Warm–Up

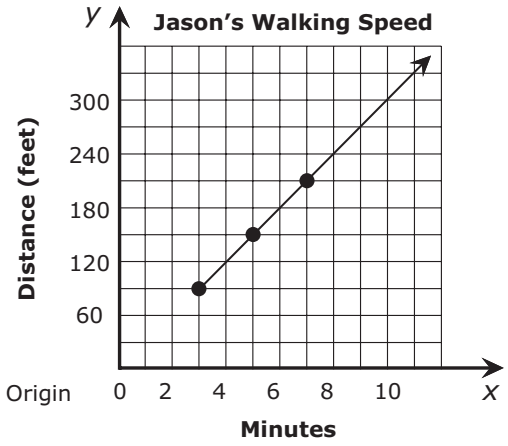
Directions: Answer Questions 1 and 2 about ratios and proportionality.

1. Determine whether the ratios $\frac{6}{9}$ and $\frac{8}{12}$ form a proportion and explain your answer.

2. Determine whether the ratios $\frac{6}{16}$ and $\frac{14}{56}$ form a proportion and explain your answer.

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S Step.

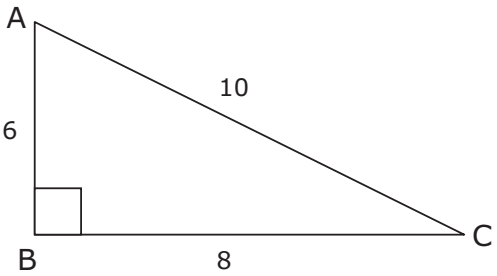
Jason was graphing the relationship between the distance he could walk in a certain number of minutes. He wanted to see if the relationship between the minutes walked and the distance was proportional. He chose the times of 3 minutes and 7 minutes to use to compare the relationship. Using what you know about the relationship between similar right triangles, what is the ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$ or change in vertical over change in horizontal?



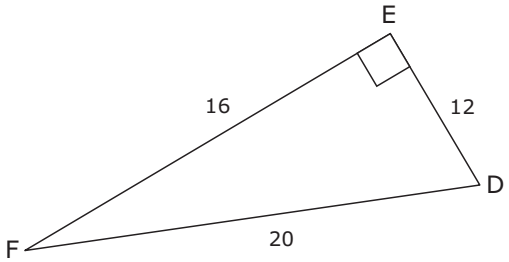
S Underline the question.
This problem is asking me to find the _____
_____.

Directions: Complete this page with your teacher and partner.

Triangle 1



Triangle 2

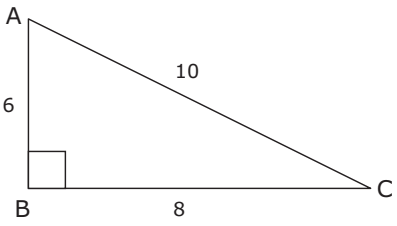


1. Triangle 1 and Triangle 2 are both right triangles. Explain how you know this.

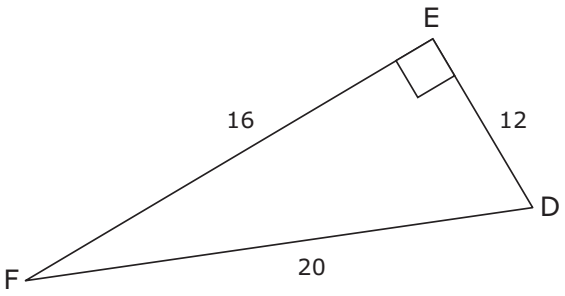
When we are trying to determine whether two triangles are similar, we can look at the measures of the corresponding sides.

Directions: Complete this page with your teacher and partner.

