**Proportions Review (Chapter 6)** Name: KEY

1) Ms. Hall conducted a survey of her students on the pets they have at home. 63 students have a dog, 27 students have a cat, and 20 students have a fish.

a) What is the ratio of cats to dogs? Give answer in ***simplest form.***

27 cats ÷3 / 63 dogs ÷3 → 9 cats ÷3 / 21 dogs ÷3 → 3 cats / 7 dogs or 3 cats to 7 dogs or 3 cats : 7 dogs

b) What is the ratio of fish to total pets?

63 + 27 + 20 = 110

20 fish ÷10 / 110 total ÷10 → 2 fish / 11 total or 2 fish to 11 total or 2 fish : 11 total

2) Ms. Hall's went to Starbucks and there were three different sizes of drinks. Which should she order? **Identify** the best deal. **Explain** your reason. *Show work for all three sizes! Did you label your answer?*

16 oz cup for $2.91 is the best deal because it is $0.18 per oz and the other two options cost more!

| Size (oz) | Cost ($) |
|---|---|
| 12 | $2.52 |
| 16 | $2.91 |
| 20 | $3.89 |

$2.52 / 12 oz → $0.21 per oz

$2.91 / 16 oz → $0.18 per oz

$3.89 / 20 oz → $0.19 per oz

3) You read 208 pages in 4 hours.

a) Express this as a unit rate

208 pg ÷4 / 4 hr ÷4 = 52 pages per hour

b) Determine how many pages you read in 7 hours

52(7) = 364 pages

4) Write a proportion that could be used to solve for the situation. ***Then solve***!

*72 miles in 3 hours*
*120 miles in x hours*

$\frac{72}{3} = \frac{120}{x}$

$360 = 72x$

$\frac{360}{72} = \frac{72x}{72}$

$x = 5$ hours

5) Solve the proportion for the given variable.

$\frac{k}{18} = \frac{2}{9}$

$k = 4$

$\frac{36}{9} = \frac{9k}{9}$

Also think: $\frac{k}{18} \overset{\times 2}{=} \frac{2}{9}$ (×2) $2 \cdot 2 = 4$

6) Ms. Hall pumps 13.2 gallons of gas. How many liters is this?
*(Hint: 1 liter = .264 gallons)*

$\frac{1 \text{ Liter}}{0.264 \text{ g}} = \frac{x}{13.2 \text{ g}}$

$\frac{0.264x}{0.264} = \frac{13.2}{0.264}$

50 L

7) The amount of money you spend on your favorite pair of jeans that you keep buying over and over is a proportional relationship. You spend $79.90 on two pairs of jeans.

a. **Determine** how much you spend if you buy 5 pairs

$\frac{79.9}{2} = \frac{X}{5}$ (×2.5 / ×2.5) → $199.75

b. **Determine** how many pairs you bought if you spent $359.55

$\frac{79.9}{2} = \frac{359.55}{X}$

$\frac{719.1}{79.9} = \frac{79.9X}{79.9}$ → 9 pairs

8) St. Paul is 2.25 inches from Minneapolis on a map. What is the actual distance between the cities if the scale is 1.5 inch = 8 miles?

$\frac{1.5 \text{ in}}{8 \text{ mi}} = \frac{2.25 \text{ in}}{X}$

$\frac{1.5X}{1.5} = \frac{18}{1.5}$

$X =$ 12 miles

9) An apple tree in a photograph is 4 inches in height. If the tree is 18 feet tall, what is the scale?

*In a good scale, like on google maps, you want to know how much 1 in. on the map will be in real life. It is easy to use that way!

