Name _____ Date _____ Period _____

Solving Trigonometric Equations

Solve each equation.

1. $5x + 4 = -15x - 56$

2. $5x - 7 = 19$

3. $-\frac{7}{2} = -4 + x$

Find the angles, θ, that satisfies the given equation by drawing the triangle. Give the angles in both **degrees** and **radians**. <u>You should do these problems without a calculator.</u>
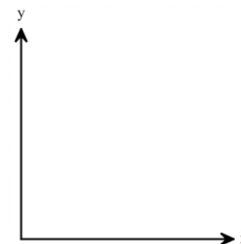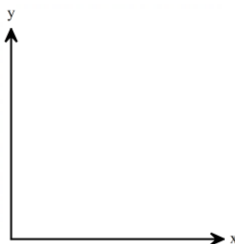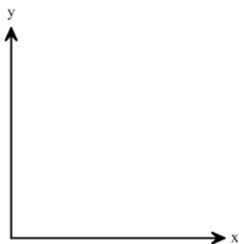
4. $\cos\theta = \frac{\sqrt{3}}{2}$

a) Draw the triangle in Quadrant 1

b) Angle in standard position

Degrees: _____   Radians: _____

c) What other quadrant can this triangle be drawn in?

$\begin{array}{c|c} S & A \\ \hline T & C \end{array}$

d) Draw the other triangle

e) Reference angle: _____

Angle in standard position

Degrees: _____   Radians: _____

5. $\tan\theta = 1$

a) Draw the triangle in Quadrant 1

b) Angle in standard position

Degrees: _____   Radians: _____

c) What other quadrant can this triangle be drawn in?

$\begin{array}{c|c} S & A \\ \hline T & C \end{array}$

d) Draw the other triangle

e) Reference angle: _____

Angle in standard position

Degrees: _____   Radians: _____

6. $\sin(x) = \frac{1}{\sqrt{2}}$

a) Draw the triangle in Quadrant 1
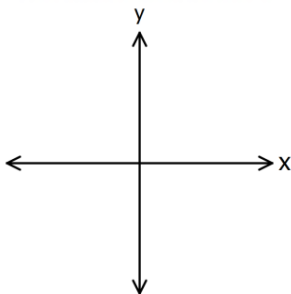

b) Angle in Standard position

Degrees: _____   Radians: _____

c) What other quadrant can this triangle be drawn in?

$\begin{array}{c|c} S & A \\ \hline T & C \end{array}$

d) Draw the other triangle

e) Reference angle: _____

Angle in standard position

Degrees: _____   Radians: _____

7. $\tan \theta = \dfrac{1}{\sqrt{3}}$

a) Draw the triangle in
   Quadrant 1
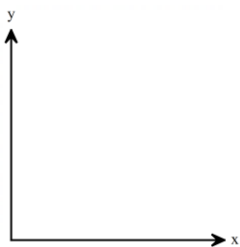
b) Angle in standard position

   Degrees: ____ Radians: ____

c) What other quadrant can
   this triangle be drawn in? $\dfrac{S|A}{T|C}$

d) Draw the other triangle

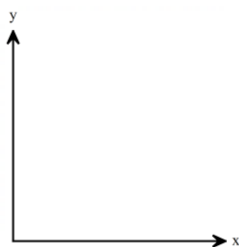e) Reference angle: _____

   Angle in standard position

   Degrees: ____ Radians: ____

8. $\cos \theta = \dfrac{1}{\sqrt{2}}$
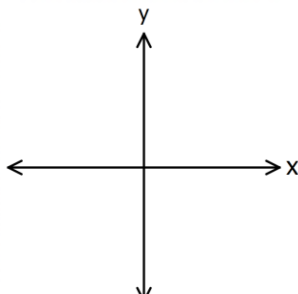
a) Draw the triangle in
   Quadrant 1

b) Angle in standard position

   Degrees: ____ Radians: ____

c) What other quadrant can
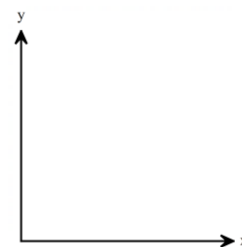   this triangle be drawn in? $\dfrac{S|A}{T|C}$

