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UNIT 1: Rates, Ratios and Proportions
Similar Figures, Shadows, and Scale Factor STUDY GUIDE

Unit Rate

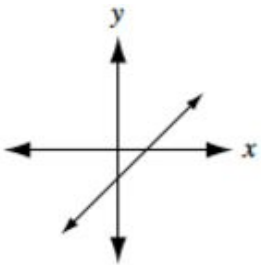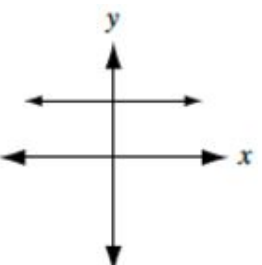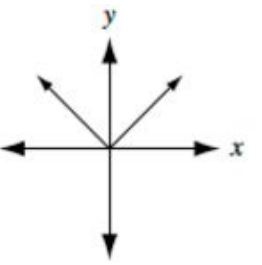|	
1) Four gallons of gasoline cost $16.80. What is the price per gallon?	2) Which is the best buy? 6 shirts for $25.50 4 shirts for $18.00 5 shirts for $21

Unit Rate with Complex Fractions
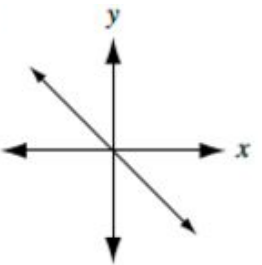
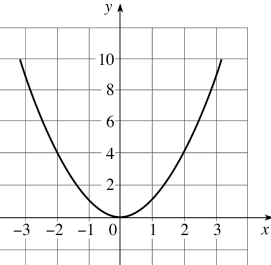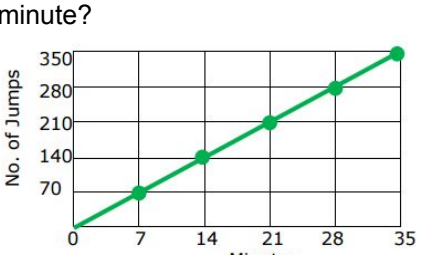|	
3) Emma drank 1/4 of a milkshake in 1/10 of an hour. How many minutes will it take her to drink a full milk shake?	5) Lillian eats 1/4 of a pound of grapes in 1/17 of a minute. How many minutes will it take her to eat a full pound of grapes?
4) A bucket of water was ⅙ full, but it still has 2 ¾ gallons of water in it. How much water would be in one fully filled bucket?	6) Lauren bikes 1 ⅓ miles in 1/10 hour. What is her rate of speed in miles per hour?

Proportional Relationships from a Graph
7) List the 3 things a graph must have to show a Proportional Relationship.

1)_____ 2)_____ 3)_____

Does the graph represent a Proportional Relationship? (Circle Proportional or Nonproportional)

8)	9)	10)	11)	12)
 Proportional Non-proportional	 Proportional Non-proportional	 Proportional Non-proportional	 Proportional Non-proportional	 Proportional Non-proportional

13) The graph below represents the number of balls thrown over time. What is the constant of proportionality? 	14) The graph below represents the number of vertical jumps Ava can do over time. How many jumps can she do per minute?

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Proportional Relationship from a Table   (Circle Proportional or NonProportional)

15) $\dfrac{7}{14}$, $\dfrac{4}{8}$

Proportional   Non-Proportional

16) (0,0) , (3,4) , (6,8) , (9,12)

Proportional   Non-Proportional

17) $\dfrac{3}{8}$, $\dfrac{6}{14}$

Proportional   Non-Proportional

18) (1,1) , (2,2) , (3,3) , (4,4)

Proportional   Non-Proportional

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19) Find the ratio of y to x for Table 1 and Table 2, simplify the fraction to simplest form.

Table 1:

NUMBER OF HOURS	TOTAL COST ($)	RATIO: $\dfrac{y}{x}$
1	$75	
2	$120	
3	$165	
4	$210	
5	$255	

Table 2:

NUMBER OF HOURS	TOTAL COST ($)	RATIO: $\dfrac{y}{x}$
1	$45	
2	$90	
3	$135	
4	$180	
5	$225	

a)Which table shows a proportional relationship?

_____

b)What makes it a proportional relationship?

_____

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20) Isabella made necklaces with beads. If the quantities are proportional, what is the constant of proportionality?