Triangle 1



Triangle 2



2. Explain the meaning of corresponding sides.

3. List the corresponding sides for Triangle 1 and Triangle 2.
$\overline{AB}$ corresponds to __ $\overline{BC}$ corresponds to __ $\overline{CA}$ corresponds to __

4. Once we have determined the corresponding sides, we are going to create a ratio to represent the relationship between the corresponding side lengths.
$\frac{\overline{AB}}{}$ = $\frac{\overline{BC}}{}$ = $\frac{\overline{CA}}{}$ =

5. What do you notice about the relationship between the numerator and the denominator in each of the ratios?

6. Simplify each of the ratios.
$\frac{\overline{AB}}{\overline{DE}} = \frac{6}{12} =$ $\frac{\overline{BC}}{\overline{EF}} = \frac{8}{16} =$ $\frac{\overline{CA}}{\overline{FD}} = \frac{10}{20} =$

7. What is the ratio between each of the corresponding side lengths of Triangle 1 and Triangle 2?

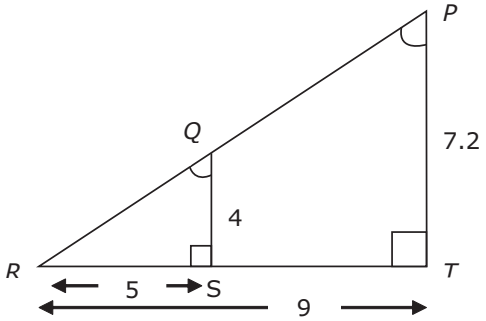
8. If each ratio can be simplified to _, what can we say about the relationship between the three ratios? _____. They are _____. Because these three ratios are equivalent, we can say that the relationship between them is _____.

9. We can now say that Triangle 1 and Triangle 2 are similar triangles. Based on what you have discovered about the two triangles and the corresponding sides, create a definition of similar triangles with your partner.

LESSON 12: Similar Triangles as Slope

Directions: Complete this page with your teacher and partner.

Determine if Triangle *QRS* ~ Triangle *PRT*.



1. What is different about these two triangles from the previous example?

2. List the corresponding sides for Triangle *QRS* and Triangle *PRT*.
$\overline{RS}$ corresponds to ___
$\overline{RQ}$ corresponds to ___
$\overline{QS}$ corresponds to ___

3. Once we have determined the corresponding sides we are going to create a ratio to represent the relationship between the corresponding leg lengths.

4. How is this relationship different from the previous example?

5. Explain how we determined if the sides were proportional for Triangle 1 and Triangle 2.

6. Look at the two ratios for Triangle *QRS* and Triangle *PRT*. Can they be simplified? ___ Why?

7. What other way can we determine if the two ratios are proportional?

Are the cross products equal?

