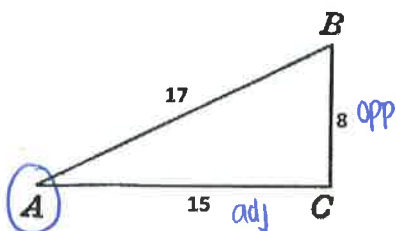


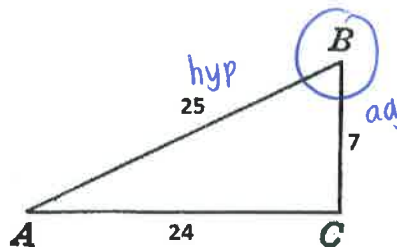
For questions #1 and 2, please write your answer in fractions in simplest form and as a decimal rounded to four places as necessary.

1. Find $\tan A$ for the right triangle below.



$$\tan A = \frac{\text{opp}}{\text{adj}} = \frac{8}{15} \quad \text{or} \quad \tan A = 0.5333$$

2. Please find $\cos B$.

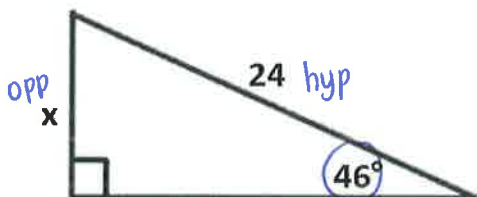


$$\cos B = \frac{\text{adj}}{\text{hyp}} = \frac{7}{25} \quad \text{or} \quad \cos B = 0.28$$

3. Use your calculator to evaluate $\cos 23^\circ$.

- a. About 0.9205 b. About 0.3901
c. About 1.0723 d. About 0.4239

4. What is the value of x to the nearest hundredth? (NOTE : diagram not drawn to scale)



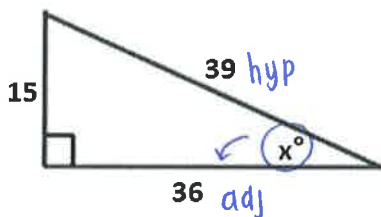
$$\sin 46 = \frac{x}{24}$$

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

$$x \approx 17.26$$

- a. $x = 23.18$ b. $x = 24.85$
c. $x = 16.67$ d. $x = 17.26$

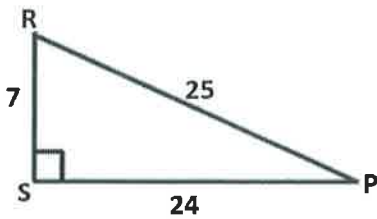
5. Use the diagram to find $\cos x$ as a fraction in simplest form.



