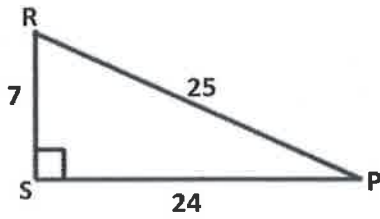


Skill Check

1. Please find $\sin R$, $\cos R$, and $\tan R$. Write your answers as fractions in simplest form **and** as decimals rounded to four places as necessary.



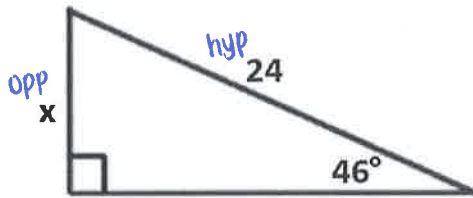
$$\sin R = \frac{24}{25} \text{ or } \sin R = 0.96$$

$$\cos R = \frac{7}{25} \text{ or } \cos R = 0.28$$

$$\tan R = \frac{24}{7} \text{ or } \tan R = 3.4286$$

For questions #2 – 4, please find the value of x rounded to the nearest tenth.

2.

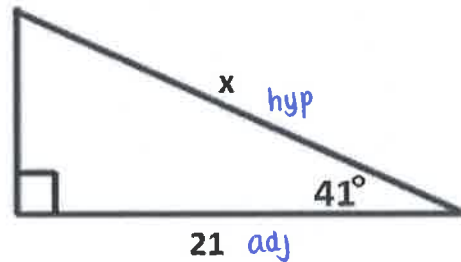


$$\frac{\sin 46}{1} = \frac{x}{24}$$

$$x = 24 \cdot \sin 46$$

$$\Rightarrow \boxed{x \approx 17.3}$$

3.



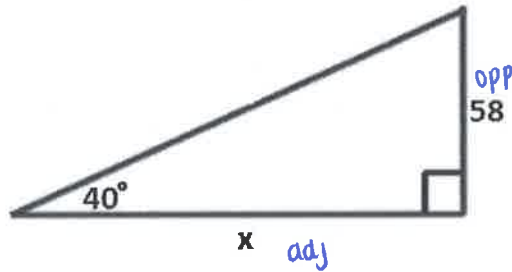
$$\frac{\cos 41}{1} = \frac{21}{x}$$

$$21 = x \cos 41$$

$$x = \frac{21}{\cos 41}$$

$$\boxed{x \approx 27.8}$$

4.



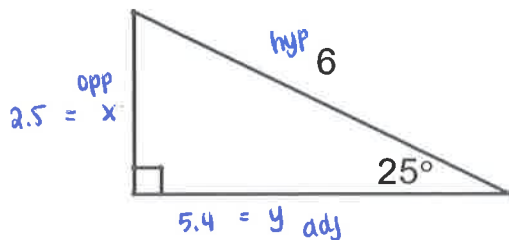
$$\frac{\tan 40}{1} = \frac{58}{x}$$

$$58 = x \tan 40$$

$$x = \frac{58}{\tan 40}$$

$$\Rightarrow \boxed{x \approx 69.1}$$

5. Please find the perimeter and area of the triangle below. Round to the nearest tenth if necessary.



$$\frac{\cos 25}{1} = \frac{y}{6}$$

$$y = 6 \cos 25$$

$$y = 5.4$$

$$\frac{\sin 25}{1} = \frac{x}{6}$$

$$x = 6 \sin 25$$

$$x = 2.5$$

$$\text{Perim} = 2.5 + 5.4 + 6$$

$$\boxed{P = 13.9 \text{ units}}$$

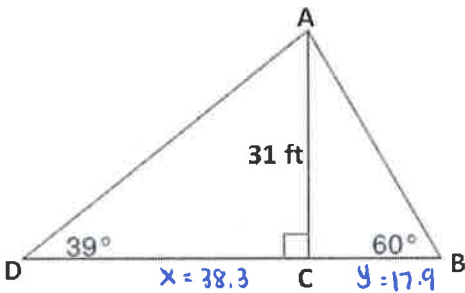
$$\text{Area} = \frac{1}{2} (5.4)(2.5)$$

$$\boxed{A = 6.75 \text{ units}^2}$$

For questions #6 – 7, please solve for the indicated side of the triangle. Round to the nearest tenth.

