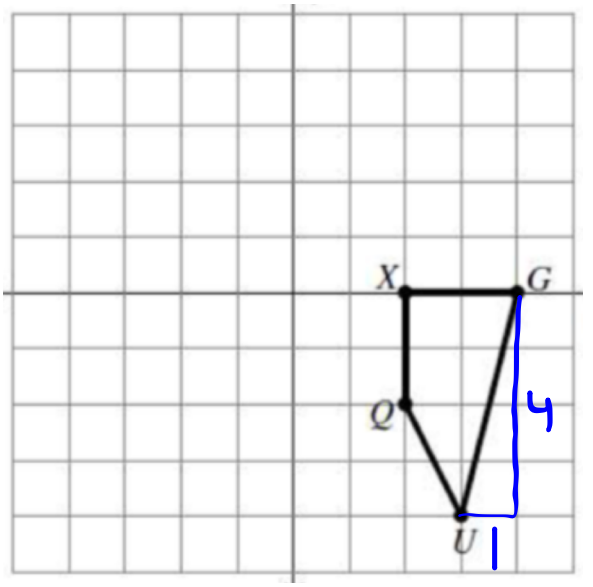
Warm Up



$a^2+b^2=c^2$

$4^2+1^2=17$

$\sqrt{17}=\sqrt{c^2}$

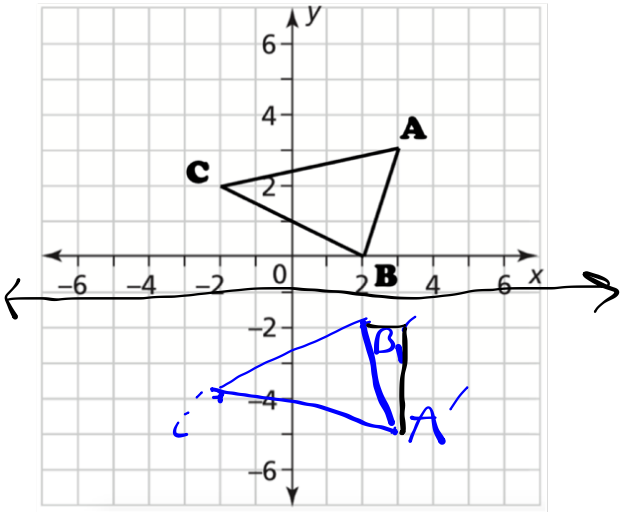
$4.1=c$

$UG=4.1$

Find the length of the side UG

Hint: Use Pythagorean Theorem

Reflect Δ ABC across the line y = –1.



Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$1^2 + 3^2 = c^2$

$1 + 9 = c^2$

$\sqrt{10} = \sqrt{c^2}$

3.2 = c

Calculate the slope for each side of Δ A'B'C'.

Slope A'B' = -3

Slope B'C' = $\frac{1}{2}$

Slope A'C' = $-\frac{1}{5}$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

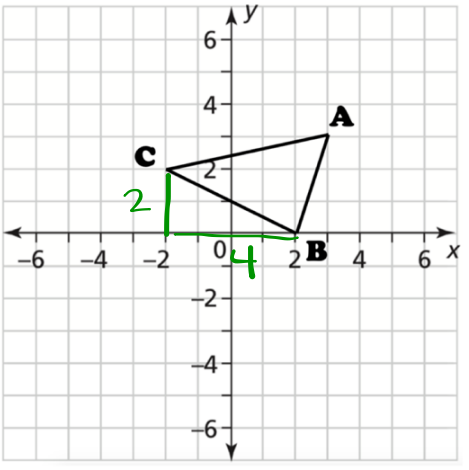
Name Key

Homework Questions?

Transformations and Congruence

We will be using Δ ABC as our Preimage for all of the following problems.

1. Using the Pythagorean Theorem, calculate the lengths of each side of Δ ABC. Round your answers to the nearest tenth.
Show work below.



