# Unit 3 Practice Test: Proportions

NAME ___Key___

For 1 –4, use the graph below to answer the questions.

1. Which of the following statements describe the graph?
   Select all that apply.

   (a.) If 25 shots were taken, 10 were made.
   b. If 20 shots were made, 40 were taken.
   (c.) If 0 shots were taken, 0 shots were made.
   (d.) If 20 shots are taken, less than 10 will be made.
   e. If 30 shots are taken, more than 15 shots will be made.

Basketball Shots
(Shots Made vs Shots Taken)
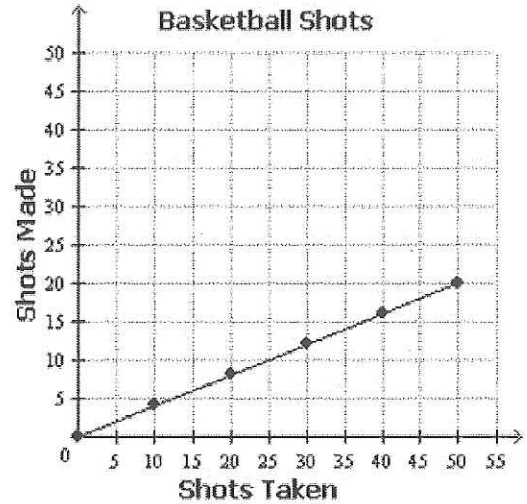
2. Select the statement about the graph that is **NOT true**.

   a. The point (0, 0) shows that 0 shots taken results in 0 shots made.
   (b.) The point (50, 20) shows that 20 shots taken results in 50 shots made.
   c. The point (40, 16) shows that if 40 shots are taken, 16 are made.

3. Select **all** of the ordered pairs that would also lie on the line above?

   a. (60, 30)
   (b.) (75, 30)
   c. (100, 50)
   (d.) (100, 40)

4. If 125 shots are taken, that means that ___50___ shots will be made. Fill–in the blank.

For 5–8, circle whether it is proportional or not. If they are proportional find the unit rate (Be sure to include units if you can) AND write the equation.

5. (Proportional) or NOT?

X	Y
9	72
8	64
7	56
5	40

Unit Rate: ___8___

Equation: ___$y = 8y$___

6. Proportional or (NOT?)

X	Y
2	7
3	8
4	9
5	10

Unit Rate: _____

Equation: ___$y = x + 5$___

7. (Proportional) or NOT?

Money

Total Savings ($): 0, 94, 188, 282, 376, 470
Number of Weeks: 0, 2, 4, 6, 8, 10
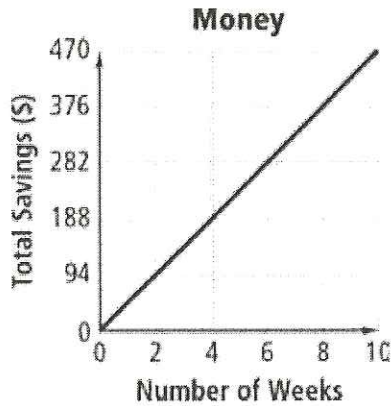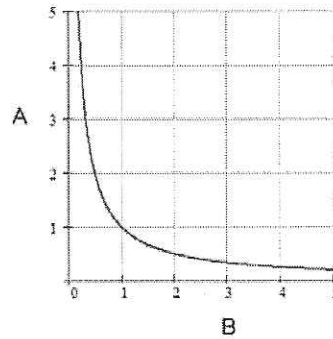
Unit Rate: $\dfrac{\$47}{wk}$

Equation: $y = 47x$

8. Proportional or (NOT?)

A 3, B

Unit Rate: $-$

Equation: $y = \dfrac{1}{x}$

For 9–11, solve each of the proportions and show your work for full credit.

9. $\dfrac{4}{7} = \dfrac{x}{12}$

$7x = 48$
$\dfrac{7}{7} \quad \dfrac{7}{}$
$x = \dfrac{48}{7}$

#9 answer: $x = \dfrac{48}{7} = 6\dfrac{6}{7}$

10. $\dfrac{2}{7} = \dfrac{3}{x}$

$2x = 21$
$\dfrac{2}{} \quad \dfrac{2}{}$
$x = \dfrac{21}{2}$

#10 answer: $x = \dfrac{21}{2} = 10\dfrac{1}{2}$

11. $\dfrac{3}{2x-1} = \dfrac{7}{5x+4}$

$3(5x+4) = 7(2x-1)$
$15x + 12 = 14x - 7$
$-14x \qquad -14x$
$x + 12 = -7$
$-12 \quad -12$

#11 answer: $x = -19$

For 12–19 each of the following, write a proportion and then solve. Show your work.

