Unit 5 Review for Final Name _____

Date _____ Block _____

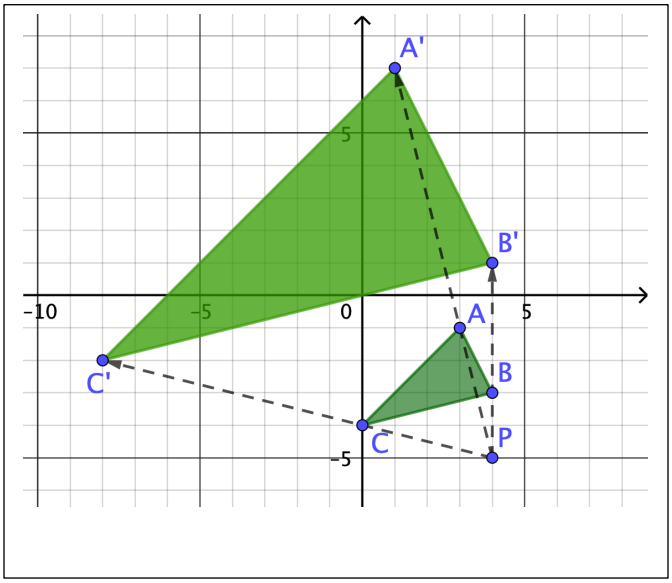
Similarity

1. Plot point *P* with coordinates (4 , -5).

Then, dilate triangle ABC using point *P* as the center of dilation and a scale factor of 3.

Figure how far it is horizontally and vertically from the Center of Dilation to each vertex of triangle ABC. Then multiply each of those distances by the scale factor to find the coordinates of A', B', and C'.

P to A: Go 1 left 4 up *P to B: Go 2 up* *P to C: Go 4 left 1 up*	*P to A': Go 3 left 12 up* *P to B' Go 6 up* *P to C': Go 12 left 3 up*

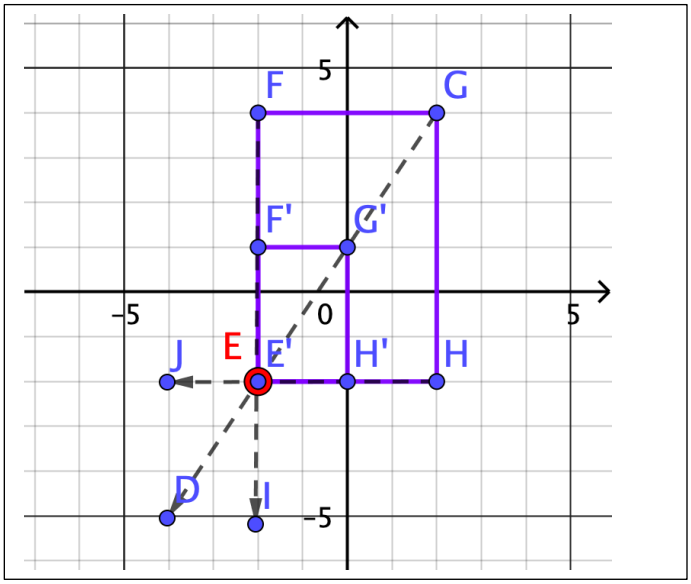


2. E'F'G'H' is the image of EFGH under a dilation. Determine the center of dilation, and the scale factor of that dilation. Also, compare the areas of each shape.

Center: *(-2,-2) or Point E or E'*
Draw lines from G through G', F through F', and H through H'. These all meet at the center of dilation. ***Note:*** *if a point and its image point (like E and E') are the same point, that is the center of dilation.*

Scale Factor: *0.5*
Distance from Center of dilation to G is 6 up, 4 right. Distance from Center of Dilation to G' is 3 up, 2 right. 3/6 = 2/4 = 0.5. ***Or,*** *length of EF is 6 and length of EF' is 3. 3/6 = 0.5*

Determine the area of each rectangle:
EFGH: 4 x 6 = 24 square units
E'F'G'H': 2 x 3 = 6 square units



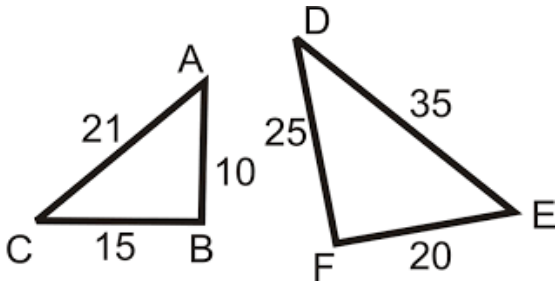
ACP: What is the scale factor between the areas? *Area Scale factor = 6/24 = 0.25. This is equal to the* ***square*** *of the dilation scale factor because it is a 2-dimensional figure where the image figure is half the length of the original* ***and*** *half the width of the original.*

3. Triangle ABC has an area of 15 cm^2. If ABC is dilated by a scale factor of 3, what is the area of $A'B'C'$, the dilated image?

*The area of the image triangle would be equal to the original area, 15, multiplied by the **square** of the scale factor, or 9.*

Area of A'B'C': 9 x 15 = 135 cm^2

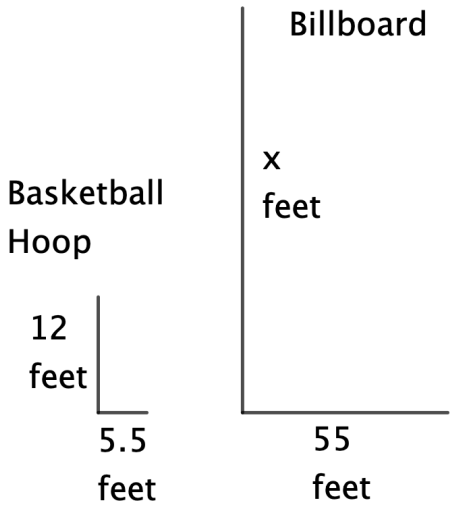
4. Are the triangles below **similar**? If so, how do you know? (AA, SAS, SSS?) Show your work.



