. **Mental Math** Professional chefs usually measure ingredients by weight rather than by volume. A recipe calls for 2 ounces of flour for every 3 ounces of sugar.
   a. If you are a chef and you use 12 ounces of sugar, how many ounces of flour should you use?
   b. Explain how you can use mental math to find the answer. Explain why a chef might need mental math to find an answer like this.
10. **Writing** Ann's car can go 228 miles on 6 gallons of gas. During a drive last weekend, Ann used 7 gallons of gas.
    a. How far did she drive?
    b. Explain how the problem changes if you were given the distance Ann drove last weekend instead of how much gas she used.
11. **Reasoning** The equation $y = 6.41x$ describes a proportional relationship between x and y.
    a. What is the constant of proportionality?
    b. Explain why your answer is called the "constant of proportionality."
12. **Multiple Representations** The proportions $\frac{a}{b} = \frac{c}{d}$ and $\frac{b}{a} = \frac{d}{c}$ are called equivalent proportions.
    a. Find a proportion equivalent to $\frac{3}{7} = \frac{9}{x}$.

       A. $\frac{7}{3} = \frac{9}{x}$ **B.** $\frac{7}{3} = \frac{x}{9}$

       C. $\frac{7}{9} = \frac{x}{3}$ **D.** $\frac{7}{x} = \frac{9}{3}$
    b. What is the solution of the proportion?
    c. Explain why, based on this example, solving an equivalent proportion can be useful.

PRACTICE TUTORIAL

Name: ______________________________

4-7 Additional Practice

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Leveled Practice **In 1–2, fill in the missing signs or numbers.**

1. Write an equivalent expression to $m - (8 - 3m)$ without parentheses.

$m \bigcirc 8 \bigcirc 3m$

$= m \bigcirc 3m \bigcirc 8$

$= \boxed{}\, m \bigcirc 8$

2. Write an equivalent expression to $-2(1.5h + 5) - 4(-0.5 + 3h)$.

$-2 \cdot \boxed{} + (-2) \cdot \boxed{} -$

$4 \cdot \boxed{} + (-4) \cdot \boxed{}$

$= \boxed{}\, h + \boxed{} + \boxed{} + \boxed{}\, h$

$= \boxed{}\, h + \boxed{}$

3. A bag of mixed nuts contains almonds and hazelnuts. There are $(6x + 13)$ nuts in this particular bag, and $(3x - 7)$ of these are hazelnuts.

a. Which expression represents the number of almonds in the bag?

Ⓐ $6x + 13 - (3x - 7)$

Ⓑ $3x - 7 - 6x + 13$

Ⓒ $6x + 13 - 3x - 7$

Ⓓ $3x - 7 - (6x + 13)$

b. There are $\boxed{}$ almonds in the bag.

4. Simplify each expression.

a. $10x - (-7 + 6x)$

b. $12y - (-4 - 8y)$

c. $14z - 3 - (6 - 5z)$

d. $(-9p + 7) - (-9p + 3)$

5. Subtract $(7.8 - 5.1t)$ from $(2.8 - 3.2t)$. Use the Commutative Property to show the difference another way.

6. Critique Reasoning Tim simplified the difference $\frac{1}{2}p - \left(\frac{1}{4}p - 4\right)$ as $\frac{3}{4}p - 4$. Did he find the correct difference? Explain.

In 7–8, subtract the expressions.

7. $(-4b + 15 - 7k) - (6 + 4b - 2k)$

8. $\left(7j + \frac{1}{8}q + 3\right) - \left(\frac{5}{8}q - 11 + 2j\right)$

9. Higher Order Thinking Make a conjecture about what happens when expressions are subtracted in the opposite order. What happens when the results are added? Support your conjecture with an example in which several of the signs are negative.

Assessment Practice

10. An expression is shown.

$(0.5n + 0.3) - (0.75n - 0.45)$

Create an equivalent expression without parentheses.

11. Select all pairs of equivalent expressions.

- ☐ $6x + 13 - (3x - 7)$ and $6x + 13 + (-3x + 7)$
- ☐ $3x - 7 - 6x + 13$ and $-3(x + 2)$
- ☐ $6x + 13 - 3x - 7$ and $5x + 10 - 2x - 4$
- ☐ $3x - 7 - (6x + 13)$ and $-2x - 7 + (5x - 13)$
- ☐ $-(6x + 13) - (-3x - 7)$ and $-3(x + 2)$