d) Draw the other triangle

e) Reference angle: _____

   Angle in standard position

   Degrees: ____ Radians: ____

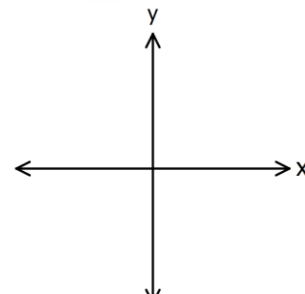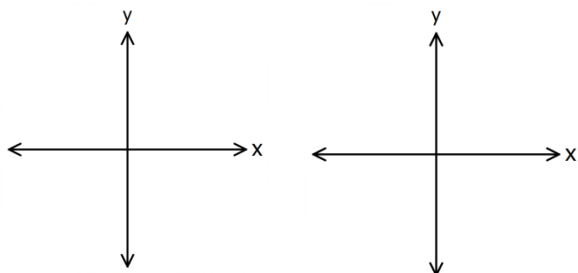**9.** $\sin(x) = \dfrac{\sqrt{3}}{2}$

a) Draw the triangle in
   Quadrant 1

b) Angle in Standard position

   Degrees: ____ Radians: ____

c) What other quadrant can
   this triangle be drawn in? $\dfrac{S|A}{T|C}$

d) Draw the other triangle

e) Reference angle: _____

   Angle in standard position

   Degrees: ____ Radians: ____

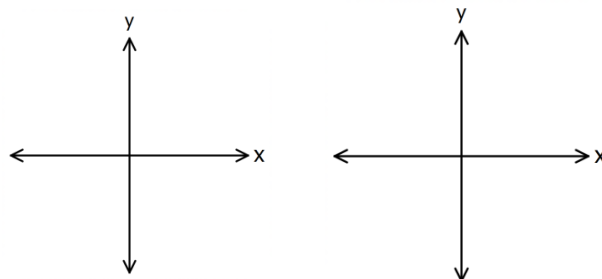**Find all angles in the interval $[0°, 360°)$ and $[0, 2\pi)$ that satisfy each equation.**

10. $\cos(x) = \dfrac{1}{2}$
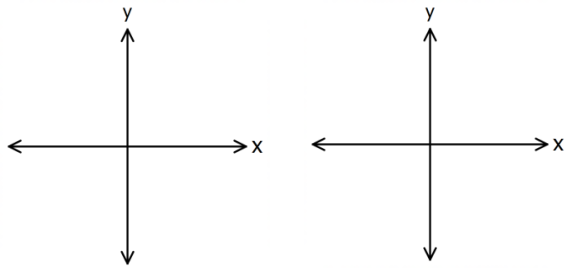
Reference angle: _____

Degrees: _____ Radians: _____

11. $\tan \theta = \sqrt{3}$
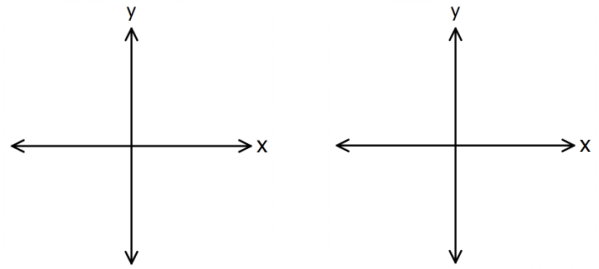
Reference angle: _____

Degrees: _____ Radians: _____

12. $\sin(x) = -\dfrac{\sqrt{3}}{2}$

13. $\tan(x) = -1$

Reference angle: _____

Degrees: _____   Radians: _____

Reference angle: _____

Degrees: _____   Radians: _____

14. $\cos\theta = -\dfrac{1}{\sqrt{2}}$
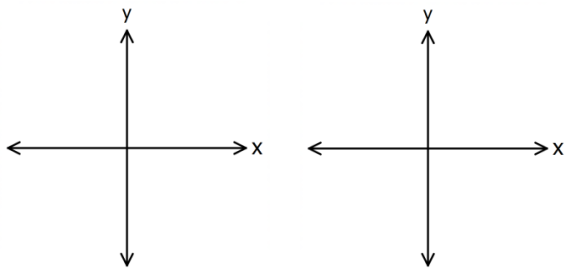
15. $\sin(x) = -\dfrac{1}{\sqrt{2}}$