8. If the cross products between the two corresponding legs are equal, then the two triangles are _____. Explain why.

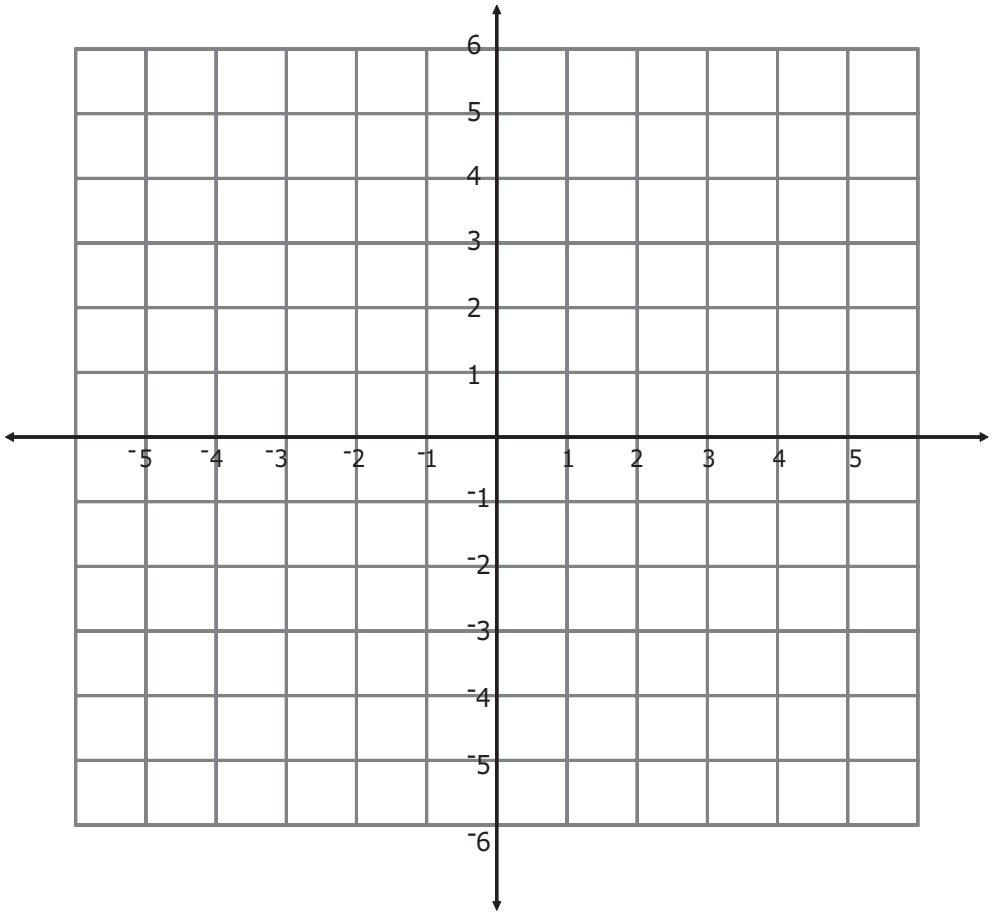
9. We can now say that Triangle QRS and Triangle PRT are _____. Why?

Directions: Complete this page with your teacher and partner.

1. Graph the coordinates: *A* (2, 3), *B* (2, 0), and *C* (0, 0).

2. Graph the coordinates: *D* (0, 0), *E* (0, ¯6), and *F* (¯4, ¯6).

3. Connect points *A*, *B*, and *C*. Connect points *D*, *E*, and *F*. What do you notice about the figure that is formed by connecting each set of points?



Directions: Complete this page with your teacher and partner.

Use the triangles on the coordinate plane on S153 to complete the following chart and answer the questions about the relationship between the two triangles.

	Triangle *ABC*	**Triangle *DEF***
Length of Vertical Leg		
Length of Horizontal Leg		
Ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$		

4. What are the corresponding sides of the two triangles?

5. Explain what you know about similar triangles.

6. Write the relationships between the corresponding sides as a proportion.

Now substitute in the values for the leg lengths to determine if the triangles are similar.

_____ Is this statement true? ___. What does this mean?

7. There is another relationship to explore with similar triangles. That relationship is the ratio between the _____ leg and the _____ leg of each triangle. What is the ratio of the $\frac{\text{vertical leg}}{\text{horizontal leg}}$ in Triangle *ABC*? __ What is the ratio of the $\frac{\text{vertical leg}}{\text{horizontal leg}}$ in Triangle *DEF*? __

8. What do you notice about the two ratios?

9. Is there a way to draw a line that will pass through the hypotenuse of both triangles? ___ Draw the line to pass through the hypotenuse of both triangles.

Directions: Complete this page with your teacher and partner.

10. Let's choose two points on that line that we have not used in our triangles. ($^{-}2$, $^{-}3$) and (4, 6). Mark them with stars.

Point 1	Point 2	Change in vertical distance	Change in horizontal distance	Ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$
★ ($^{-}2$, $^{-}3$)	★ (4, 6)			
♥	♥			
♦	♦			

- Choose two other sets of points on the line.
- Mark the points you use with hearts and diamonds.
- Determine the change in vertical distance.
- Determine the change in horizontal distance.
- Write the change as a simplified ratio in the table above.

With your partner, make a prediction about the relationship between the vertical and horizontal distance of any two points on that line?

Was your prediction correct? ___ Explain.

