

constraint: Information that restricts where an angle is drawn

Ex: Find the six trigonometric ratios of θ using the given information.

a) $\tan \theta = \boxed{-\frac{5}{4}}$

$\cos \theta > 0$

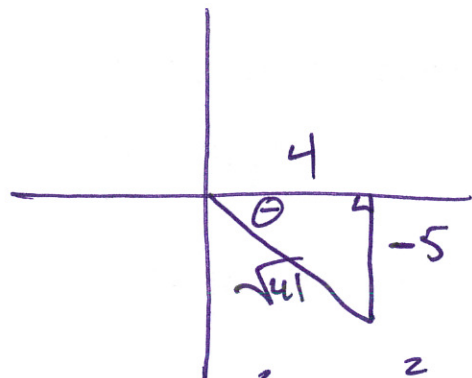
$\cot \theta = \boxed{-\frac{4}{5}}$

$\sin \theta = \frac{-5}{\sqrt{41}} \cdot \frac{\sqrt{41}}{\sqrt{41}} = \boxed{-\frac{5\sqrt{41}}{41}}$

$\cos \theta = \frac{4}{\sqrt{41}} \cdot \frac{\sqrt{41}}{\sqrt{41}} = \boxed{\frac{4\sqrt{41}}{41}}$

$\csc \theta = \boxed{-\frac{\sqrt{41}}{5}}$

$\sec \theta = \boxed{\frac{\sqrt{41}}{4}}$



$$(4)^2 + (-5)^2 = r^2$$

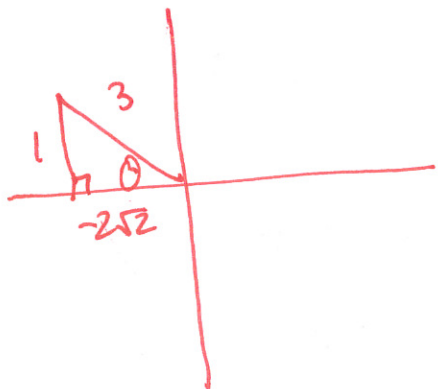
$$16 + 25 = r^2$$

$$41 = r^2$$

b) $\csc \theta = \boxed{3}$
 $\sin \theta = \boxed{\frac{1}{3}}$

$\cot \theta < 0$

$\tan \theta < 0$



$$1^2 + x^2 = 3^2$$

$$1 + x^2 = 9$$

$$x^2 = 8$$

$$x = -\sqrt{8}$$

$$x = -2\sqrt{2}$$

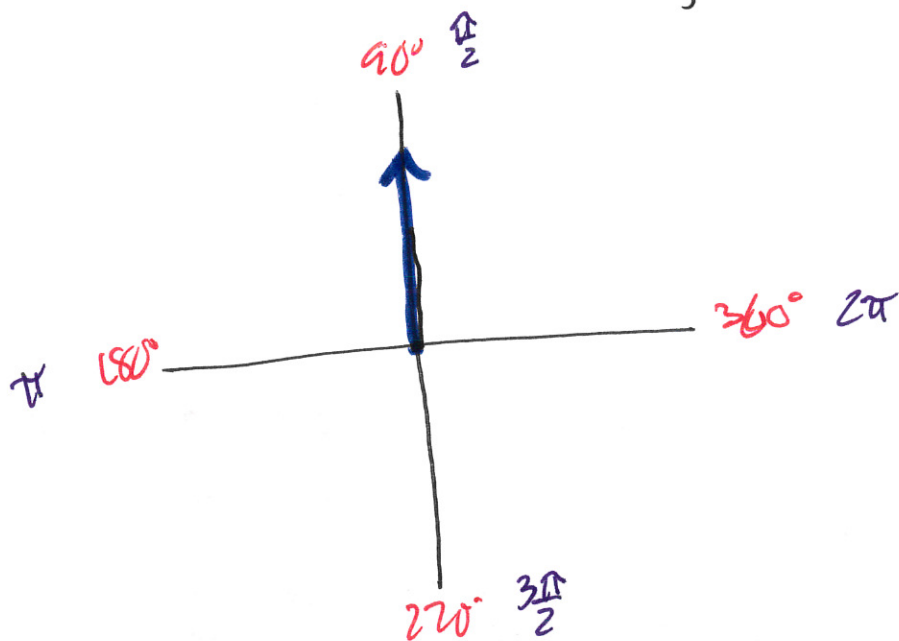
$\cos \theta = \boxed{-\frac{2\sqrt{2}}{3}}$

$\tan \theta = \frac{1}{-2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{-\frac{\sqrt{2}}{4}}$

$\sec \theta = \frac{-3}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{-\frac{3\sqrt{2}}{4}}$

$\cot \theta = \boxed{\frac{-2\sqrt{2}}{1}}$

quadrant angle : Any angle where the terminal side lies along either the x-axis or the y-axis.



To find the value of trig functions for quadrant angles, we use the formulas:

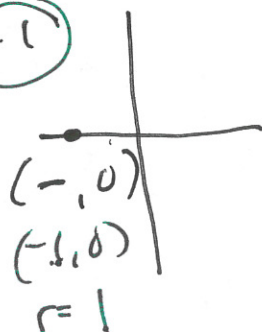
$$\sin \theta = \frac{y}{r}$$

r = distance from $(0,0)$

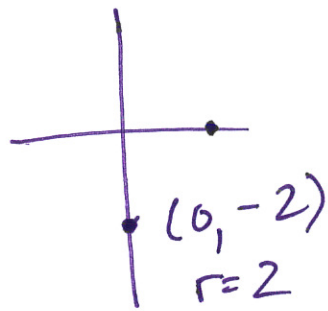
$$\cos \theta = \frac{x}{r}$$

$$\tan \theta = \frac{y}{x}$$

Evaluate $\cos 180^\circ = \frac{-1}{1} = -1$



Find the six trig values for $\frac{3\pi}{2}$



$$\sin \frac{3\pi}{2} = \frac{-2}{2} = -1$$

$$\cos \frac{3\pi}{2} = \frac{0}{2} = 0$$

$$\tan \frac{3\pi}{2} = \frac{-2}{0} \rightarrow \text{undefined}$$

$$\csc \frac{3\pi}{2} = -1$$

$$\sec \frac{3\pi}{2} \rightarrow \text{undefined}$$

$$\cot \frac{3\pi}{2} = 0$$