Get out your homework from yesterday and start checking your answers with the key below.

Classwork - Solving and Writing Proportions

1.) Determine if the following tables and graphs show a proportional relationship. You must so work/reasoning for why you think the answer is yes or no. If the relationship is proportional then find the unit rate (constant of proportionality).

A)

Months	Inches	
5	10	$= \frac{2}{1}$
10	14	$= \frac{1.4}{1}$
15	18	$= \frac{1.2}{1}$
20	22	
25	26	

Proportional? **Yes** or (**No**)

If yes, unit rate = N/A

B)

Seconds	Meters	
3	15	$= \frac{5}{1}$
4	20	$= \frac{5}{1}$
7	35	$= \frac{5}{1}$
9	45	$= \frac{5}{1}$
11	55	$= \frac{5}{1}$

Proportional? (**Yes**) or **No**

If yes, unit rate = 5m/1s

C)

Hours	Cost	
1	20	$\frac{20}{1}$
3	30	$\frac{10}{1} = \frac{10}{1}$
5	40	
7	50	
9	60	

Proportional? **Yes** or (**No**)

If yes, unit rate = N/A

Determine if each of the following situations is proportional and answer the following questions. Explain.

2A) Is the data proportional? Yes
Justify your answer

$\frac{15}{10} = \frac{1.5}{1}$ $\frac{22.50}{15} = \frac{1.5}{1}$ $\frac{30}{20} = \frac{15}{1}$

$\frac{45}{30} = \frac{1.5}{1}$ $\frac{52.50}{35} = \frac{1.5}{1}$

Days	Money
10	15
15	22.50
20	30
30	45
35	52.50

2B) If proportional, what is the constant of proportionality?

$1.50/1 day

2C) If proportional, write a rule for the situation.

Money = 1.5 • days

3A) Is the data proportional? No
Justify your answer

$\frac{6}{2} = \frac{3}{1}$ $\frac{8}{3} = \frac{2.6}{1}$

Minutes	Liters
2	6
3	8
5	12
6	14
8	18

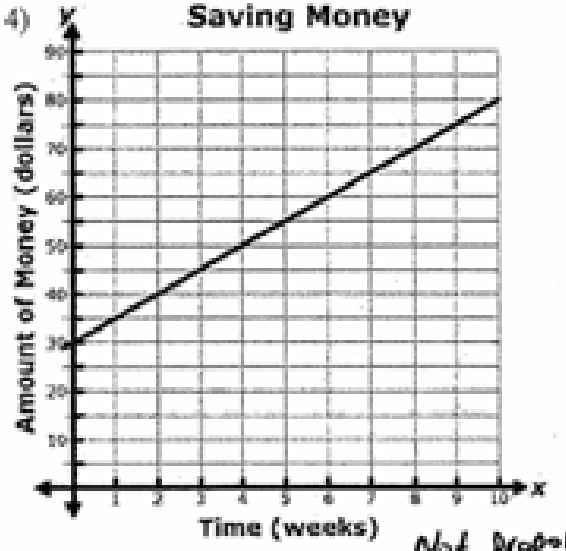
3B) If proportional, what is the constant of proportionality?

N/A

3C) If proportional, write a rule for the situation.

N/A

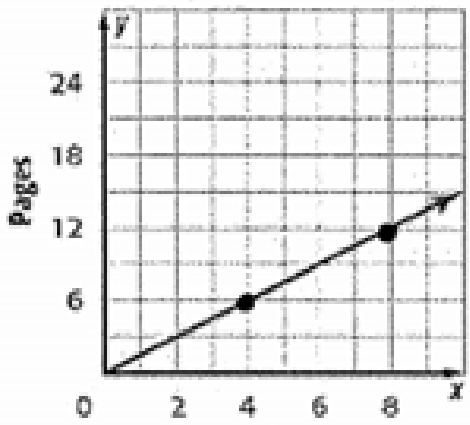
4)



Proportional? Yes or (No) : Not proportional because the graph does not pass through the origin

If yes, unit rate = N/A

5)



$\frac{12}{8} = \frac{1.5}{1}$ $\frac{6}{4} = \frac{1.5}{1}$

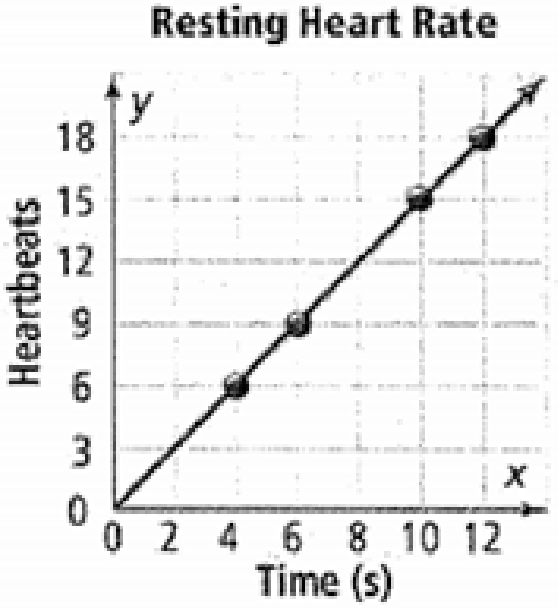
Proportional? (Yes) or No

If yes, unit rate = 1.5 pages/1 min

6) Determine if the following situation is proportional and answer the following questions. Explain.