4 in : 18 ft

$\frac{4 \text{ in}}{4} = \frac{18 \text{ ft}}{4}$

1 in = 4.5 ft

10) A scale on a blueprint is 2 cm = 5 feet. Complete the table:

| | Room | Blueprint | Actual |
|---|---|---|---|
| 1. | Bedroom | 2.5 cm | 6.25 ft |
| 2. | Kitchen | 6 cm | 15 ft |

$\frac{2 \text{ cm}}{5 \text{ ft}} = \frac{X \text{ cm}}{15 \text{ ft}}$ (×3 / ×3)

$\frac{2 \text{ cm}}{5 \text{ ft}} = \frac{2.5 \text{ cm}}{X \text{ ft}}$

$\frac{2X}{2} = \frac{12.5}{2}$

$X = 6.25$

11) Ms. Hall runs on average 8 miles in a five day period. How many miles would she run in 9 days?

a. 1.6 miles
b. 14.4 miles
c. 5.625 miles
d. 18.8 miles

$\frac{8 \text{ mi}}{5 \text{ d}} = \frac{X}{9 \text{ d}}$

$\frac{72}{5} = \frac{5X}{5}$

12) 5 centimeters is equal to 1.97 feet. How many centimeters are in 4 feet?

a. 5.08 cm
b. 2.4625 cm
c. 10.15 cm
d. 1.576 cm

$\frac{5 \text{ cm}}{1.97 \text{ ft}} = \frac{X}{4 \text{ ft}}$

$\frac{20}{1.97} = \frac{1.97X}{1.97}$

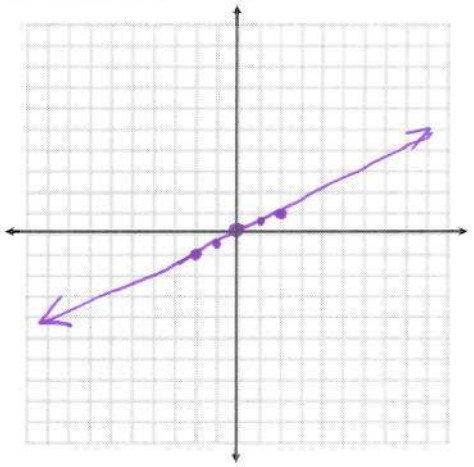
## REVIEW Ch 8

1) **Find** five solutions of $y = \frac{1}{2}x$. **Write** the solutions as ordered pairs. **Graph** by plotting ordered pairs.

a.

| $x$ | | $y$ | $(x, y)$ |
|---|---|---|---|
| -2 | $y = \frac{1}{2}(-2)$ | -1 | $(-2, -1)$ |
| -1 | $y = \frac{1}{2}(-1)$ | $-\frac{1}{2}$ | $(-1, -\frac{1}{2})$ |
| 0 | $y = \frac{1}{2}(0)$ | 0 | $(0, 0)$ |
| 1 | $y = \frac{1}{2}(1)$ | $\frac{1}{2}$ | $(1, \frac{1}{2})$ |
| 2 | $y = \frac{1}{2}(2)$ | 1 | $(2, 1)$ |

b.

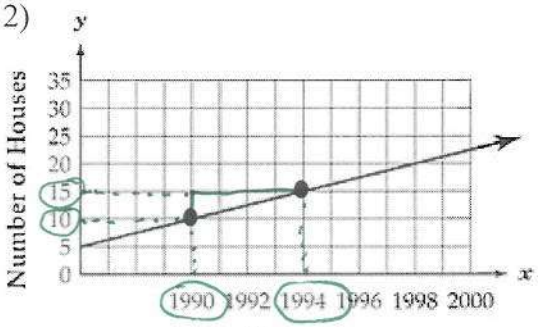


c. Is this **proportional?** Why or why not? **Explain.**

Yes! It goes through the origin!

Find the **rate of change** for each relationship. ***Label!***

2)




$\frac{\text{rise}}{\text{run}} = \frac{5}{4}$

3)

| Hours ($x$) | 2 | 5 | 9 |
|---|---|---|---|
| Profit ($y$) | 15 | 37.5 | 67.5 |

$\frac{y_2 - y_1}{x_2 - x_1}$

$\frac{37.5 - 15}{5 - 2} = \frac{22.5}{3} = 7.5$

2) $\frac{5}{4}$ or 1.25 homes per year

3) $7.5 per hour

4) The total distance you have traveled *varies directly* with the number of hours you drive. You can travel 452 miles in 7 hours.

a) **Write an equation** that could be used to find total distance traveled for $x$ number of hours driven.

