

Section 1.2 - Angle Relationships, Similar Triangles

GEOMETRIC PROPERTIES

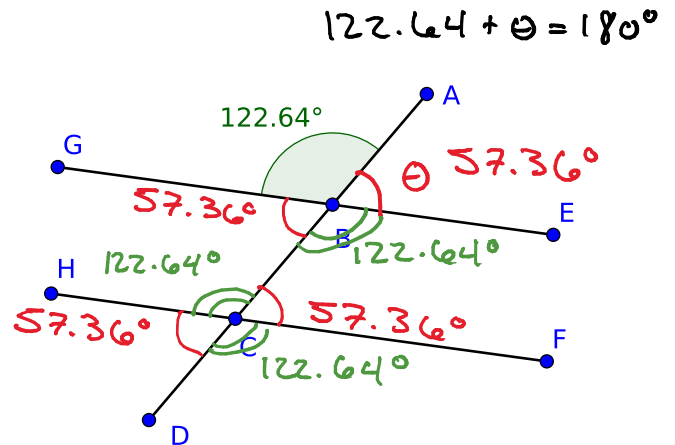
1. Find all angle measures on the diagram below.

Angles in red, θ :

$$122.64^\circ + \theta = 180^\circ$$

$$\Rightarrow \theta = 180^\circ - 122.64^\circ$$

$$= \boxed{57.36^\circ}$$



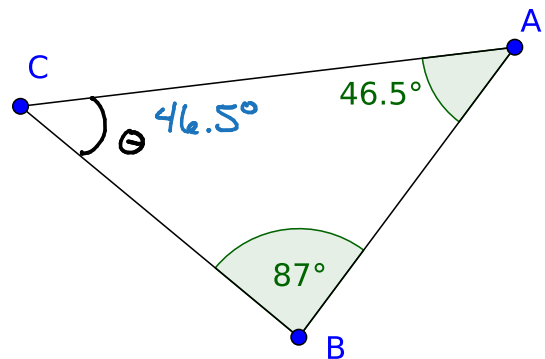
2. Find all angle measures on the diagram below.

Find θ so:

$$\theta + 46.5^\circ + 87^\circ = 180^\circ$$

$$\Rightarrow \theta = 180^\circ - 87^\circ - 46.5^\circ$$

$$= 46.5^\circ$$



3. Find all angle measures on the diagram below.

Find x by:

$$95^\circ + x = 180^\circ$$

$$\Rightarrow x = 180^\circ - 95^\circ$$

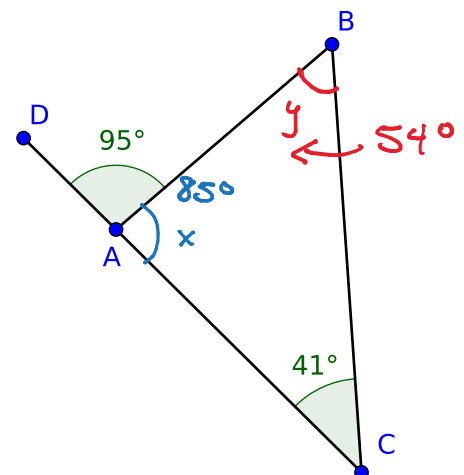
$$= \boxed{85^\circ}$$

Now find y by:

$$y + 85^\circ + 41^\circ = 180^\circ$$

$$\Rightarrow y = 180^\circ - 41^\circ - 85^\circ$$

$$= \boxed{54^\circ}$$



SIMILAR TRIANGLES

4. Find the remaining sides of these two similar triangles.

Similar triangles so proportional side lengths.

