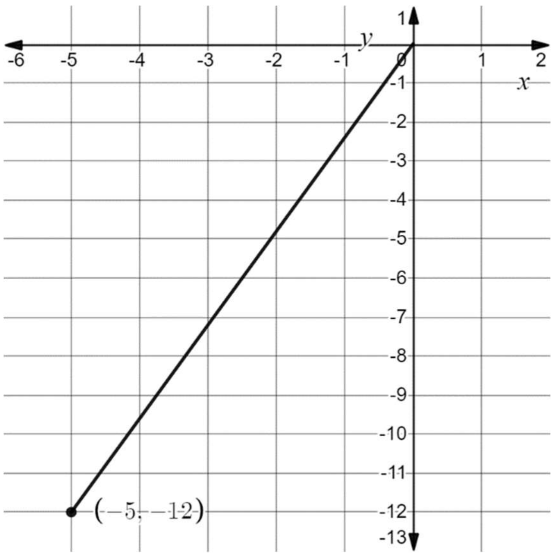
Name: ________________________________ Date: ____________________

Learning Goal 2.2	Using trigonometric ratios and solving simple trigonometric equations.

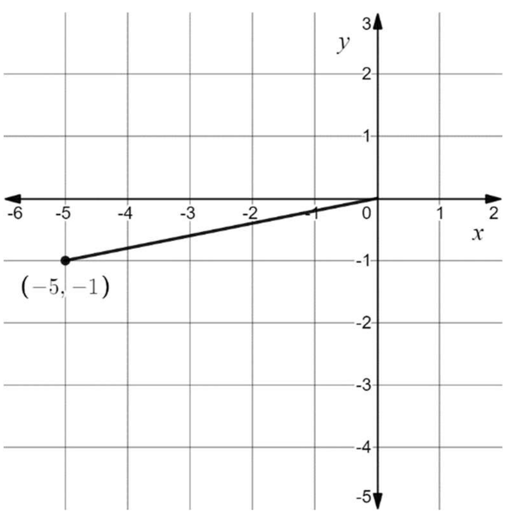
1. The point $P(-5,-12)$ lies on the terminal arm of an angle θ, in standard position. Determine the exact trigonometric ratios for $\sin\theta, \cos\theta$ and $\tan\theta$.



$$x^2+y^2=r^2$$
$$(-5)^2+(-12)^2=r^2$$
$$25+144=r^2$$
$$169=r^2$$
$$r=13$$

$$\sin\theta=\frac{y}{r} \qquad \cos\theta=\frac{x}{r} \qquad \tan\theta=\frac{y}{x}$$
$$=-\frac{12}{13} \qquad =-\frac{5}{13} \qquad =\frac{12}{5}$$

2. Suppose θ is an angle in standard position with terminal arm in quadrant III, and $\tan\theta = {}^{1}/_{5}$. What are the exact values of $\sin\theta$ and $\cos\theta$?

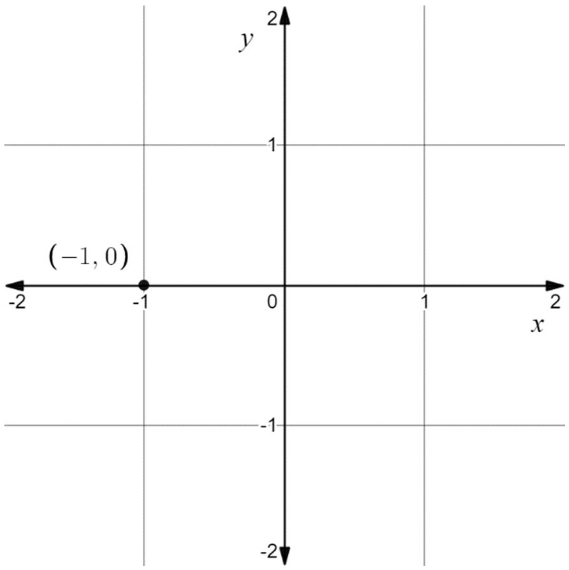


$$x^2+y^2=r^2$$
$$(-5)^2+(-1)^2=r^2$$
$$25+1=r^2$$
$$26=r^2$$
$$r=\pm\sqrt{26}$$

But we only consider $r=\sqrt{26}$ because it represents a distance measured from the origin.

$$\sin\theta=\frac{y}{r} \qquad \cos\theta=\frac{x}{r}$$
$$=-\frac{5}{\sqrt{26}} \qquad =-\frac{1}{\sqrt{26}}$$

3. Determine the values of $\sin\theta$, $\cos\theta$ and $\tan\theta$ when the terminal arm of quadrantal angle θ coincides with the negative $x-$ axis.



This means that the value of x is equal to the value of r (in this case I chose one because it's simple) and $y = 0$.

$$\sin\theta = \frac{y}{r} = \frac{0}{1} = 0$$

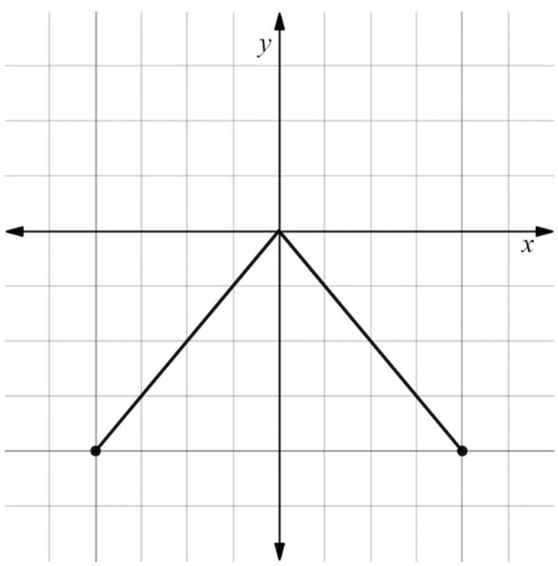
$$\cos\theta = \frac{x}{r} = \frac{-1}{1} = -1$$

$$\tan\theta = \frac{y}{x} = \frac{0}{-1} = 0$$

4. Given $\sin\theta = -0.8090$ where $0° \leq \theta < 360°$, determine the measure of θ to the nearest tenth of a degree.

If $\sin\theta$ is negative, then the terminal arm of the angle either lives in quadrants III or IV.

$$\sin\theta_R = -0.8090$$
$$\theta_R = 54.0°$$



Quadrant III

$$\theta = 180° + \theta_R = 180° + 54° = 234.0°$$

Quadrant IV

$$\theta = 360° - \theta_R = 360° - 54° = 306.0°$$