6. $\overline{DB} = 38.3 + 17.9 = 56.2 \text{ ft}$

7. $\overline{AB} = 26.6$



$$\frac{\tan 39}{1} = \frac{31}{x}$$

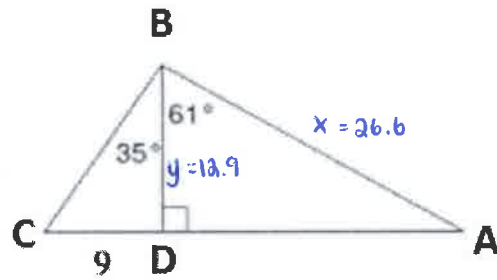
$$31 = x \tan 39$$

$$x = \frac{31}{\tan 39} \approx 38.3$$

$$\frac{\tan 60}{1} = \frac{31}{y}$$

$$31 = y \tan 60$$

$$y = \frac{31}{\tan 60} \approx 17.9$$



$$\frac{\tan 35}{1} = \frac{9}{y}$$

$$9 = y \tan 35$$

$$y = \frac{9}{\tan 35} \approx 12.9$$

$$\frac{\cos 61}{1} = \frac{12.9}{x}$$

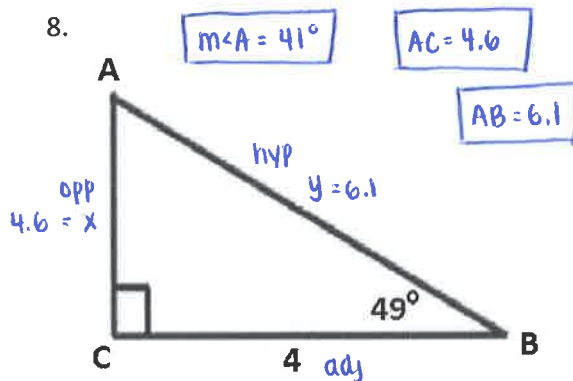
$$12.9 = x \cos 61$$

$$x = \frac{12.9}{\cos 61}$$

$$x = 26.6$$

For questions #8 – 9, please solve the right triangles.

8.



$$\frac{\tan 49}{1} = \frac{x}{4}$$

$$x = 4 \tan 49$$

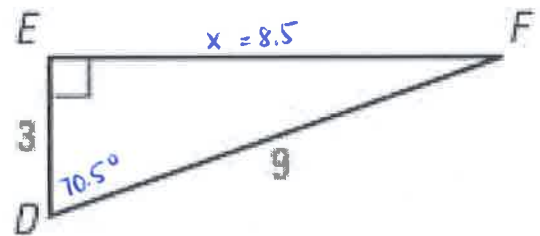
$$x \approx 4.6$$

$$\frac{\cos 49}{1} = \frac{4}{y}$$

$$4 = y \cos 49$$

$$y = \frac{4}{\cos 49} \approx 6.1$$

9.



$$m\angle D = \cos^{-1}\left(\frac{3}{9}\right)$$

$$m\angle D = 70.5^\circ$$

$$m\angle F = 19.5^\circ$$

$$\frac{\tan 70.5}{1} = \frac{x}{3}$$

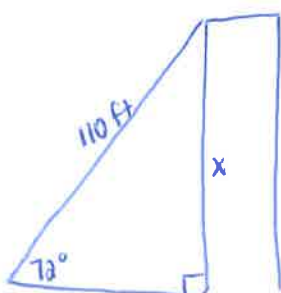
$$x = 3 \tan 70.5$$

$$x = 8.5$$

$$EF = 8.5$$

Applications – Please draw a diagram and round all answers to the nearest tenth.

10. A safety regulation states that the maximum angle of elevation for a rescue ladder is 72° . A fire department's longest ladder is 110 feet. What is the maximum safe rescue height?



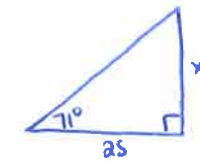
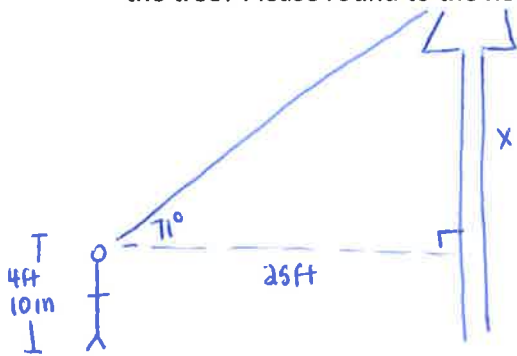
$$\frac{\sin 72}{1} = \frac{x}{110}$$

$$x = 110 \cdot \sin 72$$

$$x = 104.6$$

The max. safe rescue height is 104.6 ft

11. A hiker whose eyes are 4 feet 10 inches above ground stands 25 feet from the base of a redwood tree. She looks up at an angle of 71° to see the top of the tree. What is the height of the tree? Please round to the nearest tenth of a foot.



$$\frac{\tan 71}{1} = \frac{x}{25}$$

$$x = 25 \cdot \tan 71$$

$$x = 72.6 \text{ ft}$$

Hiker: 4 ft 10 inches:

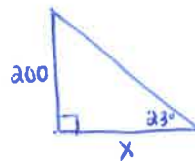
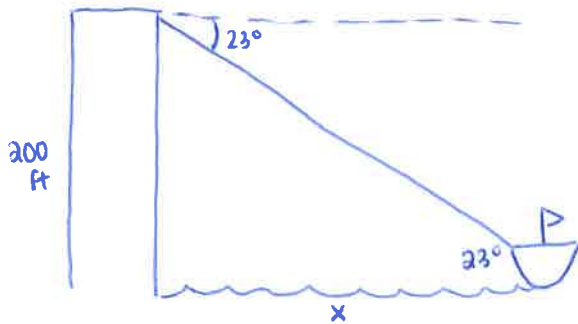
$$\frac{10}{12} = .8333 \text{ ft}$$

$$\approx 4.8 \text{ ft tall}$$

$$\text{Tree} = 4.8 \text{ ft} + 72.6 \text{ ft} = 77.4$$

The tree is 77.4 feet tall

12. From the top of a 200 foot lighthouse, the angle of depression to a ship in the ocean is 23° . How far is the ship from the base of the lighthouse?