AB = 3.2 u. $1^2+3^2=c^2$, $1+9=c^2$, $10=c^2$, $\sqrt{10}=c$

BC = 4.5 u. $2^2+4^2=c^2$, $4+16=c^2$, $20=c^2$, $\sqrt{20}=c$

AC = 5.1 u. $1^2+5^2=c^2$, $1+29=c^2$, $26=c^2$, $\sqrt{26}=c$

AB = 3.2 units BC = 4.5 units AC = 5.1 units

2. Calculate the slope for each side of Δ ABC.

Slope AB = $3/1 = 3$

Slope BC = $-2/4 = -\frac{1}{2}$

Slope AC = $1/5$

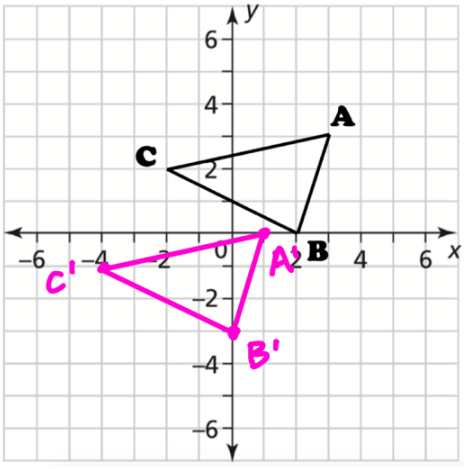
For each of the following questions, graph the transformation and then answer the questions.

3. **Translate** Δ ABC following the rule (x, y) → (x – 2, y – 3)

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$1^2+3^2=c^2$
$10=c^2$
$\sqrt{10}=c$

$\overline{A'B'} = 3.2$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $3/1 = 3$

Slope B'C' = $-2/4 = -\frac{1}{2}$

Slope A'C' = $1/5$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

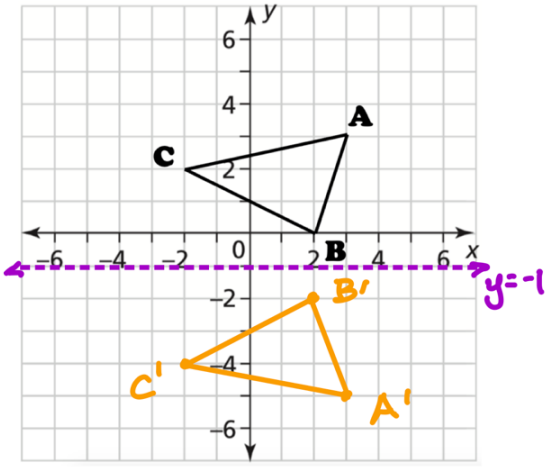
- The length of A'B' is the same as the length of AB.
- The slopes of the sides of ΔA'B'C' are equal to the slopes of the corresponding sides of ΔABC.

4. **Reflect** Δ ABC across the line y = –1.

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$1^2+3^2=c^2$
$1+9=c^2$
$10=c^2$
$\sqrt{10}=c$

$\overline{A'B'} = 3.2$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $-3/1$

Slope B'C' = $2/4$

Slope A'C' = $-1/5$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

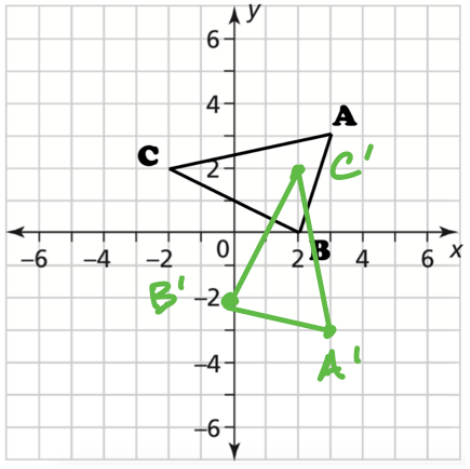
- The length of A'B' is the same as the length of AB.
- The slopes of the sides of ΔA'B'C' are not equal to the slopes of the corresponding sides of ΔABC, BUT the absolute values of corresponding sides ARE equal.

5. **Rotate** Δ ABC 90° clockwise around the point (0, 0).

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$1^2+3^2=c^2$
$1+9=c^2$
$10=c^2$
$\sqrt{10}=c$

$\overline{A'B'} = 3.2$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $-1/3$

Slope B'C' = $4/2 = 2$

Slope A'C' = -5

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

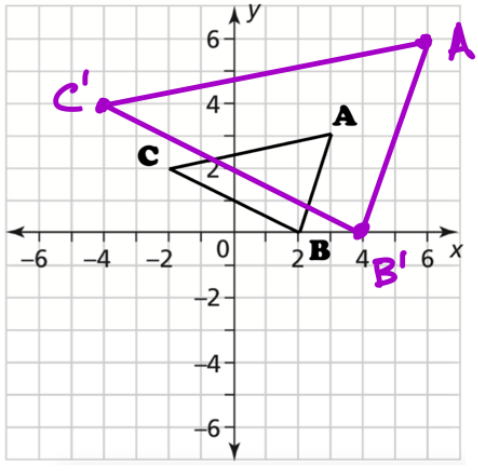
- The length of A'B' is the same as the length of AB.
- The slopes of the sides of ΔA'B'C' are not equal to the slopes of the corresponding sides of ΔABC. They are the negative reciprocal of slopes on ΔABC.