$\frac{452 \text{ mi} \div 7}{7 \text{ hr} \div 7} = 64.6$ (for unit Rate, k)

4a) $y = 64.6x$

b) **Calculate** the distance you will travel after driving for 16 hours. *Remember the label!*

4b) 1,033.6 miles

5) Which represents a **proportional** relationship? Check $\frac{y}{x}$ for all ordered pairs

a.

| $x$ | 1 | 2 | 3 |
|---|---|---|---|
| $y$ | 5 | 10 | 15 |

5 5 5

b.

| $x$ | 1 | 2 | 3 |
|---|---|---|---|
| $y$ | -5 | -15 | -20 |

-5 -7.5 -6.6

c.

| $x$ | 0 | 2 | 4 |
|---|---|---|---|
| $y$ | 0 | 1 | 8 |

0 ½ 2

d.

| $x$ | 1 | 5 | 9 |
|---|---|---|---|
| $y$ | 1 | 6 | 10 |

1 1.2 1.1̄

6) **WORK** Tyler is applying for summer jobs. He is considering working for Valley Fair and has been told by friends what he might be making shown in the table. **Find** the rate of change. **Interpret** its meaning.

$\frac{40-24}{5-3} = \frac{16}{2} =$ \$8 per hour $\frac{y_2-y_1}{x_2-x_1}$

He would make \$8 each hour he works

| Hours | Money Earned |
|---|---|
| $x$ | $y$ |
| 3 | 24 |
| 5 | 40 |

7) **RENTAL** The amount you pay for renting a kayak is directly proportional to the number of hours you want to rent for. Suppose you have to pay \$15 to rent a kayak for 2 hours.

a) **Find** the constant of variation, $k$.

$\frac{\$15}{2\text{ hr}} =$ \$7.5 per hour

b) **Write an equation** that relates hours you rent for, $h$, to total cost, $c$.

$C = 7.5h$

or

$y = 7.5x$

c) How much would you have to pay to rent a kayak for 5 hours?

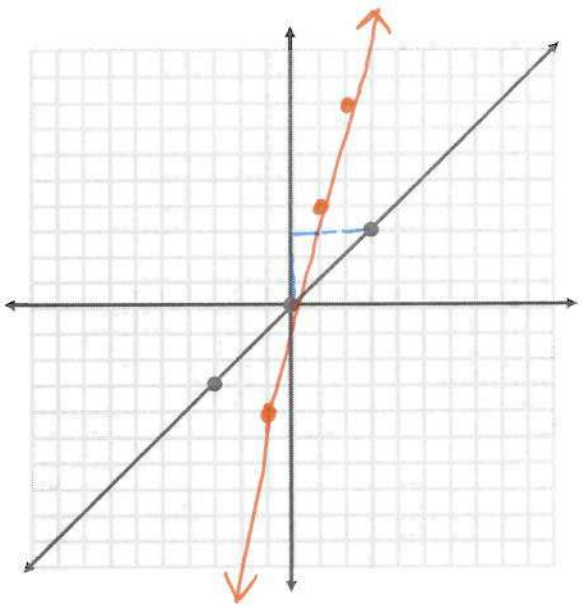
$7.5(5) =$ \$37.50

8) **FOOD** The weekly cost of Ms. Pint's grocery bills is given by $c = 55 \cdot w$, where $w$ is the number of weeks she is shopping for groceries. What is the slope in this situation? ***Explain*** what it means.

$C = 55w$ (55 = slope)

Slope is 55. She pays \$55 each week for groceries.

9) Use the graph at right to answer the following:



a) What is the **slope** of the line?

$\frac{\text{rise}}{\text{run}} : \frac{3}{3} = 1$

b) Is this graph **proportional**? *Why or why not*?

yes! It goes through the origin!

