Core Focus on Proportions & Probability
Block 2 Test ~ Proportions and Similarity

Name_____   Period_____   Date_____

Part I – Selected Response

1. What is the value of x in the proportion
$$\frac{9}{12} = \frac{6}{x}?$$
  A. 8
  B. 10
  C. 12
  D. 18

2. Trevor bought 5 packages of cake mix for $22.50. How much would 8 packages of cake mix cost?
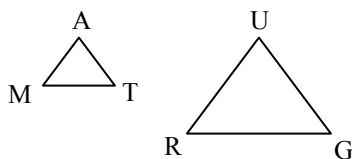
  A. $30.00
  B. $32.00
  C. $36.00
  D. $37.50

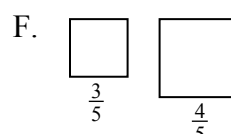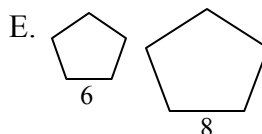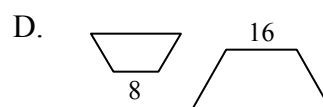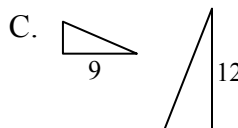**3.** Inessa ran 3 laps in 8 minutes. How long would it take her to run 10 laps at this pace?
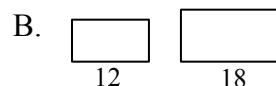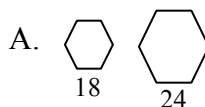
  A. 30 minutes
  B. $26\frac{2}{3}$ minutes
  C. 24 minutes
  D. $3\frac{3}{4}$ minutes

4. ΔMAT is similar to ΔRUG. Which side of ΔRUG corresponds to $\overline{MT}$ in ΔMAT?
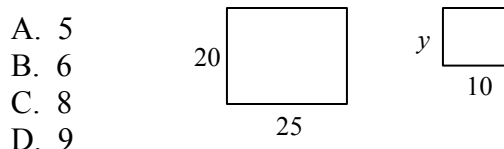
  A. $\overline{RU}$
  B. $\overline{UG}$
  C. $\overline{UR}$
  D. $\overline{RG}$

5. Which pairs of similar figures have a scale factor of 3 : 4? Circle all that apply.

6. What is the value for y in the similar figures?

  A. 5
  B. 6
  C. 8
  D. 9

Two similar triangles have a scale factor of 2 : 3. For numbers 7a – 7d, determine whether each statement about the triangles is true or false.

7a. The ratio of their perimeters is 2 : 3.   TRUE   FALSE

7b. The ratio of their areas is 4 : 6.   TRUE   FALSE

7c. Their perimeters could be 14 *cm* and 21 *cm*.   TRUE   FALSE

7d. Two corresponding sides could be 6 *in* and 7 *in*.   TRUE   FALSE

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Part II – Constructed Response

Solve each proportion.
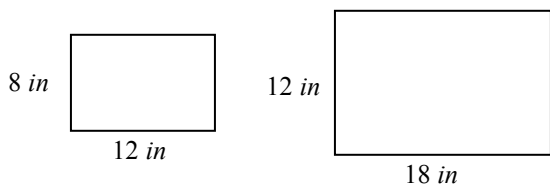
1. $\dfrac{3}{4} = \dfrac{12}{x}$

2. $\dfrac{15}{25} = \dfrac{y}{30}$

3. Tyson bought four roses for $8.88. How much would 6 roses cost? Show all work necessary to justify your answer.
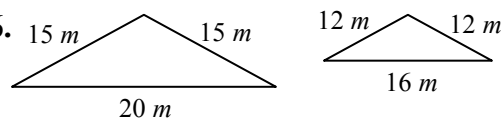
4. Mia ran 10 laps in 8 minutes. Shawna ran 4 laps in 3 minutes. Which person ran at a faster rate? Use mathematics to justify your answer.

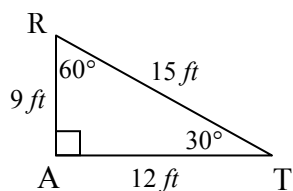**Determine the scale factor for each pair of similar figures.**

5.

8 in   12 in

12 in

18 in

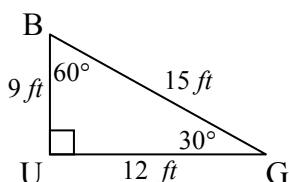**6.** 15 m   15 m   12 m   12 m

20 m   16 m

7. Use the figures below to find the corresponding sides and corresponding angles to the ones identified.

$\overline{RA}$ corresponds to _____ $\angle R \cong \angle$_____

$\overline{AT}$ corresponds to _____ $\angle A \cong \angle$_____
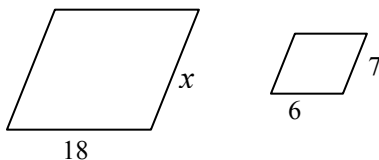
$\overline{RT}$ corresponds to _____ $\angle T \cong \angle$_____

Are $\triangle$RAT and $\triangle$BUG congruent, similar, or neither? Explain your reasoning.

