Find the exact value of the expression without using a calculator or table.

1)
$$\tan^{-1}(-1)$$

Answer: $\frac{-\pi}{4}$

Find all real numbers that satisfy the equation.

2)
$$\sin x = -\frac{\sqrt{3}}{2}$$

Answer: $\{x \mid x = -\frac{\pi}{3} + 2k\pi, x = -\frac{2\pi}{3} + 2k\pi\}$

Find all angles in degrees that satisfy the equation. Round approximate answers to the nearest tenth of a degree.

3)
$$\cos \alpha = 0.387$$

Answer: { $\alpha \mid \alpha = 67.2^{\circ} + k360^{\circ}$ or $\alpha = 292.8^{\circ} + k360^{\circ}$ }

Find all real numbers that satisfy the equation.

4)
$$\sin 2x = -\frac{1}{2}$$

Answer: $\left\{ x \mid x = \frac{7\pi}{12} + k\pi \text{ or } x = \frac{11\pi}{12} + k\pi \right\}$

Find all values of θ in [0°, 360°) that satisfy the equation. 5) sec $\theta = -\sqrt{2}$

Answer: {135°, 225°}

Find all real numbers in $[0, 2\pi]$ that satisfy the equation.

7) $2\sqrt{3} \sin(4x) = 3$

Answer:
$$\frac{\pi}{12}$$
, $\frac{\pi}{6}$, $\frac{2\pi}{3}$, $\frac{7\pi}{12}$, $\frac{7\pi}{6}$, $\frac{13\pi}{12}$, $\frac{5\pi}{3}$, $\frac{19\pi}{12}$

Find all real numbers in the interval $[0, 2\pi)$ that satisfy the equation.

8)
$$4\sin^2 x - 3 = 0$$

Answer: $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$

Find all real numbers in the interval $[0, 2\pi)$ that satisfy the equation.

9) sin x = 1 - 2 sin²x
Answer:
$$\left\{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{3\pi}{2}\right\}$$

Find all solutions of the equation in the interval [0°, 360°).

10)
$$2\cos^2\theta - 3\cos\theta + 1 = 0$$

Answer: {0°, 60°, 300°}

Find all solutions to the equation in [0°, 360°). 11) $\sin \theta + 1 = \sqrt{3} \cos \theta$ Answer: {30°, 270°}

Solve the triangle with the given parts.

12) $\beta = 28.7^{\circ}$, $\gamma = 114.3^{\circ}$, b = 48.06Answer: $\alpha = 37^{\circ}$, a = 60.23, c = 91.21

Solve the triangle with the given information.

13) $\gamma = 109.9^{\circ}$ a = 8.50 b = 11.89 Answer: c = 16.8, $\alpha = 28.4^{\circ}$, $\beta = 41.7^{\circ}$

14)
$$a = 7.8$$

 $b = 13.7$
 $c = 15.4$
Answer: $\alpha = 30.4^{\circ}$, $\beta = 62.7^{\circ}$, $\gamma = 86.9^{\circ}$

Find the area of the triangle using Heron's formula. Round to the nearest unit.

Find the magnitude and direction angle (to the nearest tenth) of the vector. Give the measure of the direction angle as an angle in $[0^\circ, 360^\circ)$.

Perform the indicated operation. Use the form <a, b> for vectors.