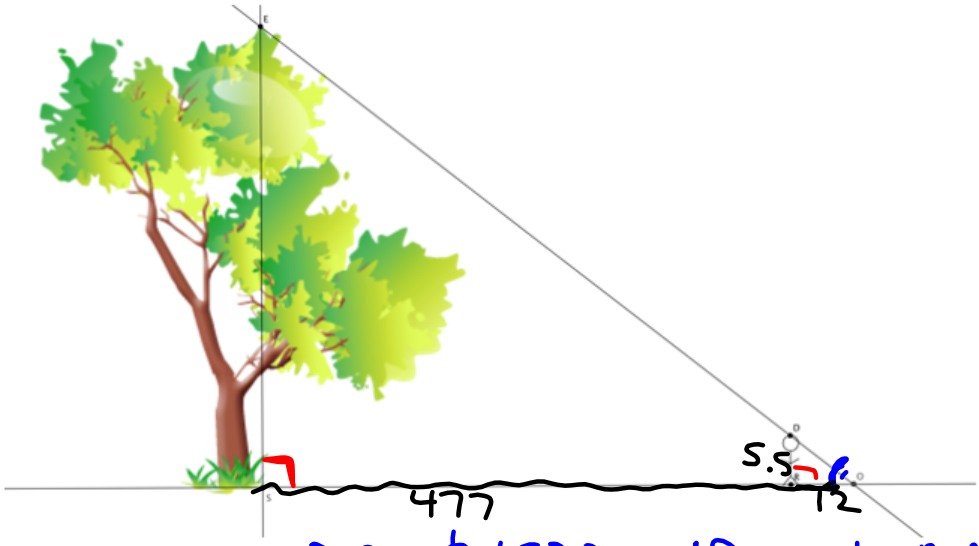
1. The world's tallest living tree is a redwood in California. It's about 370 feet tall. In a local park, there is a very tall tree. You want to find out if the tree in the local park is anywhere near the height of the famous redwood.



a. Describe the triangles in the diagram, and explain how you know they are similar or not.

∠OSE ≅ ∠DRO & ∠EOS ≅ ∠D. ∴ by AA ~ they are similar.

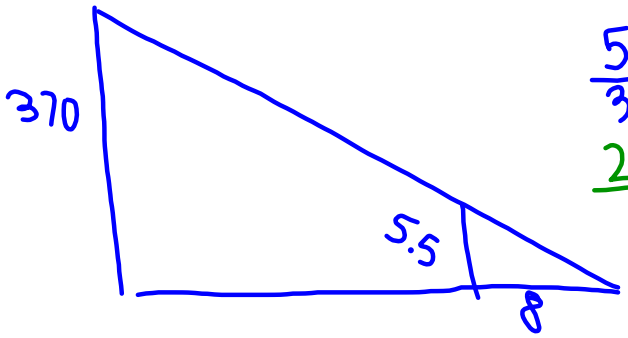
b. Assume $\triangle ESO \sim \triangle DRO$. A friend stands in the shadow of the tree. He is exactly 5.5 feet tall and casts a shadow of 12 feet. Is there enough information to determine the height of the tree? If so, determine the height. If not, state what additional information is needed.

No, need some ground measurement

c. Your friend stands exactly 477 feet from the base of the tree. Given this new information, determine about how many feet taller the world's tallest tree is compared to the one in the local park.

370 − 224.125 = 145.875

d. Assume that your friend stands in the shadow of the world's tallest redwood and the length of his shadow is just 8 feet long. How long is the shadow cast by the tree?