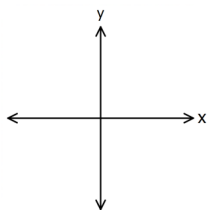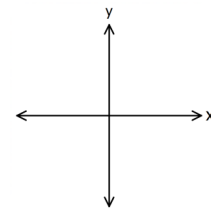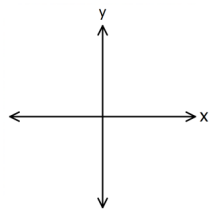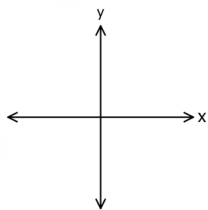Reference angle: _____
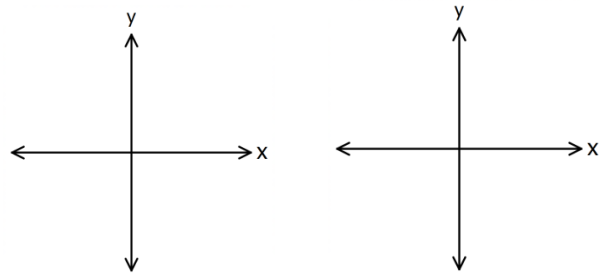
Degrees: _____   Radians: _____

Reference angle: _____

Degrees: _____   Radians: _____

Find all angles in the interval $[0°, 360°)$ that satisfy each equation.

16. $2\sin\theta + \sqrt{2} = 0$

17. $\tan\theta + \sqrt{3} = 0$

18. $2\cos\theta - \sqrt{2} = 0$
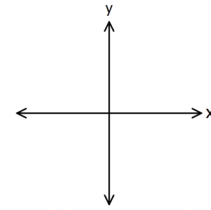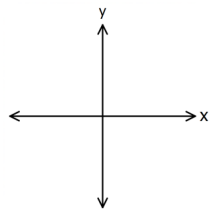
Degrees: _____
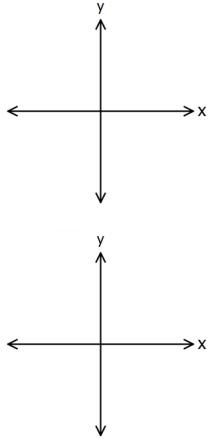
Degrees: _____

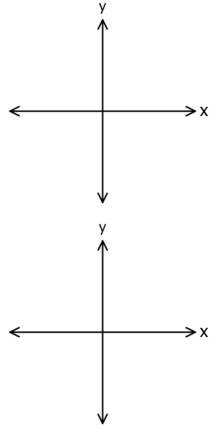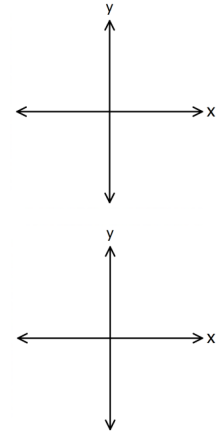Degrees: _____

19. $\tan\theta = -1$

20. $\tan\theta - 1 = 0$

21. $-\frac{7}{2} = -4 + \sin\theta$

Degrees: _____

Degrees: _____

Degrees: _____

22. $0 = -\sqrt{3} + 2\sin\theta$
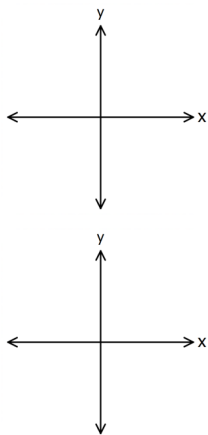
23. $\frac{1}{2}\sin\theta = -\frac{\sqrt{2}}{4}$
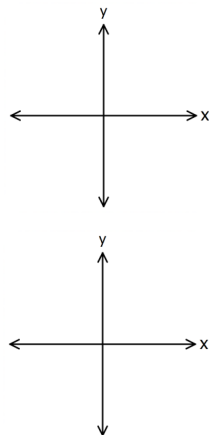
24. $5 + \cos\theta = 4 - \cos\theta$
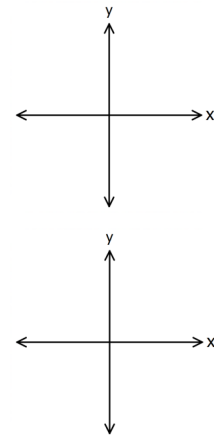
Degrees: _____

Degrees: _____

Degrees: _____

Review

25. Change $\frac{17\pi}{6}$ to degrees. Show work.

26. Change $315°$ to radians. Show work.

27. Find a positive and a negative coterminal angle for $225°$.

28. Find a positive and a negative coterminal angle for $\frac{5\pi}{3}$.

29. What is the reference angle of $300°$? Hint: Draw a picture.

30. What is the reference angle of $\frac{3\pi}{4}$? Hint: Draw a picture.