6. **Dilate** Δ ABC by a factor of two from the origin (0, 0).

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$2^2+6^2=c^2$
$4+36=c^2$
$40=c^2$
$\sqrt{40}=c$

$\overline{A'B'} = 6.3$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $\frac{6}{2} = 3$

Slope B'C' = $\frac{-4}{8} = -\frac{1}{2}$

Slope A'C' = $\frac{2}{10} = \frac{1}{5}$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

- The length of A'B' is not the same as the length of AB. It is twice as long! (Rounding makes it look less.)
- The slopes of all corresponding sides are equal.

7. For which transformations ae the following statements true? Check the appropriate boxes.

	Translation	Reflection	Rotation	Dilation
Corresponding **sides** of the Preimage and Image are **parallel**.	X			X
Corresponding **sides** of the Preimage and Image are the **same size**.	X	X	X	
Corresponding **angle measures** of the Preimage and Image are the **same size**.	X	X	X	X
The image and preimage are **congruent**.	X	X	X	

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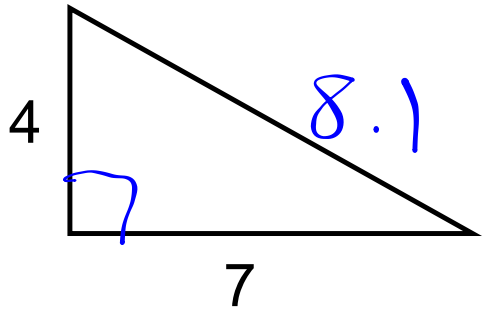
Quick Pythag Practice

The triangles below are right triangles.

Find the missing length:

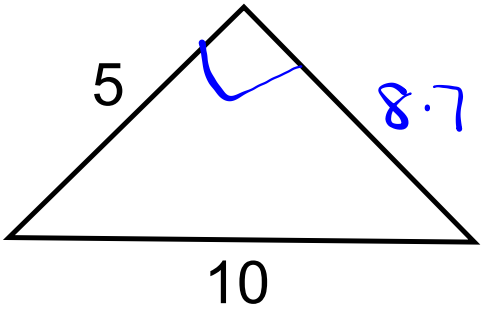


$4^2 + 7^2 = c^2$

$16 + 49 = c^2$

$\sqrt{65} = \sqrt{c^2}$

8.1



$5^2 + b^2 = 10^2$

$25 + b^2 = 100$

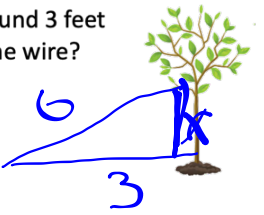
$\sqrt{b^2} = \sqrt{75}$

8.7

Pythagorean Theorem and Transformations Practice

Use the Pythagorean Theorem to solve the following problems. Drawing pictures is always helpful! Show all work and round answers to the nearest tenth.

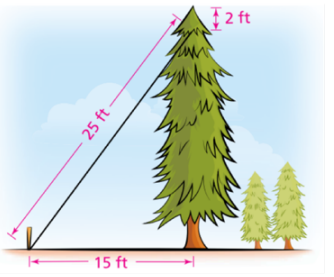
1. Marc wants to support a tree with a 6-foot wire that is attached to the ground 3 feet from the base of the tree. How high up the tree will Marc be able to put the wire?



2. Dahlia is trying to figure out the length of a staircase she will need for a deck that is 12 feet high. She wants to start the stairs 21 feet from the deck. How long will her staircase need to be?

3. In a right triangle shaped house, the roof is 51 feet long (yes, it comes down to the ground) and the base of the house is 29 feet across. Calculate the height of the house at its highest point.

4. At an evergreen farm, the taller trees are braced by wires. A wire extends from 2 feet below the top of the tree to a stake in the ground. What is the tallest tree that can be braced with a 25-foot wire staked 15 feet from the base of the tree?