A) Transfer information from the graph shown to the table below.

Time	2	4	6	8	10
Heartbeats	3	6	9	12	15



B) Is the relationship between the number of heartbeats and seconds proportional? **Justify your answer.**

$\frac{3}{2} = \frac{1.5}{1}$ $\frac{6}{4} = \frac{1.5}{1}$ $\frac{9}{6} = \frac{1.5}{1}$ $\frac{12}{8} = \frac{1.5}{1}$ $\frac{15}{10} = \frac{1.5}{1}$

Yes

C) If proportional, what is the constant of proportionality?

1.5 heartbeats / 1 second

D) If proportional, write a rule for the situation.

Heartbeats = 1.5 • Seconds

E) Use your rule to find out how many times this person's heart will beat in one minute. (1 minute = 60 secor

Heartbeats = 1.5 • 60 90 heartbeats

F) What does the point (12, 18) represent in the situation?

This person's heart beats 18 times in 12 seconds

Ratios

A ratio is a comparison of two numbers. There are three ways that you can write a ratio of two numbers.

2 to 3 $\quad \frac{2}{3} \quad$ 2:3

Example of Writing a Ratio:

1) In a 7 game series a baseball team won 4 games and lost 3. Compare the number of wins to the number of losses using a ratio. Write the ratio in all three ways.

wins to losses

4 wins to 3 losses

$\frac{4 \text{ wins}}{3 \text{ losses}}$

4 wins : 3 losses

2) Compare the number of wins to the total number of games played.

$\frac{4 \text{ wins}}{7 \text{ games}}$

3) Practice: Use the table below to make comparisons about the games played. Write the ratio in all three ways.

Spring Training		
Team	**Wins**	**Losses**
San Diego Padres	16	11
L.A. Dodgers	18	13
Chicago Cubs	17	14

A) Cub's wins to losses.

17 wins to 14 losses

17 wins : 14 losses

17 wins
---
14 losses

B) Dodgers wins to number to the number of games they played.

18 wins to 31 losses

18 wins : 31 losses

18 wins
---
31 games

C) The number of Padres' losses to the number of Dodgers' losses.

11 losses
---
13 losses

We have worked with ratios, rates, and unit rates. We will be using these going forward to work to solve the following problems.

When you create 2 equivalent ratios, it is called a proportion.

1) Find another equivalent rate for the given ratios below to create a proportion. SHOW what work you are doing (multiplying or dividing) to get to your equivalent ratio.

$\frac{\$15}{2\ hours} \div 2 = \frac{\$7.50}{1\ h}$ $\frac{14\ meters}{4\ seconds} \div 4 = \frac{3.5\ m}{1\ s}$ $\frac{\$2.79}{1\ pound} \cdot 2 = \frac{\$5.58}{2\ lb}$ $\frac{7\ inches}{4\ years} \div 4 = \frac{1.75\ in}{1\ year}$

Which of the above ratios are unit rates? Explain why.

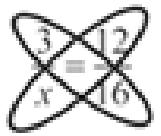
$\frac{\$2.79}{1\ lb}$ Unit rate always 1 in the denominator

Find a Missing Value using Cross-Product and Cross Multiplication

$12 \cdot x \Rightarrow 12x$

Example on how to solve for a variable

A) Look at the proportion and decide what you are going to multiply (circle the numbers diagonally if that helps) $\frac{3}{x} = \frac{12}{16}$ →



B) Multiply the numbers/variables diagonal to one another $12 \cdot x = 3 \cdot 16$

C) Simplify the equation $12 \cdot x = 48$

$\div 12$

D) To undo multiplication → Divide $\frac{48}{12} = 4$

$x = 4$

E) Do a Quick Check you answer by cross multiplying

If x = 4 → $\frac{3}{4} = \frac{12}{16}$ If I cross multiply

Does $12 \cdot 4 = 3 \cdot 16$

$48 = 48$ YES!

2) Solve the following proportions using cross multiplication. SHOW WORK.

-At times, you may get a decimal answer.

A) $\frac{2}{6} = \frac{4}{x}$

$2x = 24$

$\div 2$

$x = 12$

B) $\frac{3}{4} = \frac{d}{8}$

$4d = 24$

$\div 4$

$d = 6$

C) $\frac{\$1.50}{4 \text{ pieces}} = \frac{x}{6 \text{ pieces}}$

$9 = 4x$

$\div 4$

$x = \$2.25$

D) $\frac{\$2.75}{4 \text{ packs}} = \frac{\$5.50}{y}$

$2.75y = 22$

$\div 2.75$

$y = 8 \text{ packs}$

E) $\frac{4\ meters}{5\ seconds} = \frac{x}{55\ seconds}$

F) $\frac{4\ eggs}{10\ cups} = \frac{x}{25\ cups}$

G) $\frac{18\ boys}{x} = \frac{2\ boys}{3\ girls}$

H) $\frac{2miles}{x} = \frac{7\ miles}{21\ hours}$

I) $\frac{30\ yards}{2\ minutes} = \frac{126\ yard}{x}$

J) $\frac{6\ boys}{11\ students} = \frac{x}{88\ students}$

Hwk: E-J and #1 (A-F)