12. Clarence paid $3.21 in tax for 5 hats. At this rate, what would the tax be if he bought 3 hats?

Proportion

$\dfrac{\$}{ht} \dfrac{3.21}{5} = \dfrac{x}{3} \dfrac{\$}{ht}$

$\dfrac{5x}{5} = \dfrac{9.63}{5}$

$x = \$1.93$

#12 answer: The tax would be $1.93 for 3 hats

13. According to the label there are 215 calories in a Snickers candy bar. How many calories are there in 6 candy bars?

Proportion

$$\frac{Cal}{bar} \quad \frac{215}{1} = \frac{x}{6} \quad \frac{Cal}{bar}$$

$$x = 1,290$$

#13 answer: There are 1,290 calories in 6 Snickers.

14. A mixture of paint calls for $\frac{3}{5}$ of a cup of red paint and $\frac{4}{5}$ cups of yellow paint. How many cups of red paint would be needed for every 1 cup of yellow paint?

Proportion

$$\frac{Rd}{Yel} \quad \frac{\frac{3}{5}}{\frac{4}{5}} = \frac{x}{1} \quad \frac{Rd}{Yel}$$

$$\frac{5}{4} \cdot \frac{4}{5}x = \frac{3}{5} \cdot \frac{5}{4}$$

$$x = \frac{3}{4}c$$

#14 answer: You will need $\frac{3}{4}c$ of red paint for 1 cup of yellow paint.

15. Alicia is making cupcakes for a party she is having and wants to make sure everyone gets at least one cupcake. The recipe calls for ½ of a teaspoon of salt for every batch (21 cupcakes). If Alicia is having a party with 84 people attending, how many teaspoons of salt will Alicia use?

Proportion

$$\frac{Salt}{cc} \quad \frac{\frac{1}{2}}{21} = \frac{x}{84} \quad \frac{Salt}{cc}$$

$$\frac{21x}{21} = \frac{42}{21}$$

$$x = 2$$

#15 answer: Alicia will need 2 teaspoons of salt of 84 cupcakes

16. Mr. Moundros surveyed the 7th grade **boys on the football team** (60 students) and asked them which 7th grade camp class was their favorite. The results are displayed in the table below. If there are 285 students in the 7th grade, estimate the number of 7th graders that like "Shelter Buidling" the most?

The Wall	15
Star Lab	11
Taste of Nature	5
The BEAST	1
Incredible Journey	18
Fire Quest	5
Shelter Building	5

Proportion

$$\frac{Sur}{Total} \quad \frac{5}{60} = \frac{x}{285} \quad \frac{Sur}{Total}$$

$$\frac{60x}{60} = \frac{1,425}{60}$$

$$x = 23.75$$

#16 answer: About 24 7th graders like "Shelter Building".

17. Ninety snowboarders were asked which US state had the best snowboarding conditions. The results are displayed in the bar graph. If there are 400 snowboarders in the United Snowboarders Association, how many of them would you predict feel that Utah has the best snowboarding?

Name a State With Great Snowboarding Survey
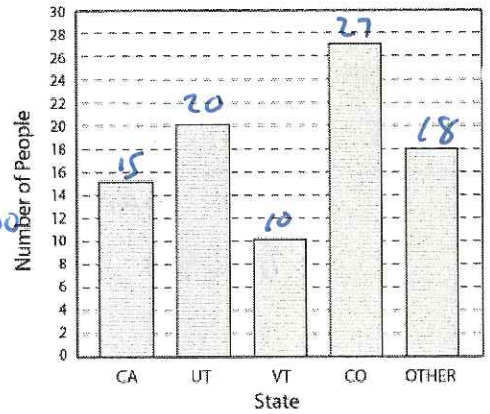
Proportion   #17 answer: _About 89 Snowboarders would like Utah out of 400_

$$\frac{Sur\ 20}{Total\ 90} = \frac{x\ Sur}{400\ Total}$$

$$\frac{90x = 8000}{90} \qquad \frac{}{90}$$

$$x = 88.\overline{8}$$

18. You decide you want to find out how many deer are in your woods in your back yard. You tag 345 deer and release them back in the wild. A month later, you collect a sample of 980 deer, 120 of which are tagged. Estimate the total deer population in that area.

Proportion

$$\frac{Tag\ 120}{Total\ 980} = \frac{345\ Tag}{x\ Total}$$

$$x = 2817.5$$

$$\frac{120x = 338,100}{120} \qquad \frac{}{120}$$

#18 answer: _There are about 3818 deer in the area._

19. A telephone booth 7 feet tall cast a shadow 20 feet long. At the same time, a nearby fire hydrant casts a shadow 8 feet. long. Find the height of the fire hydrant.