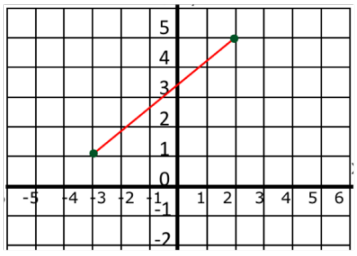
5. Find the missing length of the triangle:

6. Do the following measurements represent the sides of a right triangle? If there is not a right angle, is it an obtuse or an acute angle?

5, 11, 13

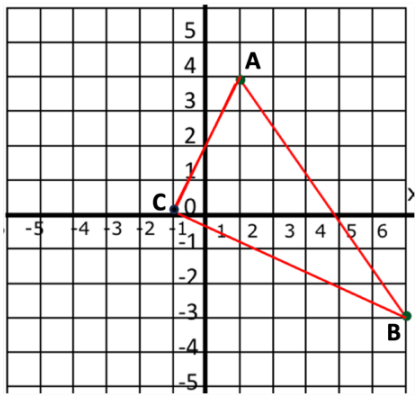
4, 7.5, 8.5

7. What is the length of the line on the graph below?



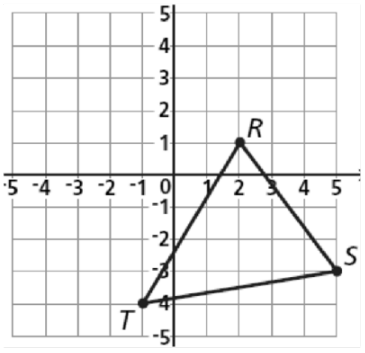
8. What is the distance between the points (7, 2) and (3, 9)?

9. Prove whether or not triangle ABC is a right triangle.

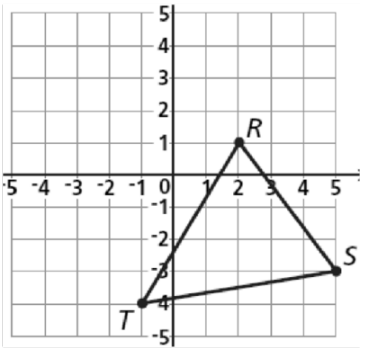


Perform the following transformations. (#'s 10-15)

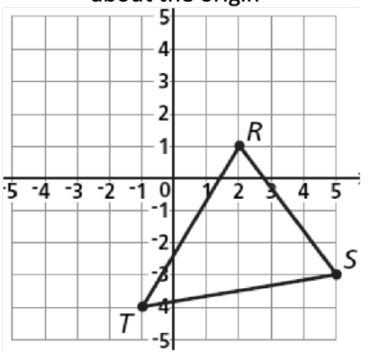
2 units left, 4 units up



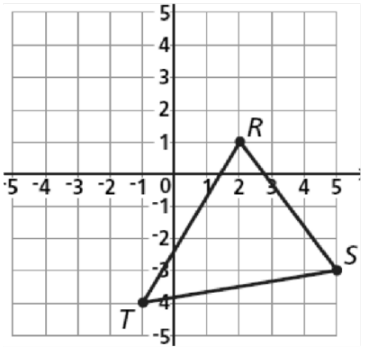
Reflection across the x-axis



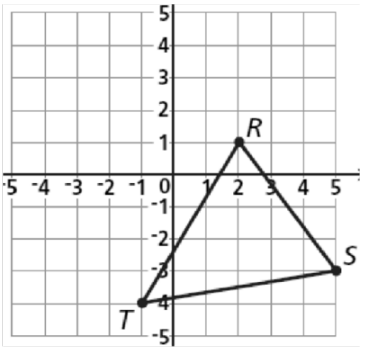
Rotation 90° counter-clockwise about the origin