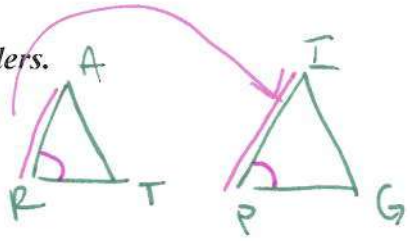
c) **Graph** the function if the slope changes to 4 *(Use the same graph as the first line)*

$y = 4x$

| $x$ | -1 | 0 | 1 | 2 |
|---|---|---|---|---|
| $y$ | -4 | 0 | 4 | 8 |

**Similarity and Congruence Unit AND Volume and Surface Area**

- ✓ ***I can identify corresponding angles and corresponding sides of similar and congruent figures.***
- ✓ ***I can set up and solve proportions to find missing measurements in similar figures.***
- ✓ ***I can measure indirectly using proportions.***
- ✓ ***I can calculate the scale factor of similar figures.***
- ✓ ***I can apply the formulas to find the volume and surface area of cylinders.***



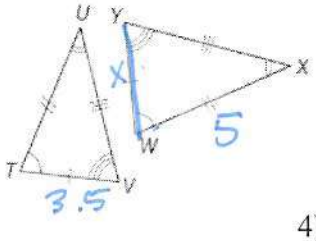

1) If $\Delta RAT \cong \Delta PIG$, which line segment is congruent to $\overline{RA}$?

$\overline{PI}$

Which angle is congruent to $\angle P$?

$\angle R$

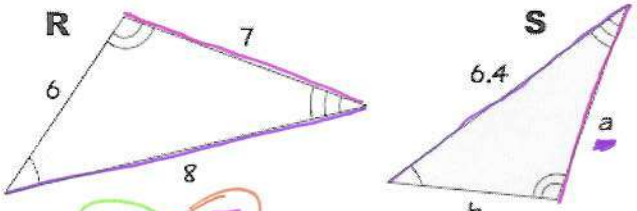
2) Ms. Pint is using origami to make a paper crane. In the process, she notices that $\Delta TUV \cong \Delta WXY$. What is the length of $\overline{YW}$ if $\overline{WX} = 5$ inches and $\overline{VT} = 3.5$ inches?




$\overline{VT} \cong \overline{WY}$

$\overline{VT} = 3.5$ so $\overline{WY} = 3.5$ in

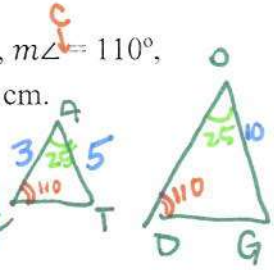
3) Find the value of $a$ if: $\Delta R \sim \Delta S$




$\frac{8}{6.4} = \frac{7}{a}$

$\frac{44.8}{8} = \frac{8a}{8}$ 5.6

4) If $\Delta CAT \sim \Delta DOG$, $m\angle A = 25°$, $m\angle$ = 110°, $\overline{AT} = 5$ cm, $\overline{OG} = 10$ cm, and $\overline{CA} = 3$ cm.




a. Find the measure of $\angle G$.

110 + 25 = 135

180 − 135 = 45°

b. Find the length of $\overline{DO}$.

$\frac{3}{5} = \frac{x}{10}$ (×2, ×2)

6 cm

5) Ms. Schroeder is approximately 6 feet tall and casts a 4 foot shadow at 3:00 P.M. At that time, a nearby chairlift post casts a shadow that is 14 feet.

a.) How tall is the chairlift?

6 | 4 21 | 14 21 ft

$\frac{6}{4} = \frac{x}{14}$ $\frac{84}{4} = \frac{4x}{4}$

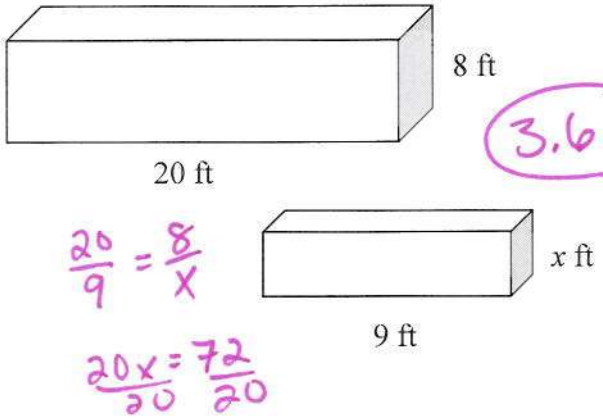
b.) Two hours later, Ms. Schroeder's shadow is 10 feet long. What is the length of the shadow of the chairlift at this time?

6 | 10 21 | x 35 ft

$\frac{6}{10} = \frac{21}{x}$

$\frac{6x}{6} = \frac{210}{6}$

6) Find the missing value if the solids are similar.