Each pair of shapes below are similar. Solve for each variable. Show all work necessary to justify your answer.

8.

9.
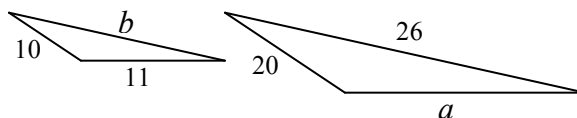
10. Victor wanted to know the height of a tree at his friend's house. On Saturday morning, he measured the shadow of the tree along the ground to be 24 feet long. At the same time, he measured his own shadow to be 3 feet long. Victor is 6 feet tall. Find the height of the tree. Use mathematics to justify your answer.

11. Use the similar hexagons to the right.
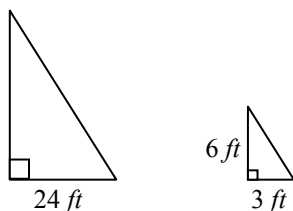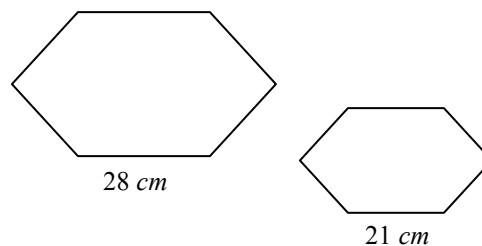

28 *cm*

21 *cm*

    a. Find their scale factor.

    b. Find the ratio of their perimeters.

    c. Find the ratio of their areas.

    d. Suppose the larger hexagon has a perimeter of 112 *cm*. What is the perimeter of the smaller hexagon? Show all work necessary to justify your answer.

12. Two similar triangles have perimeters of 10 inches and 30 inches. The smaller triangle has an area of 4 in^2. Kia used this information to find the area of the larger triangle. Unfortunately, she made an error in her work. Explain the error and then find the correct area of the larger triangle.

> Scale factor is 1 : 3
>
> Ratio of their areas is $1^2 : 3^2$ which is 1 : 6
>
> Let x = the area of the larger triangle
>
> $$\frac{1}{6} = \frac{4}{x}$$
>
> x = 24
>
> The area of the larger triangle is 24 in^2.

13. A map has a scale of 2 inches : 25 miles. Chandra uses the map to find the distance from the zoo to her house. The distance on the map is 5 inches. How many miles away is the zoo from Chandra's house? Show all work necessary to justify your answer.
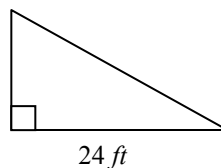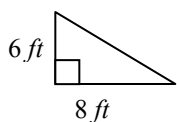
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Part III – Problem Solving

Frederick planted a tree in his backyard. He is 6 feet tall and his shadow along the ground has a length of 8 feet. The tree is currently casting a shadow along the ground that has a length of 24 feet. What would the length of the tree's shadow along the ground be if the tree were 6 feet taller?

6 *ft*

8 *ft*   24 *ft*

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Part I – Selected Response

1. What is the value of *x* in the proportion
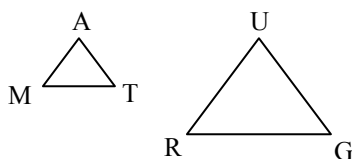$$\frac{3}{5} = \frac{6}{x}?$$

A. 9
B. 10
C. 15
D. 20

2. Robert bought 2 packages of cookies for $8.00. How much would 5 packages of cookies cost?

A. $16.00
B. $20.00
C. $24.00
D. $40.00

3. ∆MAT is similar to ∆RUG. Complete the statement:

$\overline{MT}$ corresponds to _____.

A. $\overline{RU}$
B. $\overline{UG}$
C. $\overline{UR}$
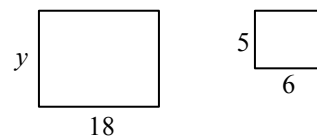D. $\overline{RG}$

4. Which scale factors describe the similar triangles? Circle **ALL** that apply.

A. 3 : 4   B. 3 : 6

C. $\frac{1}{3}$ D. $\frac{3}{4}$

E. 1 : 3   F. $\frac{3}{6}$

5. What is the value for *y* in the similar figures?

A. 10
B. 12
C. 15
D. 17

Two similar triangles have a scale factor of 3 : 5. For numbers 6a – 6c, determine whether each statement about the triangles is true or false.