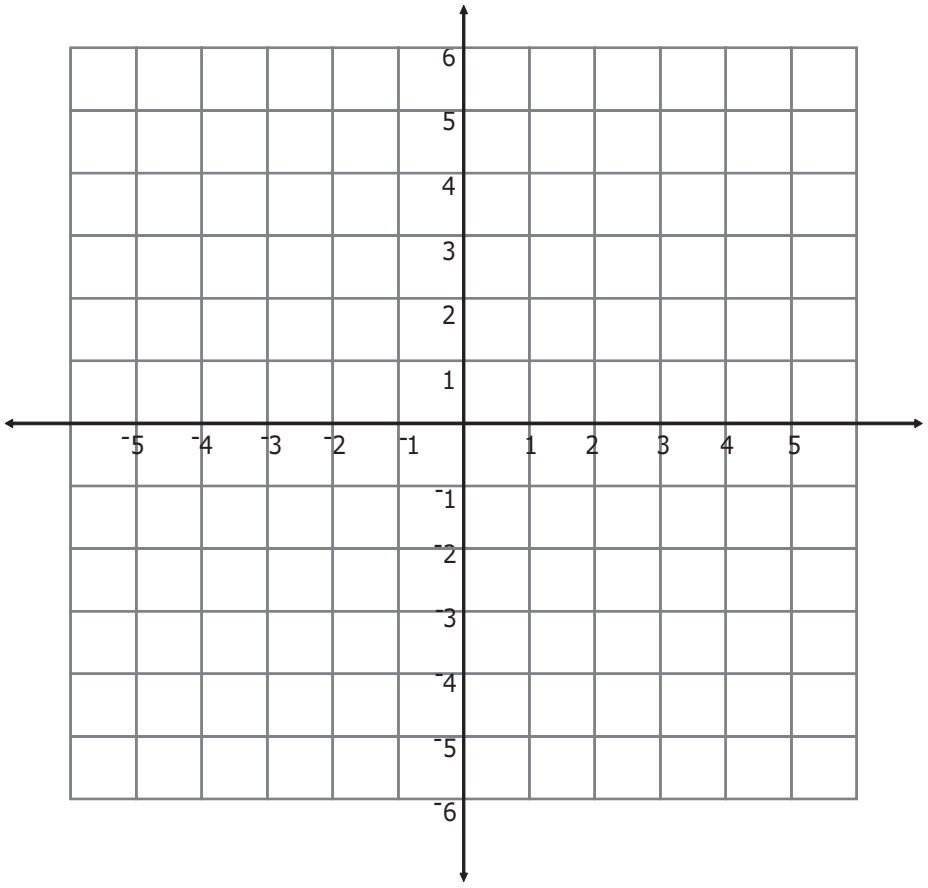
What can you conclude about the ratio of the measure of the vertical leg over the horizontal leg no matter which two points you choose on the line?

Another name for the change in vertical over the change in horizontal is _____.

LESSON 12: Similar Triangles as Slope

Directions: Complete this page with your partner.

Plot the following points: Triangle 1: (4,0) (0,0) (4,2) Triangle 2: (6,0) (0,0) (6,3)



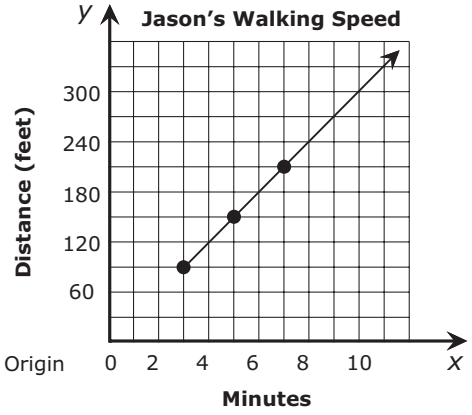
Fill out the chart using the two given points and then choose any pair of points on the line that passes through the hypotenuse.

Point 1	Point 2	Change in vertical distance	Change in horizontal distance	Ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$
(4, 2)	(6, 3)			

What can you conclude about the ratio of the measure of the vertical leg over the horizontal leg no matter which two points you choose on the line? _____ _____. This ratio is also known as _____.