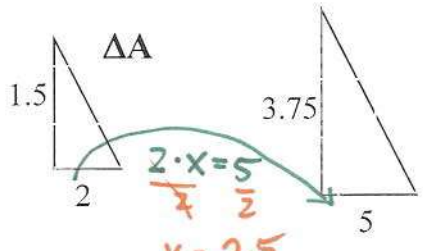



3.6 ft

$\frac{20}{9} = \frac{8}{x}$

$\frac{20x}{20} = \frac{72}{20}$

7) Given the two similar triangles below, what is the scale factor from $\Delta A$ to $\Delta B$?

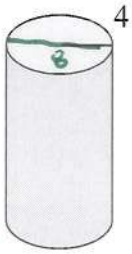


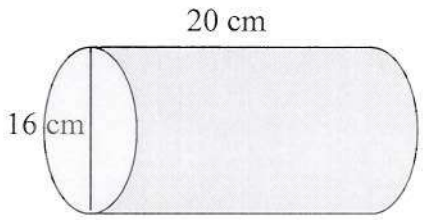

$2 \cdot x = 5$

$x = 2.5$

| A) 1 | B) 2 | C) 2.5 | D) 3.75 |
|---|---|---|---|

8) Are the solids similar? ***Explain.***



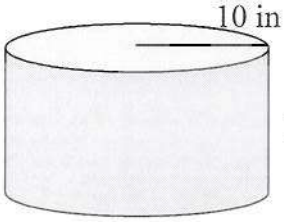

$\frac{8}{16} = \frac{10}{20}$ TRUE?

$\frac{1}{2} = \frac{1}{2}$ YES!

Yes, the ratio of diameter to height in both is 1 to 2.

**Find the volume and surface area of the cylinders below.**

9)




$V = \pi r^2 \cdot h$

$SA = 2\pi r^2 + 2\pi rh$

Volume: $3{,}768\ in^3$

Surface Area: $1{,}381.6\ in^2$

$V = \pi \cdot 10 \cdot 10 \cdot 12$

$\pi \cdot 100 \cdot 12$

$\pi \cdot 1200$

$3768\ in^3$


$20 \cdot \pi$

$62.8$

$62.8 \cdot 12 = 753.6$


$\pi \cdot 10 \cdot 10$

$\pi \cdot 100$

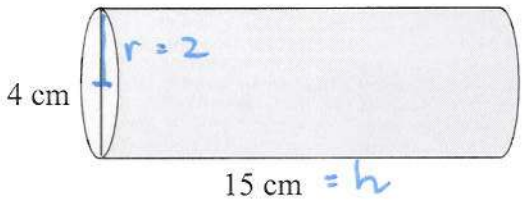
$314$

2 circles so $314 \cdot 2$

$628$

Total, add

10)




Volume: $188.4\ cm^3$

Surface Area: $213.52\ cm^2$

$V = \pi \cdot 2 \cdot 2 \cdot 15$

$\pi \cdot 4 \cdot 15$

$\pi \cdot 60$

$188.4\ cm^3$

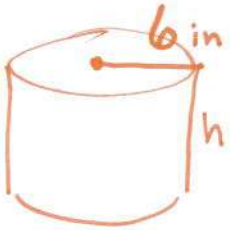
$SA = 2\pi rh + 2\pi r^2$

$2\pi \cdot 2 \cdot 15 + 2\pi \cdot 2 \cdot 2$

$4 \cdot \pi \cdot 15$

$60 \cdot \pi$ + $8 \cdot \pi$ $25.12$

11) Ms. Hall has a cylindrical bucket of ice cream to share at her next NJHS meeting. The bucket has a radius of 6 inches and can hold a volume of 905 $in^3$ of ice cream. What is the height of the ice cream bucket to the nearest inch? ***(Hint: Draw and label a picture)***




$V = 905\ in^3$

$V = \pi \cdot r^2 \cdot h$

$905 = \pi \cdot 6 \cdot 6 \cdot h$

$905 = \pi \cdot 36 \cdot h$

$\frac{905}{113.04} = \frac{113.04 \cdot h}{113.04}$

8 in