hts / shadows

$\frac{5.5}{370} = \frac{8}{x}$

$\frac{2960}{5.5} = \frac{5.5x}{5.5}$

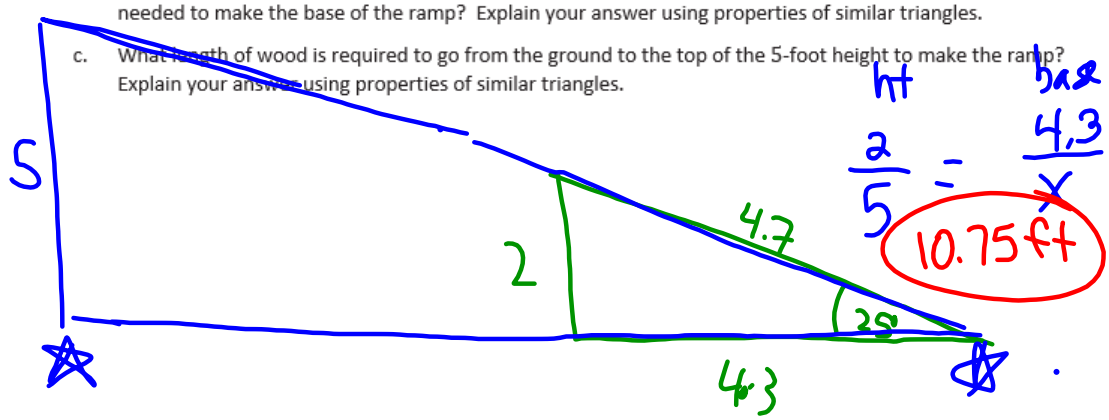
$x = 538.18$ ft

2. A reasonable skateboard ramp makes a 25° angle with the ground. A two feet tall ramp requires about 4.3 feet of wood along the base and about 4.7 feet of wood from the ground to the top of the two-foot height to make the ramp.

a. Sketch a diagram to represent the situation.

b. Your friend is a daredevil and has decided to build a ramp that is 5 feet tall. What length of wood will be needed to make the base of the ramp? Explain your answer using properties of similar triangles.

c. What length of wood is required to go from the ground to the top of the 5-foot height to make the ramp? Explain your answer using properties of similar triangles.

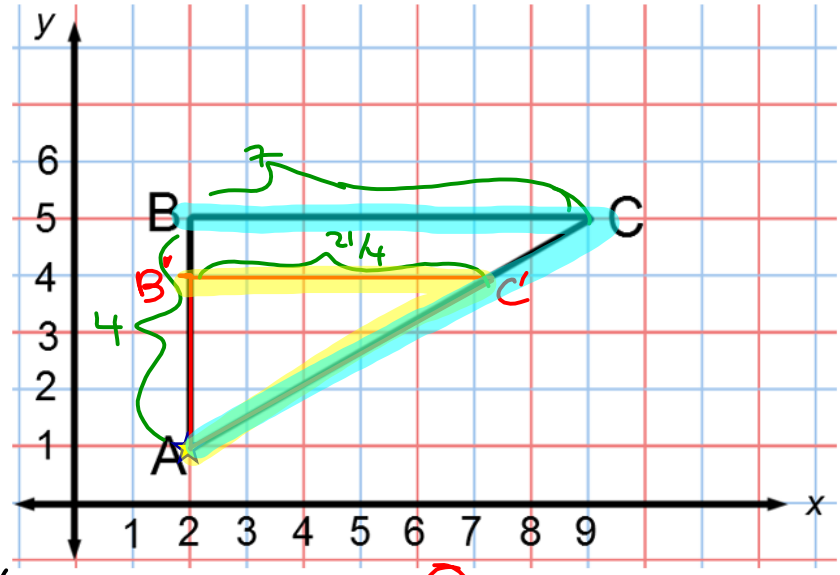


ht / base

$\frac{2}{5} = \frac{4.3}{x}$

10.75 ft

1. Use the diagram below to answer the questions that follow.



a. Dilate $\triangle ABC$ from center A and scale factor $r = \frac{3}{4}$. Label the image $\triangle AB'C'$.

b. Find the coordinates of points B' and C'.

B'(2,4)

C'(7,4)

C'(7.25,4)

.75×7 = 5.25

$\frac{3}{4} \times 7 = \frac{3}{4} \times \frac{7}{1} = \frac{21}{4}$

$\frac{21}{4} + 2 = \frac{21}{4} + \frac{8}{4} = \frac{29}{4}$

5.25+2 = 7.25

c. Are $\angle ACB$ and $\angle AC'B'$ equal in measure? Explain.

Dilated shapes are similar, so all the angles stay the same.

d. What is the relationship between the segments BC and $B'C'$? Explain in terms of similar triangles.

→ B'C' is 3/4 of BC

B'C' is parallel to BC

e. If the length of segment AC is 8.1 units, what is the length of segment AC'? Explain in terms of similar triangles.