Directions: Complete the following SOLVE problem with your teacher.

Jason was graphing the relationship between the distance he could walk in a certain number of minutes. He wanted to see if the relationship between the minutes walked and the distance was proportional. He chose the times of 3 minutes and 7 minutes to use to compare the relationship. Using what you know about the relationship between similar right triangles, what is the ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$ or change in vertical over change in horizontal?



S Underline the question.
This problem is asking me to find _____
_____.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.

L Write in words what your plan of action will be.

Choose an operation or operations.

V Estimate your answer.
Carry out your plan.

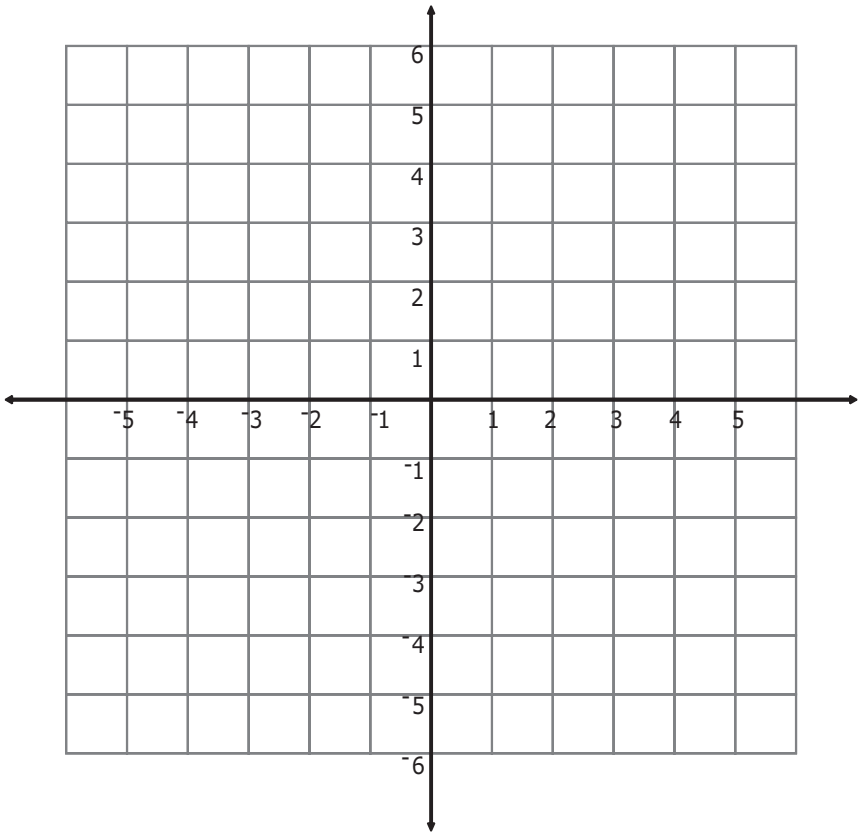
E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)

Is your answer accurate? (Check your work.)
Write your answer in a complete sentence.

Directions: Complete this page with your partner.

Plot the coordinates for two similar triangles where the hypotenuse can be connected with a straight line.



Use the chart below to select two sets of points on the line through the hypotenuse. Complete the chart for two different sets of points.

Point 1	Point 2	Change in vertical distance	Change in horizontal distance	Ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$

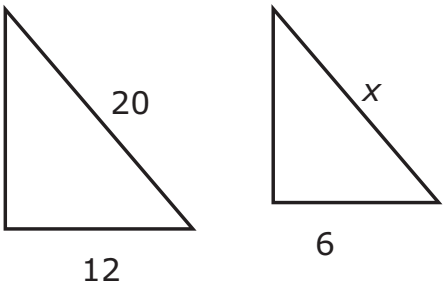
What can you conclude about the ratio of the measure of the vertical leg over the horizontal leg no matter which two points you choose on the line? _____ _____. This ratio is also known as _____.

