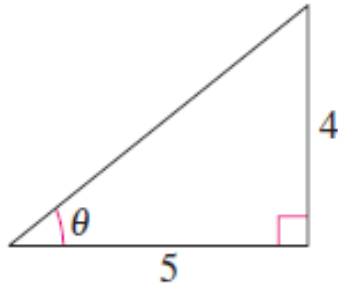
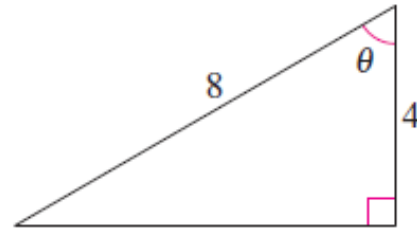


Please find the exact values of the six trigonometric functions of the angle θ shown in the figure.

1.

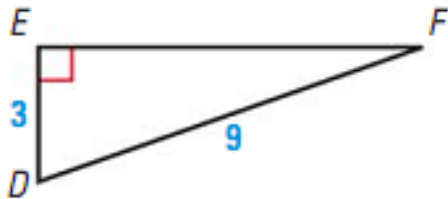


2.

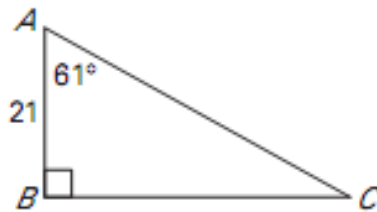


Please solve the right triangles below. Please write side lengths in simplest radical form, if possible.

3.



4.



5. A damsel is in distress and is being held captive in a tower. Her knight in shining armor is on the ground below with a ladder. When the knight stands 15 feet from the base of the tower and looks up at his precious damsel, the angle of elevation to her window is 60 degrees. How long does the ladder have to be for him to be able to rescue her? Round your answer to the nearest tenth.

6. A fire department's longest ladder is 110 feet long, and the safety regulation states that they can use it for rescues up to 100 feet off the ground. What is the maximum safe angle of elevation for the rescue ladder? Round your answer to the nearest tenth.
7. You want to find the height of a tower used to transmit cell phone calls. You stand 100 feet away from the base of the tower and at eye-level, you measure the angle of elevation to be 40° . How high is the tower if your eye-level is 5 feet 8 inches off the ground? Round your answer to the nearest tenth.

In questions #8 – 11, state the quadrant in which θ lies.

8. $\sin\theta > 0$ and $\cos\theta > 0$
9. $\sin\theta < 0$ and $\sec\theta < 0$
10. $\sin\theta > 0$ and $\cos\theta < 0$
11. $\sec\theta > 0$ and $\cot\theta < 0$

The point is on the terminal side of an angle in standard position. Determine the exact values of the six trigonometric functions of the angle.

12. $(5, 12)$

13. $(-4, 10)$

14. $(-5, -2)$

Find the values of the six trigonometric functions of θ with the given constraint.

15. $\cos\theta = \frac{8}{17}$ and $\tan\theta < 0$

16. $\tan\theta = -\frac{15}{8}$ and $\sin\theta > 0$

17. $\csc\theta = -\frac{5}{3}$ and $\cos\theta < 0$

18. $\cot\theta = -3$ and $\frac{\pi}{2} < \theta < \pi$

Answer Key

$$1) \quad \sin \theta = \frac{4\sqrt{41}}{41}, \cos \theta = \frac{5\sqrt{41}}{41}, \tan \theta = \frac{4}{5}$$
$$\csc \theta = \frac{\sqrt{41}}{4}, \sec \theta = \frac{\sqrt{41}}{5}, \cot \theta = \frac{5}{4}$$

$$2) \quad \sin \theta = \frac{\sqrt{3}}{2}, \cos \theta = \frac{1}{2}, \tan \theta = \sqrt{3}$$
$$\csc \theta = \frac{2\sqrt{3}}{3}, \sec \theta = 2, \cot \theta = \frac{\sqrt{3}}{3}$$

$$3) \quad EF = 6\sqrt{2}, m\angle D = 70.5^\circ, m\angle F = 19.5^\circ$$

$$4) \quad BC = 37.9, AC = 43.3, m\angle C = 29^\circ$$

$$5) 30 \text{ feet} \quad 6) 65.4^\circ \quad 7) 89.6 \text{ feet} \quad 8) \text{ I} \quad 9) \text{ III} \quad 10) \text{ II} \quad 11) \text{ IV}$$

$$12) \quad \sin \theta = \frac{12}{13}, \cos \theta = \frac{5}{13}, \tan \theta = \frac{12}{5}$$
$$\csc \theta = \frac{13}{12}, \sec \theta = \frac{13}{5}, \cot \theta = \frac{5}{12}$$

$$13) \quad \sin \theta = \frac{5\sqrt{29}}{29}, \cos \theta = -\frac{2\sqrt{29}}{29}, \tan \theta = -\frac{5}{2}$$
$$\csc \theta = \frac{\sqrt{29}}{5}, \sec \theta = -\frac{\sqrt{29}}{2}, \cot \theta = -\frac{2}{5}$$

$$14) \quad \sin \theta = -\frac{2\sqrt{29}}{29}, \cos \theta = -\frac{5\sqrt{29}}{29}, \tan \theta = \frac{2}{5}$$
$$\csc \theta = -\frac{\sqrt{29}}{2}, \sec \theta = -\frac{\sqrt{29}}{5}, \cot \theta = \frac{5}{2}$$

$$15) \quad \sin \theta = -\frac{15}{17}, \cos \theta = \frac{8}{17}, \tan \theta = -\frac{15}{8}$$
$$\csc \theta = -\frac{17}{15}, \sec \theta = \frac{17}{8}, \cot \theta = -\frac{8}{15}$$

$$16) \quad \sin \theta = \frac{15}{17}, \cos \theta = -\frac{8}{17}, \tan \theta = -\frac{15}{8}$$
$$\csc \theta = \frac{17}{15}, \sec \theta = -\frac{17}{8}, \cot \theta = -\frac{8}{15}$$

$$17) \quad \sin \theta = -\frac{3}{5}, \cos \theta = -\frac{4}{5}, \tan \theta = \frac{3}{4}$$
$$\csc \theta = -\frac{5}{3}, \sec \theta = -\frac{5}{4}, \cot \theta = \frac{4}{3}$$

$$18) \quad \sin \theta = \frac{\sqrt{10}}{10}, \cos \theta = -\frac{3\sqrt{10}}{10}, \tan \theta = -\frac{1}{3}$$
$$\csc \theta = \sqrt{10}, \sec \theta = -\frac{\sqrt{10}}{3}, \cot \theta = -3$$