Name: _____ Date: _____

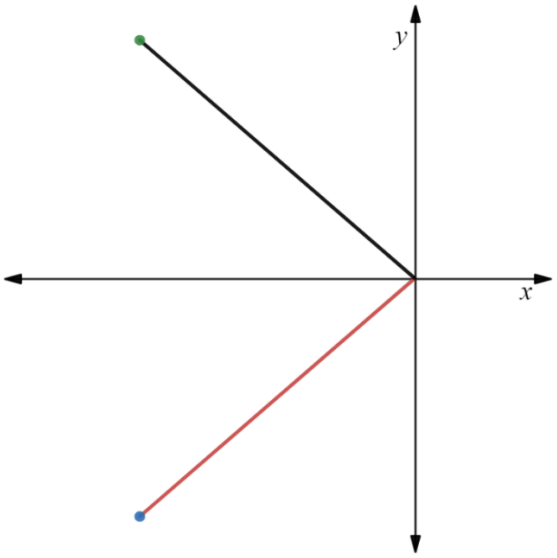
Learning Goal 4.2	Solving first- and second-degree equations over restricted domains and all real numbers.

More Questions – Solutions

1. Solve the following trigonometric equation on the specified domain for exact value(s) of θ, where possible. Otherwise round your answers to the nearest hundredth.

a. $7\cos\theta + 5 = 2 - 3\cos\theta\,,\ \ 0° \le \theta < 360°$

$$7\cos\theta + 5 = 2 - 3\cos\theta$$
$$10\cos\theta + 5 = 2$$
$$10\cos\theta = -3$$
$$\cos\theta = -\frac{3}{10}$$
$$\theta = \cos^{-1}\left(-\frac{3}{10}\right)$$
$$\theta_1 = 107°$$

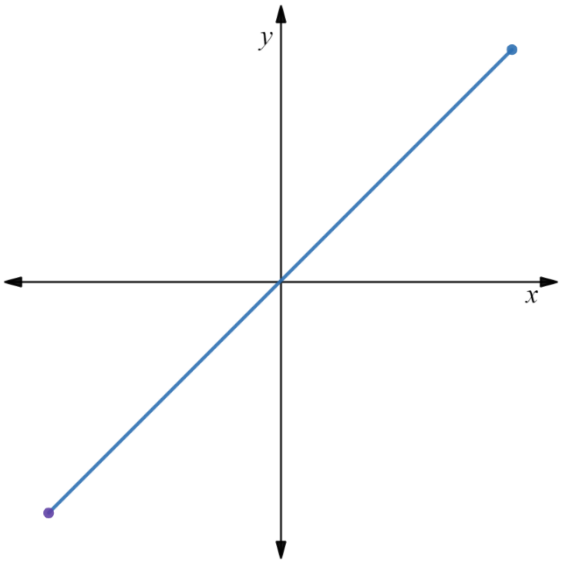


$\theta_R = 180° - 107°$ $\quad\quad$ $\theta_2 = 180° + 73°$

$\theta_R = 73°$ $\quad\quad$ $\theta_R = 253°$

b. $17 + 3\cot\theta = 29, -2\pi \le \theta \le 2\pi$

$$17 + 3\cot\theta = 29$$
$$3\cot\theta = 12$$
$$\cot\theta = 4$$
$$\tan\theta = \frac{1}{4}$$
$$\theta = \tan^{-1}\left(\frac{1}{4}\right)$$
$$\theta_1 \approx 0.24$$

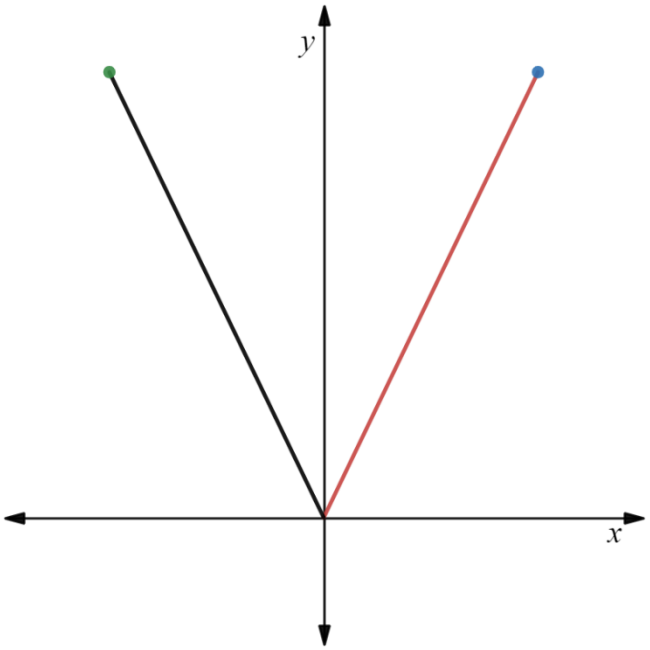


$\theta_R \approx 0.24$ $\quad\quad$ $\theta_2 \approx \pi + 0.24$

$\theta_2 = 3.39$

c. $4\csc x - 5 = 3, -180° \le x < 360°$

$$4\csc x - 5 = 3$$
$$4\csc x = 8$$
$$\csc x = 2$$
$$\sin x = \frac{1}{2}$$
$$x = \sin^{-1}\left(\frac{1}{2}\right)$$
$$x_1 = 30°$$

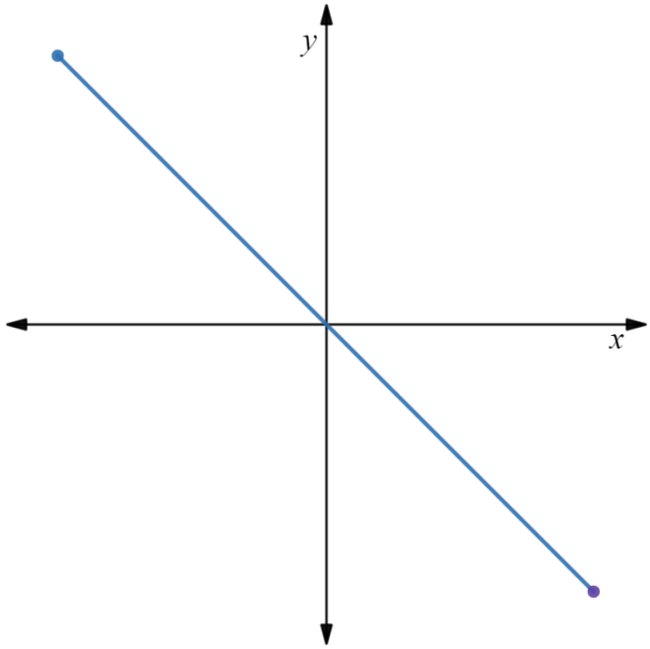


$x_R = 30°$

$x_2 = 180° - 30°$
$x_2 = 150°$

d. $7\cot\theta - 4 = 6\cot\theta - 5, 0 \le \theta < 4\pi$

$$7\cot\theta - 4 = 6\cot\theta - 5$$
$$7\cot\theta = 6\cot\theta - 1$$
$$\cot\theta = -1$$
$$\tan\theta = -1$$
$$\theta_1 = \frac{3\pi}{4}$$



$$\theta_2 = 2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$$

$\theta_R = \frac{\pi}{4}$

$$\theta_3 = 3\pi - \frac{\pi}{4} = \frac{11\pi}{4}$$

$$\theta_4 = 4\pi - \frac{\pi}{4} = \frac{15\pi}{4}$$