6a. The ratio of their perimeters is 3 : 5.   TRUE   FALSE

6b. Two corresponding sides could be 6 *cm* and 10 *cm*.   TRUE   FALSE

6c. The ratio of their areas is 6 : 10.   TRUE   FALSE

7. A kitchen is drawn on a piece of paper using 1 inch : 2 feet. The kitchen is 14 feet long. How many inches long will the kitchen be on the paper?

A. 28 inches
B. 13 inches
C. 7 inches
D. 6 inches

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Part II – Constructed Response
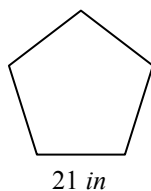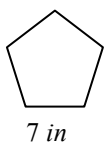
Solve each proportion.

1. $\dfrac{3}{4} = \dfrac{9}{x}$

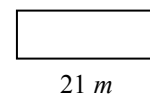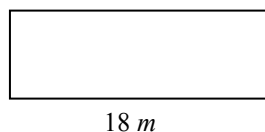**2.** $\dfrac{4}{8} = \dfrac{y}{12}$

3. Jim ran 10 laps in 5 minutes. How many laps will Jim run in 12 minutes? Show all work necessary to justify your answer.

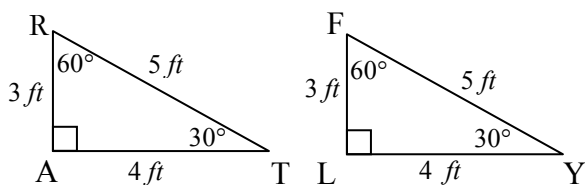**Determine the scale factor for each pair of similar figures.**

4.

7 *in*

21 *in*

5.

21 *m*

18 *m*

6. For the pair of congruent figures below, find the corresponding sides and corresponding angles to the parts identified.

R
60°   5 ft
3 ft
30°
A   4 ft   T

F
60°   5 ft
3 ft
30°
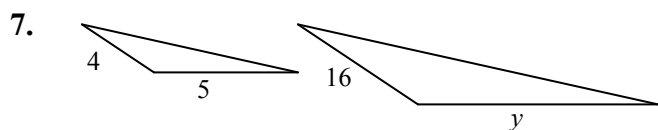L   4 ft   Y

$\overline{RA}$ corresponds to _____ $\angle R \cong \angle$_____

$\overline{AT}$ corresponds to _____ $\angle A \cong \angle$_____

$\overline{RT}$ corresponds to _____ $\angle T \cong \angle$_____
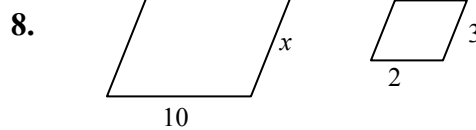
The shapes below are similar. Use a proportion to solve for each variable. Show all work necessary to justify your answer.

7.

4   5   16   y

Proportion: $\dfrac{4}{16} = $ ——

Work:

Answer:

8.

x   10   3   2

Proportion:

Work:

Answer:

9. Use the similar hexagons to the right.

    a. Find their scale factor.

30 *cm*

    b. Find the ratio of their perimeters.

20 *cm*

    c. Find the ratio of their areas.

    d. Suppose the larger hexagon has a perimeter of 90 *cm*. What is the perimeter of the smaller hexagon? Show all work necessary to justify your answer.
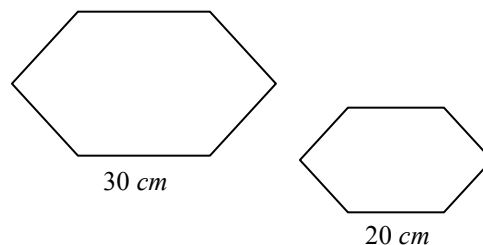
10. A map has a scale of 2 inches : 5 miles. Mike measured his trip on a map. It was 10 inches. He used this information to find the number of miles for his trip. His work below shows a mistake. Explain Mike's mistake and then find the number of miles for Mike's trip.

$$\frac{2\,inches}{5\,miles} = \frac{x\,miles}{10\,inches}$$

$(2)(10) = 5x$

$20 = 5x$

$4 = x \qquad \boxed{4\ miles}$

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Part III – Problem Solving

Frederick planted a tree in his backyard. He is 6 feet tall and his shadow along the ground has a length of 8 feet. The tree is currently casting a shadow along the ground that has a length of 24 feet. What would the length of the tree's shadow along the ground be if the tree were 6 feet taller?

6 ft

8 ft   *24 ft*