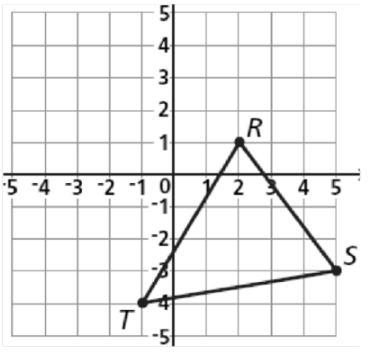
Reflection across y = –2



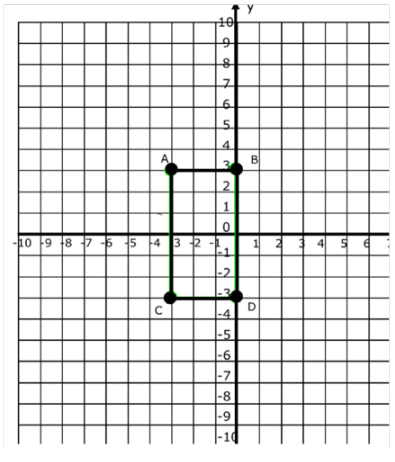
(x, y) → (x–3, y)



Rotation 180° counter-clockwise



16. Graph the image of rectangle ABCD after a dilation of scale factor 3 centered at the origin.



Preimage		Image	
Length AB		Length A'B'	
Length AC		Length A'C'	
Perimeter ABCD		Perimeter A'B'C'D'	
Area ABCD		Area A'B'C'D'	

Are the Image and Preimage congruent or similar?

What is the sale factor for the lengths?

What is the scale factor for the areas?

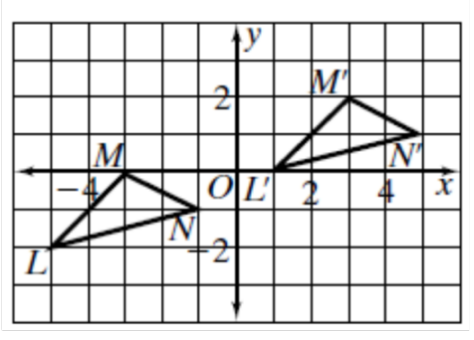
17. Rectangle ABCD has a perimeter of 16 units. Side AB is 3 units. ABCD is dilated to form rectangle A'B'C'D' where side A'B' is 6.6 units.

What is the Scale factor? Show how you calculated it.

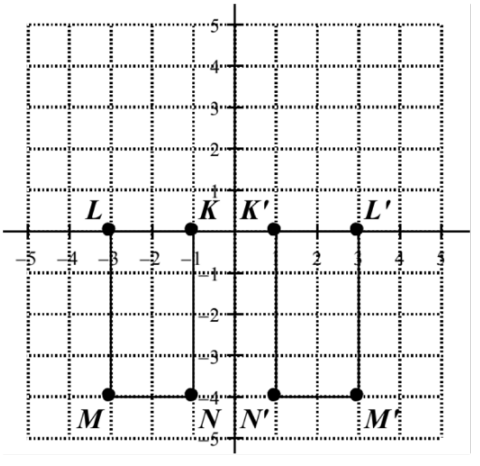
What is the perimeter of A'B'C'D'?

What was the transformation? Describe the transformation in words.

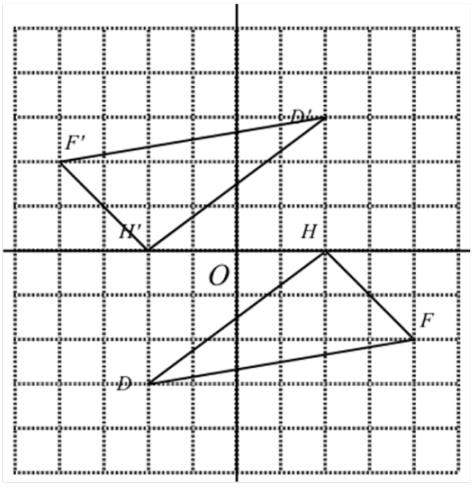
18.



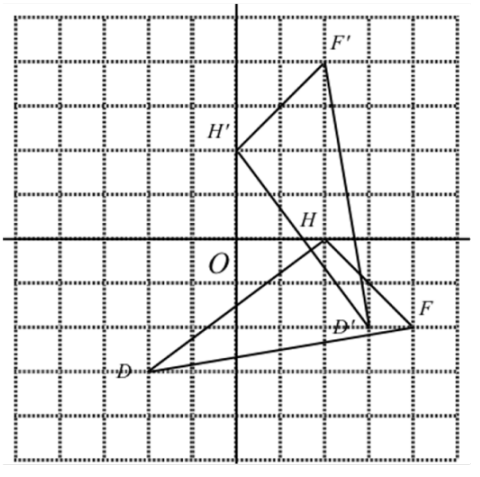
19.



20.



21.



Homework

Finish classwork