1. Line up side lengths from smallest to longest:
10 15 21 and 20 25 35

*2. Determine if ratios are the same: $\frac{10}{20} = \frac{15}{25} = \frac{21}{35}$? This is **not** true because 10 is half of 20 but 15 is not half of 25 and 21 is not half of 35.*
---

5. A 12-foot high basketball hoop casts an 8.5-foot long shadow. A billboard nearby casts a shadow 55 feet long. Draw a diagram of this situation and determine the height of the billboard. *Draw a picture.*



(Figure not draw to scale)

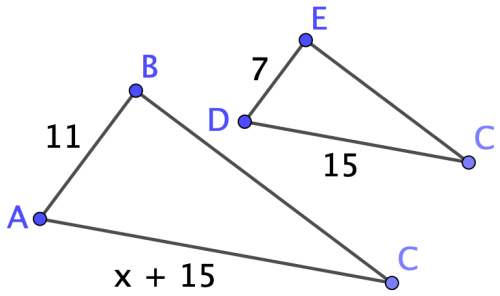
Since figures we are similar, we can create a proportion from corresponding sides:
$\frac{55}{5.5} = \frac{x}{12}$

*Cross multiply to get: 5.5x = 12 * 55 = 660*
5.5x = 660
x = 120 (Divide both sides by 5.5)

*You might also have seen that the scale factor going from the hoop to the billboard is 10, so the billboard would be 10 * 12 = 120 feet.*

6. **ΔABC is similar to ΔDEC.**

First, draw the two triangles separately. Label the vertices and known side lengths. Then solve for *x*.

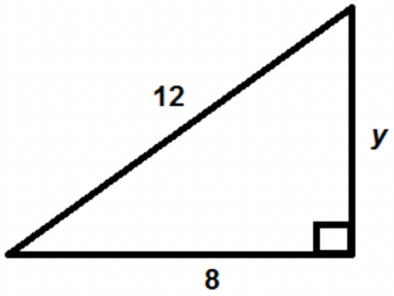


Since the two triangles are similar, we can set up the following proportion:

$\frac{x+15}{15} = \frac{11}{7} \rightarrow \frac{Big}{Small} = \frac{Big}{Small}$, *where each ratio matches two corresponding sides, one from the big triangle, one from the small.*

Cross multiplying, we get
*7(x + 15) = 15 * 11*
7x + 105 = 165
7x = 60
x = 60/7 = 8.57

PYTHAGOREAN THEOREM:
7. Which equation below will allow you to solve for ***y*** ? *Circle your answer.*

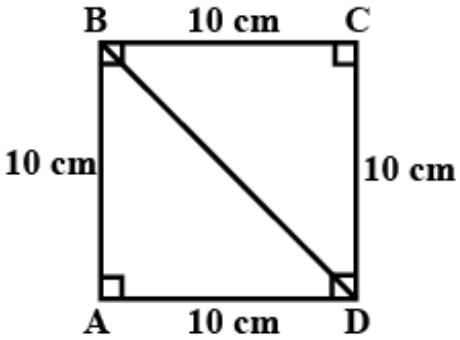


$12^2 + 8^2 = y^2$ *OR* **$8^2 + y^2 = 12^2$**

$12^2 + 8^2 = y^2$ is the correct equation because the hypotenuse (always the longest side) must be isolated on one side of the equation.

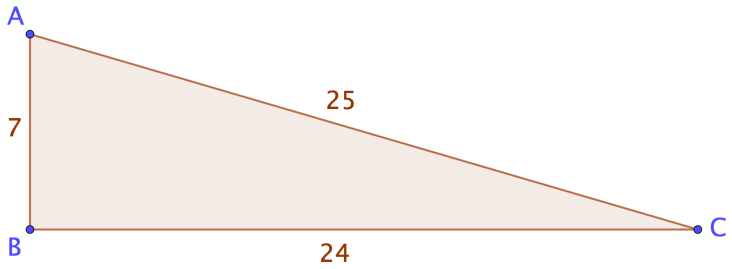
Now, solve for ***y****. Round your answer the nearest tenth.*
$12^2 + 8^2 = y^2$
$144 + 64 = y^2$
$208 = y^2$
$y = \sqrt{208} = 14.42$

8. A square has side lengths of 10cm. Find the length of the diagonal.



Since ABD is a right triangle, we can use the Pythagorean Theorem:
$10^2 + 10^2 = Diagonal^2$
$100 + 100 = 200 = Diagonal^2$
Diagonal $= \sqrt{200} \approx 14.1$

9. a) Sketch a triangle below that has side lengths of 7, 24 and 25.

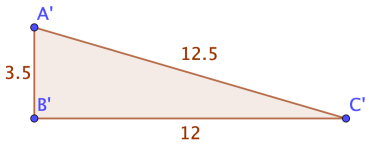


b) Is this a RIGHT triangle? Show work to prove or disprove.

If it is a right triangle, then $7^2 + 24^2 = 25^2$
$49 + 576 = 625$?
$625 = 625$ ✓

c) Sketch **2 more triangles** below that are similar to your triangle above. Be sure to label the side lengths on each.

All sides multiplied by 0.5



All sides multiplied by 1.5