Number of Necklace	2	4	6	8	10
Number of Beads	7	14	21	28	35

21) Write an equation that represents the relationship.

x	y
ˉ2	ˉ7
ˉ4	ˉ14
ˉ6	ˉ21
ˉ8	ˉ28

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22) The table shows how the number of people who ride a roller coaster depends on the number of cars on the rollercoaster.

Number of Cars	Number of People
3	18
5	30
6	36
8	48

a) How many people can ride in 1 car?_____
b) In 10 cars?_____

23) Write an equation to represent the data in the table.

x	y
2	ˉ6.5
5	ˉ16.25
9	ˉ29.25
11	ˉ35.75

Part B

Similar Figures

Corresponding Side are _____ and _____.

Corresponding Angles are _____.

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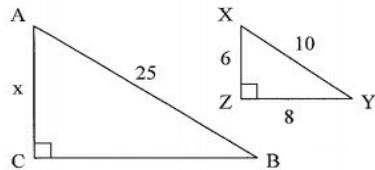| 1. Are the following rectangles similar?	2. Find the missing side.
A 18 B, W 25 X, 36, 45 rectangles ABCD and WXYZ	Two triangles: 14 and x; 2 and 1
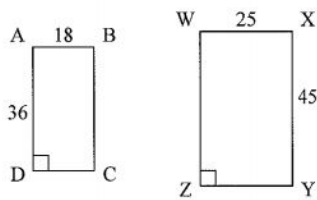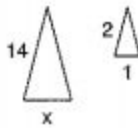
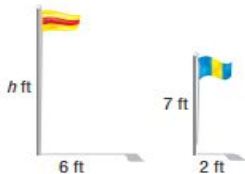| 3. Given $\triangle IJK \sim \triangle LMN$, Find the length of $\overline{IJ}$ and then the length of $\overline{IK}$.	4. Find side length AC.
Triangle IJK with x, 54, y; Triangle LMN with M 28, 42, 35, L	A, X, 10, 6, 25, x, Z, 8, Y, C, B

$$\frac{Height}{Shadow} = \frac{Height}{Shadow} \quad or \quad \frac{Height}{Height} = \frac{Shadow}{Shadow}$$
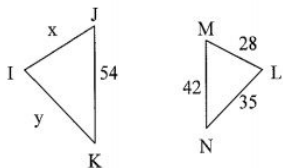
Indirect Measurement (Shadows)

5.	6.
FLAGS How tall is the taller flagpole?	**BUILDING** How tall is the building?
h ft, 7 ft, 6 ft, 2 ft	h ft, 50 ft, 50 ft, 12.5 ft

7. Find the height of the tree.

x, 30 ft, 5 ft, 4 ft
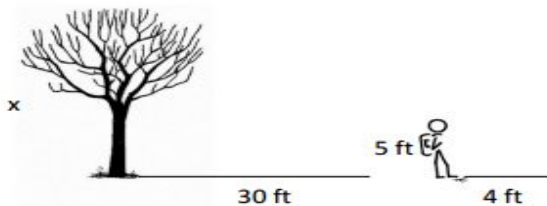
$$\frac{New}{Original} = Scale\ Factor$$

Scale Factor

8. The scale factor for a model is 8 cm = _____ m	9. The scale of a map is 2m = 4 mi map:
Model : 30.5 cm actual: 70.6 m	12m actual: _____ mi
10. James made a scale drawing of his school, which has an actual height of 70 feet. A flagpole in front of the school is 25 feet tall, and James made the flagpole 10 inches tall in his drawing. What is the height of the school in James drawing?	11. A picture of a sailboat is as shown. What is the scale factor if the real-life boat is 7500 cm long?
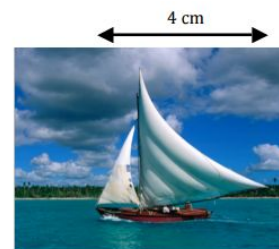
Answer Key Part A

1) $4.20

2) 5 shirts for $21 ($4.20)

3) 24

4) 16 ½

5) 1 ⅛

6) 4/17

7) 13 ⅓

8) 3 hours

9) 1) straight line (linear) 2) constant of proportionality 3) goes through origin

10) Nonproportional

11) nonproportional

12) nonproportional

13) proportional

14) nonproportional

15) 5

16) 10

17) proportional

18) proportional

19) nonproportional

20) proportional

21) nonproportional

22) proportional

23) a) table 2 b) constant rate of change

24) 3.5

25) 7

26) y = 3.5x

27) y = -3.25x

28) y = 2.56x

29) a) 6 b) 60