$$\frac{AB}{A'B'} = \frac{AC}{A'C'} \Rightarrow \frac{7}{3} = \frac{1.8}{A'C'}$$

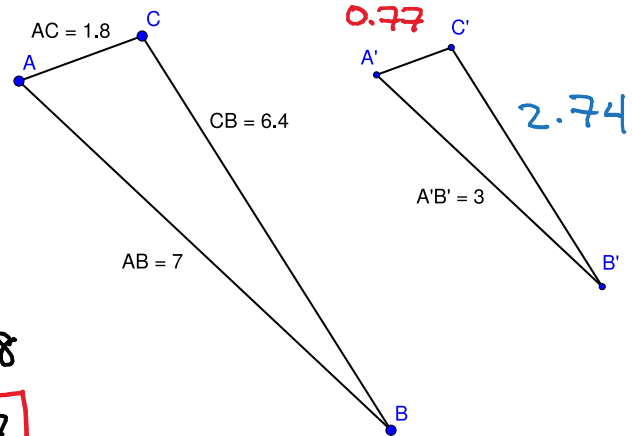
$$\Rightarrow 7A'C' = 3 \cdot 1.8$$

$$\Rightarrow A'C' \approx \boxed{0.77}$$

$$\frac{AB}{A'B'} = \frac{BC}{B'C'} \Rightarrow \frac{7}{3} = \frac{6.4}{B'C'}$$

$$\Rightarrow 7B'C' = 3 \cdot 6.4$$

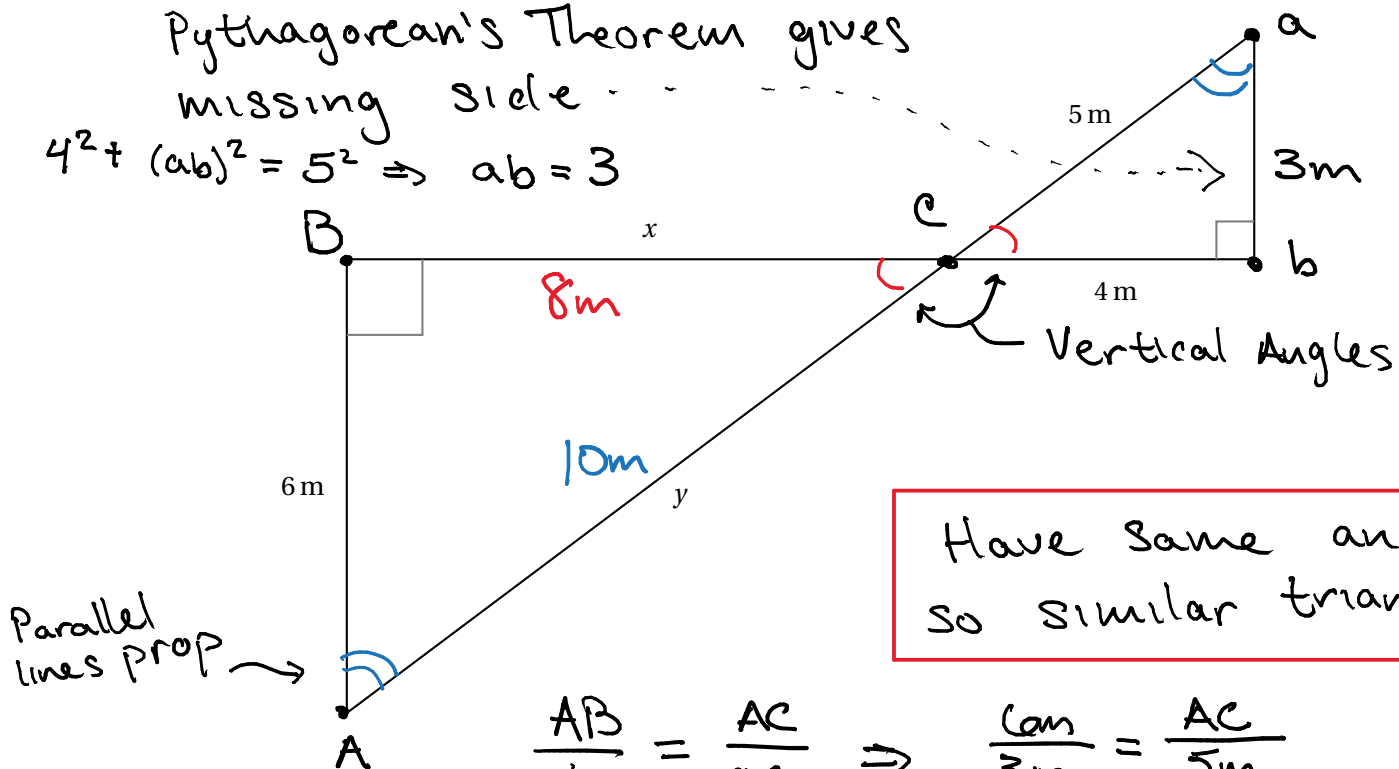
$$\boxed{B'C' = 2.74}$$



5. Find the lengths of x and y in the figure below. It would help to recall Pythagorean's Theorem for triangles.

Pythagorean's Theorem gives
missing side

$$4^2 + (ab)^2 = 5^2 \Rightarrow ab = 3$$



Have same angles
so similar triangles!