Proportion

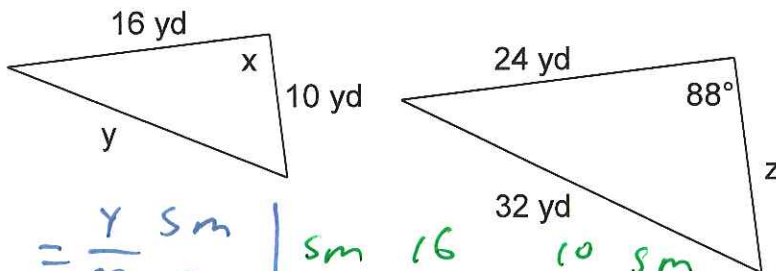$$\frac{Ht\ 7}{Shd\ 20} = \frac{x\ Ht}{8\ Shd}$$

$$x = 2.8$$

$$\frac{20x = 56}{20} \qquad \frac{}{20}$$

#19 answer: _The fire hydrant is 2.8ft_

20. The triangles are similar. Find the values of x, y and z. Show your work.

16 yd
x
10 yd
y

24 yd
88°
z
32 yd

$$\frac{sm\ 16}{Bg\ 24} = \frac{y\ Sm}{32\ Bg}$$

$$\frac{24y = 512}{24} \qquad \frac{}{24}$$

$$y = 21.\overline{3}$$

$$\frac{sm\ 16}{Bg\ 24} = \frac{10\ Sm}{z\ Bg}$$

$$\frac{16z = 240}{16} \qquad \frac{}{16}$$

$$z = 15$$

x = _88°_

y = _21.\overline{3} yds_

z = _15 yds_

21. The triangles are similar. Find the values of x and y. Show your work.

a)

$$\frac{Sm}{Bg} \quad \frac{13}{x} = \frac{6}{7.5} \quad \frac{Sm}{Bg}$$

$$\frac{6x}{6} = \frac{97.5}{6}$$

$$x = 6.25$$

$$\frac{Sm}{Bg} \quad \frac{6}{7.5} = \frac{14}{y+14} \quad \frac{Sm}{Bg}$$

$$6(y+14) = 105$$

$$6y + 84 = 105$$

$$6y = 21$$

$$y = 3.5$$

x = __6.25 units__

y = __3.5 units__

22. Find the missing area in the pair of similar figures below. Show your work.

6 cm pre   2 cm Im

$$\frac{Im}{pre} \quad \frac{1}{9} = \frac{x}{81} \quad \frac{Im}{pre}$$

$$9x = 81$$

$$x = 9$$

Area = 81 cm²   Area = ?   #22 answer: __9 cm²__

$$ASF = (SLSF)^2 = \left(\frac{2}{6}\right)^2 = \left(\frac{1}{3}\right)^2 = \frac{1}{9}$$

For 23–25, convert each, show your work, and don't forget your units to your answer.

Conversions		
1 hour = 3600 seconds	1 mile = 5280 feet	1 yard = 3 feet
1 meter = 3.28 feet	1 km = 0.62 miles	1 kg = 2.2 lbs
1 inch = 2.54 cm = 25.4 mm	1 quart = 0.946 liters	1 quart = 2 pints
16 oz = 1 lb	1 cup = 8 oz	1 gallon = 4 quarts

23. How many cups are in 24 oz?

$$\frac{C}{oz} \quad \frac{1}{8} = \frac{x}{24} \quad \frac{C}{oz}$$

$$\frac{8x}{8} = \frac{24}{8}$$

#23 answer: __3 C__

24. 5 gal is how many pints?

$$\frac{gal}{qts} \quad \frac{1}{4} = \frac{5}{x} \quad \frac{gal}{qts}$$

$$x = 20 \, qts$$

$$\frac{qts}{pts} \quad \frac{1}{2} = \frac{20 \, qts}{y \, pts}$$

$$y = 40 \, pts$$

#24 answer: __40 pts__

25. 5 km/hr = _____ mi/week

$$\frac{km}{mi} \quad \frac{1}{.62} = \frac{5 \, km}{x \, mi}$$

$$x = 3.1 \, mi$$

$$\frac{hr}{day} \quad \frac{24}{1} = \frac{1 \, hr}{y \, day}$$

$$24y = 1$$

$$y = \frac{1}{24} \, day$$

$$\frac{day}{wk} \quad \frac{7}{1} = \frac{\frac{1}{24} day}{z \, wk}$$

$$7z = \frac{1}{24}$$

$$z = \frac{1}{168} \, wks$$

#25 answer: __520.8 mi / wk__

$$\frac{3.1 \, mi}{\frac{1}{168} wks} = \frac{520.8 \, mi}{wk}$$

For 26 & 27, solve each problem below. Show your work.

26. A car is 18 feet long. A toy company would like to make a scale of it. They want to use the scale of 4 feet = 1 centimeter. How long would the toy car be?

$$\frac{ft}{cm} \quad \frac{4}{1} = \frac{18\ ft}{x\ cm}$$

$$\frac{4x = 18}{4 \quad 4}$$

$$x = 4.5$$

#26 answer: The car should be 4.5cm long.

27. A scale drawing of a home is pictured below. If the image is scaled by a factor of 7, what is the actual length and height of the house?

Length = 56ft   Height = 35ft

$$\frac{Act.}{Im} \quad \frac{7}{1} = \frac{x}{8} \quad \frac{Act}{Im} \qquad Length$$

$$x = 56\ ft$$

$$\frac{Act}{Im} \quad \frac{7}{1} = \frac{y}{5} \quad \frac{Act}{Im}$$

$$y = 35\ ft$$

5ft

8 ft