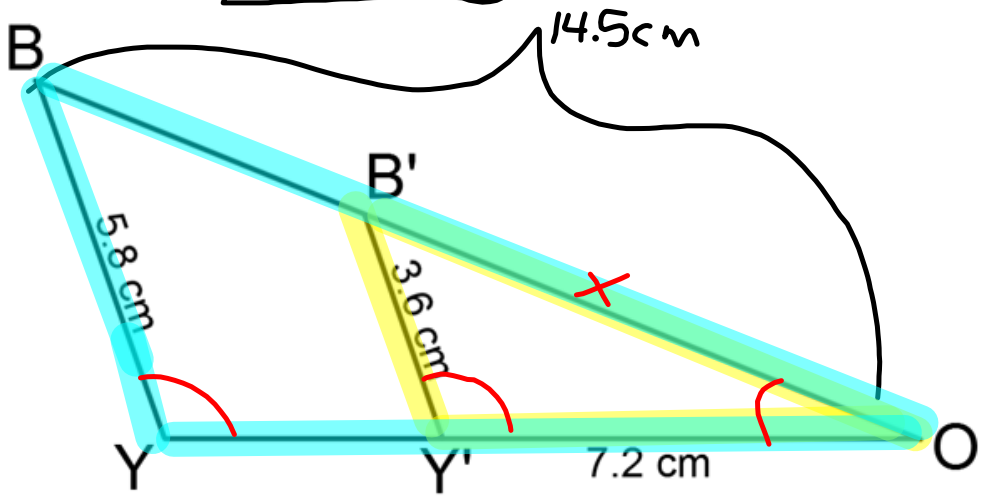
$AC' = \frac{3}{4} \times AC$

$AC' = \frac{3}{4} \times 8.1$

$AC' = 0.75 \times 8.1$

$AC' = 6.075$

2. Use the diagram below to answer the questions that follow. The length of each segment are marked on the diagram. In addition, segment OB is 14.5 cm.



a. Suppose segment BY is parallel to segment $B'Y'$. Is $\triangle BOY$ similar to $\triangle B'O'Y'$? Explain.

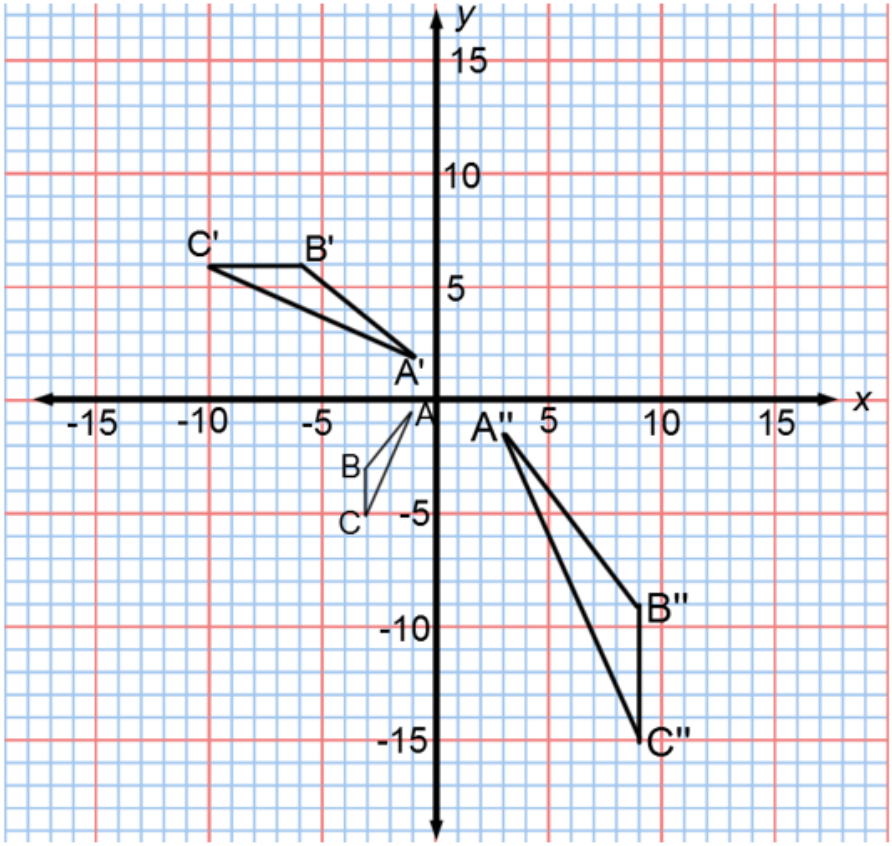
$\angle BOY \cong \angle B'OY'$
$\angle BYO \cong \angle B'Y'O$
} Yes, $\triangle BOY \sim \triangle B'OY'$ by AA criterion

b. What is the length of segment OB'? Show your work.

$\frac{3.6}{5.8} = \frac{x}{14.5}$

c. What is the length of segment OY? Show your work.

3. Given $\triangle ABC \sim \triangle A'B'C'$ and $\triangle ABC \sim \triangle A''B''C''$ in the diagram below, answer parts (a)–(c).



a. Describe the sequence that shows the similarity for $\triangle ABC$ and $\triangle A'B'C'$.

b. Describe the sequence that shows the similarity for $\triangle ABC$ and $\triangle A''B''C''$.

c. Is $\triangle A'B'C'$ similar to $\triangle A''B''C''$? How do you know