Homework

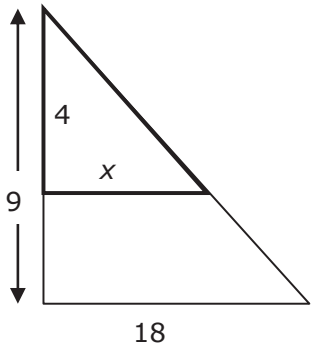
Name _____ **Date** _____

Directions: For Questions 1 and 2, find the value of x in each pair of similar triangles.

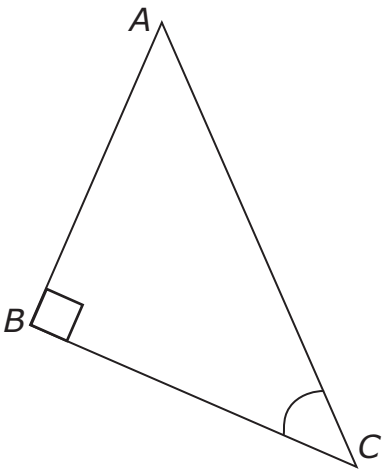
1.

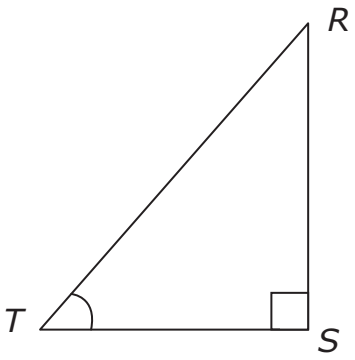


2.



These triangles are similar.





Name all corresponding sides:

3. Side $\overline{AB}$ corresponds to side __.

4. Side $\overline{AC}$ corresponds to side __.

5. Side $\overline{BC}$ corresponds to side __.

Homework

Name _____ **Date** _____

Directions: Use the coordinate graph and the information below to complete Questions 6 – 10.

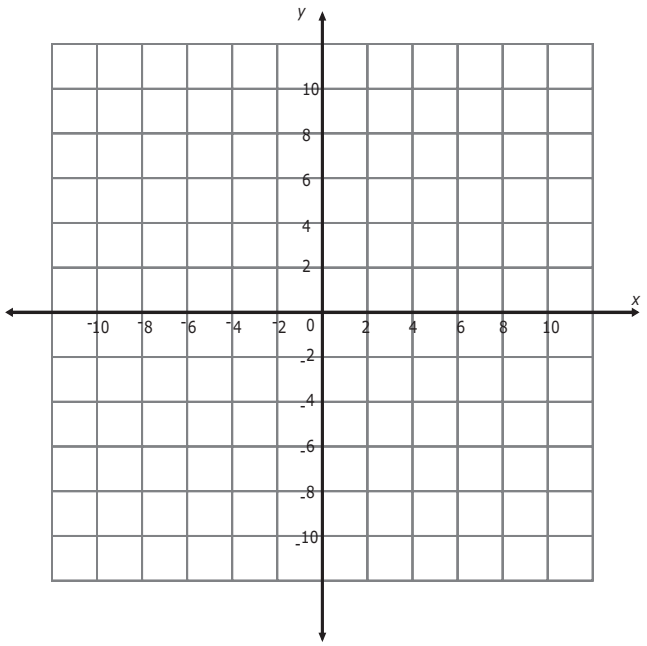
6. Graph this set of similar triangles.

Triangle *GHI* (0, 0), (0, ⁻8), and (4, ⁻8)
Triangle *KLM* (⁻4, 8), (⁻4, 4), and (⁻2, 4)

7. Graph this set of similar triangles

Triangle *ABC* (⁻10, 0), (⁻6, 0), and (⁻6, 2)
Triangle *MNO* (⁻2, 4), (6, 4), and (6, 8)

8. Extend the line connecting the hypotenuses for each set of similar triangles.



Choose two sets of points that are on the line for one of the sets of triangles and complete the chart.

	Point 1	Point 2	Change in vertical distance	Change in horizontal distance	Ratio of $\frac{\text{vertical leg}}{\text{horizontal leg}}$
9.					
10.					