$$\cos x = \frac{36}{39} = \frac{12}{13}$$

$$\boxed{\cos x = \frac{12}{13}}$$

6. Please find $\sin R$, $\cos R$, $\tan R$ as fractions in simplest form.

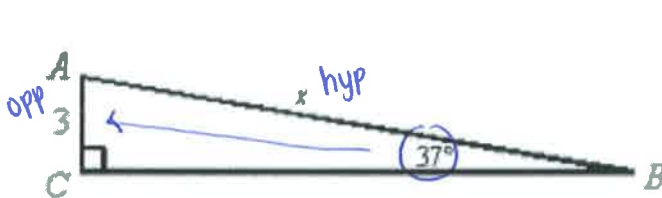


$$\sin R = \frac{\text{opp}}{\text{hyp}} = \frac{24}{25}$$

$$\cos R = \frac{\text{adj}}{\text{hyp}} = \frac{7}{25}$$

$$\tan R = \frac{\text{opp}}{\text{adj}} = \frac{24}{7}$$

7. Please find the value of x , to the nearest hundredth. (NOTE: diagram not drawn to scale)



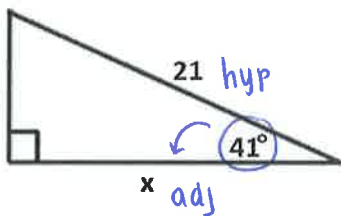
~~$$\sin 37 = \frac{3}{x}$$~~

$$3 = x \cdot \sin 37$$

$$\frac{3}{\sin 37} = \frac{x \cdot \sin 37}{\sin 37}$$

$$x = \frac{3}{\sin 37} \approx \boxed{4.98}$$

8. Please find x . Round to the nearest hundredth.

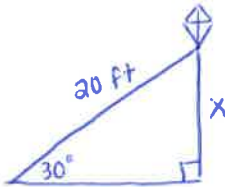


~~$$\cos 41 = \frac{x}{21}$$~~

$$x = 21 \cdot \cos 41$$

$$x \approx \boxed{15.85}$$

9. A 20 foot string attached to a kite makes a 30° angle with the ground. What is the height of the kite?



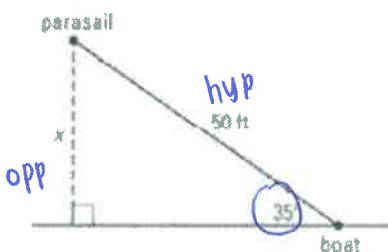
~~$$\sin 30 = \frac{x}{20}$$~~

$$x = 20 \cdot \sin 30$$

$$x = 10$$

The kite is
10 ft above
the ground

10. A parasailing company uses a 50-foot cable to connect the parasail to the back of the boat. About how far is the parasail from the water when the cable has a 35° angle of elevation? Round to the nearest tenth.



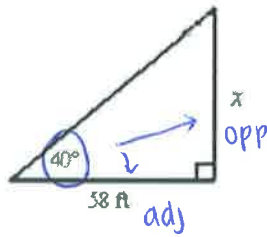
~~$$\sin 35 = \frac{x}{50}$$~~

$$x = 50 \cdot \sin 35$$

$$x = 28.7$$

The parasail is
about 28.7 feet
from the water

11. A photographer shines a camera light at a particular painting forming an angle of 40° with the camera platform. If the light is 58 feet from the wall where the painting hangs, how high above the platform is the painting? Round to the nearest tenth.



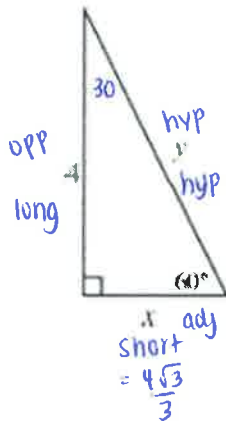
$$\tan 40 = \frac{x}{58}$$

$$x = 58 \cdot \tan 40$$

$$x = 48.7$$

The painting is 48.7 feet above the platform

12. Find the missing side lengths for x and y using the special right triangle patterns. Then find x and y using the appropriate trigonometric ratios.



Special Right Δ 's:

$$\text{long} = \text{short} \cdot \sqrt{3}$$

$$\frac{4}{\sqrt{3}} = \frac{x}{\sqrt{3}}$$

$$x = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3} = x$$

$$\text{hyp} = \text{short} \cdot 2$$

$$y = \frac{4\sqrt{3}}{3} \cdot 2 = \frac{8\sqrt{3}}{3} = y$$

$$\text{Trig: } \tan 60 = \frac{4}{x}$$

$$\frac{4}{\tan 60} = \frac{x \cdot \tan 60}{\tan 60}$$

$$x = \frac{4}{\tan 60}$$

$$x \approx 2.3$$

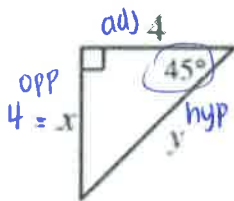
$$\sin 60 = \frac{4}{y}$$

$$\frac{4}{\sin 60} = \frac{y \cdot \sin 60}{\sin 60}$$

$$y = \frac{4}{\sin 60}$$

$$y \approx 4.6$$

13. Find the missing side lengths for x and y using the special right triangle patterns. Then find x and y using the appropriate trigonometric ratios.



Special Right Δ 's:

$$x = 4$$

$$\text{hyp} = \text{leg} \cdot \sqrt{2}$$

$$y = 4\sqrt{2}$$

$$\text{Trig: } \tan 45 = \frac{x}{4}$$

$$x = 4 \cdot \tan 45$$

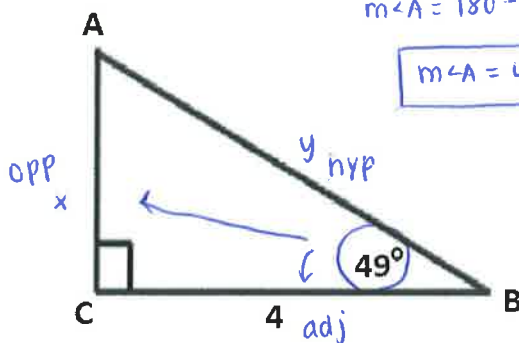
$$x = 4$$

$$\cos 45 = \frac{4}{y}$$

$$\frac{4}{\cos 45} = \frac{y \cdot \cos 45}{\cos 45}$$

$$y = \frac{4}{\cos 45} = 5.7 = y$$

14. Find all side lengths and angle measures of ΔABC using the diagram below. Round to the nearest tenth.



$$m\angle A = 180 - 90 - 49$$

$$m\angle A = 41^\circ$$

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

$$x = 4 \cdot \tan 49$$

$$x = 4.6$$

$$AC = 4.6$$

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

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

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

$$y = 6.1$$

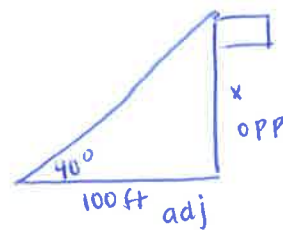
$$AB = 6.1$$

15. The flagpole in Newton High School's parking lot casts a 100 ft shadow along the ground. If the angle of elevation from the tip of the shadow to the top of the flagpole is 40° , how tall is the flagpole? Round to the nearest tenth.

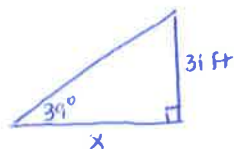
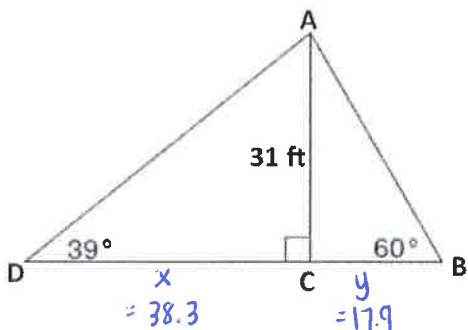
$$\frac{\tan 40}{1} = \frac{x}{100}$$

$$x = 100 \cdot \tan 40$$

$$x \approx 83.9 \text{ ft tall}$$



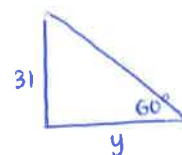
16. Please find the length of \overline{DB} .



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

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

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



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

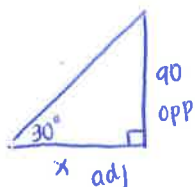
$$\frac{31}{\tan 60} = \frac{y \cdot \tan 60}{\tan 60}$$

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

$$DB = 38.3 + 17.9$$

$$DB = 56.2 \text{ ft}$$

17. You are standing on top of a 60 foot building looking up at the top of a 150 foot building. The angle of elevation you measure is 30° . How far apart are the buildings?

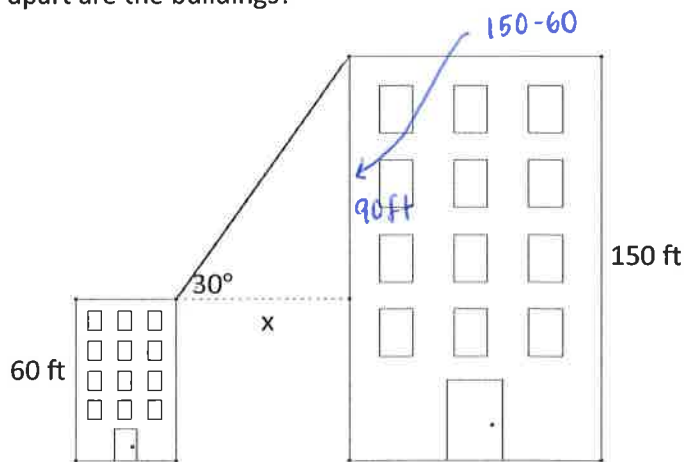


~~$$\frac{\tan 30}{1} = \frac{90}{x}$$~~

$$\frac{90}{\tan 30} = \frac{x \cdot \tan 30}{\tan 30}$$

$$x = \frac{90}{\tan 30}$$

$$x \approx 155.9 \text{ ft}$$



ANSWERS

1) $\frac{8}{15}, 0.5333$ 2) $\frac{7}{25}, 0.28$ 3) A 4) D 5) $\frac{12}{13}$ 6) $\frac{24}{25}, \frac{7}{25}, \frac{24}{7}$ 7) 4.98

8) 15.85 9) 10 ft 10) 28.7 ft 11) 48.7 ft 12) SRT: $x = \frac{4\sqrt{3}}{3}, y = \frac{8\sqrt{3}}{3}$; TRIG: $x = 2.3, y = 4.6$

13) SRT: $x = 4, y = 4\sqrt{2}$; TRIG: $x = 4, y = 5.7$ 14) $m\angle A = 41^\circ, AC = 4.6, AB = 6.1$ 15) 83.9 ft

16) 56.2 ft 17) 155.9 ft