$$\frac{AB}{ab} = \frac{AC}{ac} \Rightarrow \frac{6m}{3m} = \frac{AC}{5m}$$

$$\Rightarrow \boxed{AC = 10m}$$

$$\frac{AB}{ab} = \frac{BC}{bc} \Rightarrow \frac{6m}{3m} = \frac{BC}{4m}$$

$$\Rightarrow \boxed{BC = 8m}$$

5. Find the lengths for x and y in the figure to the right. It might help to recall Pythagorean's theorem for triangles.

Pythagorean's Thm:

$$3^2 + 4^2 = z^2$$

$$\Rightarrow z = \sqrt{9+16} = \sqrt{25}$$

$$\boxed{z = 5}$$

Similar triangles:

$$\frac{5+x}{5} = \frac{6}{4}$$

$$\frac{3+y}{3} = \frac{6}{4}$$

$$\Rightarrow 4(5+x) = 30$$

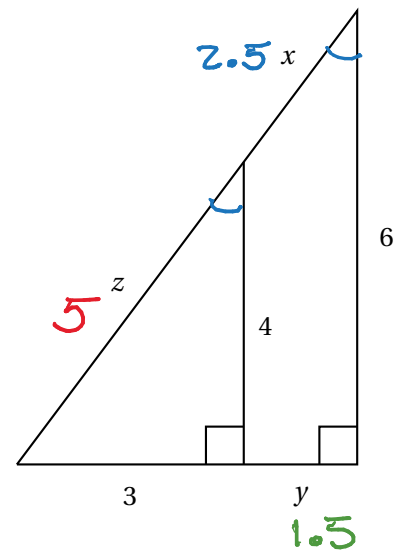
$$4(3+y) = 18$$

$$\Rightarrow 4x = 10$$

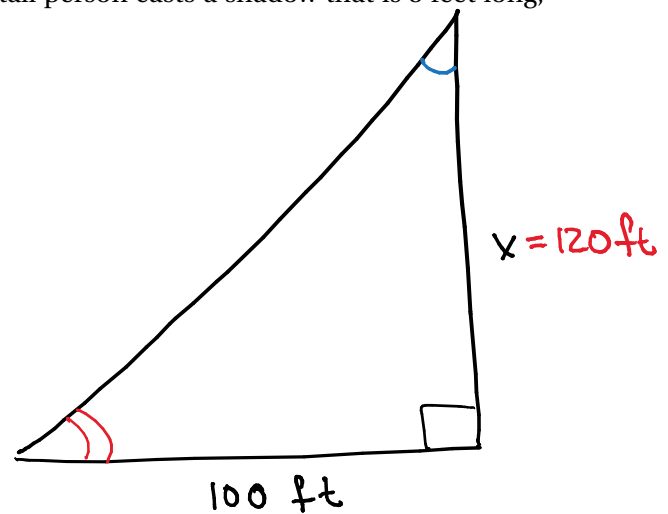
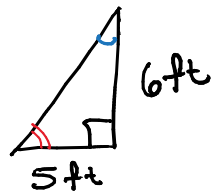
$$4y = 6$$

$$\Rightarrow \boxed{x = 2.5}$$

$$\boxed{y = \frac{3}{2} = 1.5}$$



5. If a tree casts a shadow that is 100 feet long, and a 6 foot tall person casts a shadow that is 5 feet long, what is the height of the tree?



Have similar triangles!

$$\frac{100\text{ft}}{5\text{ft}} = \frac{x}{6\text{ft}} \Rightarrow x = \frac{600}{5}\text{ft}$$

$$\boxed{x = 120\text{ft}}$$