$$\frac{\tan 23}{1} = \frac{200}{x}$$

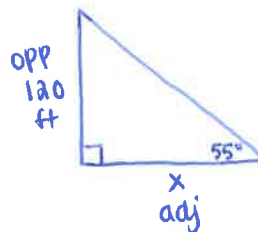
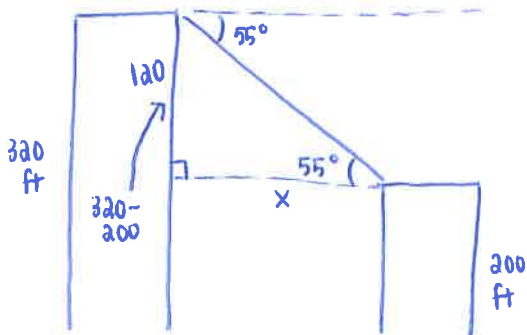
$$200 = x \tan 23$$

$$x = \frac{200}{\tan 23}$$

$$x \approx 471.2$$

The ship is 471.2 ft away

13. The angle of depression from the top of a 320 foot office building to the top of a 200 foot office building is 55° . How far apart are the buildings?



$$\frac{\tan 55}{1} = \frac{120}{x}$$

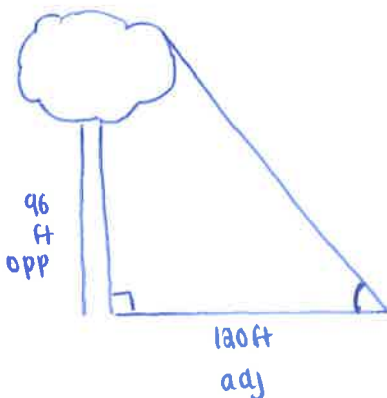
$$120 = x \tan 55$$

$$x = \frac{120}{\tan 55}$$

$$x \approx 84 \text{ ft}$$

The buildings are 84 ft apart

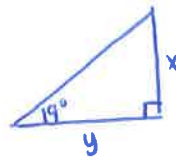
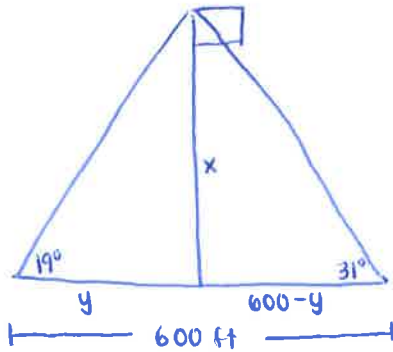
14. A 96 foot tree casts a shadow that is 120 feet long. What is the angle of elevation of the sun?



$$\text{angle of elevation} = \tan^{-1}\left(\frac{96}{120}\right)$$

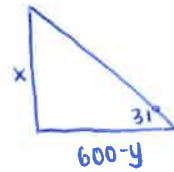
$$\text{angle} \approx 38.7^\circ$$

15. Two observers are 600 feet apart on opposite sides of a flagpole. The angles of elevation from the observers to the top of the pole are 19° and 31° . Find the height of the flagpole.



$$\frac{\tan 19^\circ}{1} = \frac{x}{y}$$

$$x = y \tan 19^\circ$$



$$\frac{\tan 31^\circ}{1} = \frac{x}{600 - y}$$

$$x = \tan 31^\circ (600 - y)$$

$$y \tan 19^\circ = \tan 31^\circ (600 - y)$$

$$y \tan 19^\circ = 600 \tan 31^\circ - y \tan 31^\circ$$

$$y \tan 19^\circ + y \tan 31^\circ = 600 \tan 31^\circ$$

$$y (\tan 19^\circ + \tan 31^\circ) = 600 \tan 31^\circ$$

$$0.4452y = 360.5164$$

$$y = 381.4$$

$$x = 381.4 \tan 19^\circ$$

$$x = 131.3$$

The flagpole is 131.3 feet tall

- Answer Key: 1) $\sin R = \frac{24}{25}, 0.96$; $\cos R = \frac{7}{25}, 0.28$; $\tan R = \frac{24}{7}, 3.4286$ 2) 17.3 3) 27.8
 4) 69.1 5) $A = 6.8 \text{ units}^2, P = 13.9 \text{ units}$ 6) 56.2 7) 26.6 8) $m\angle A = 41^\circ, AC = 4.6, AB = 6.1$
 9) $EF = 8.5, m\angle D = 70.5^\circ, m\angle F = 19.5^\circ$ 10) 104.6 ft 11) 77.4 ft 12) 471.2 ft
 13) 84 ft 14) 38.7° 15) 131.3 ft