

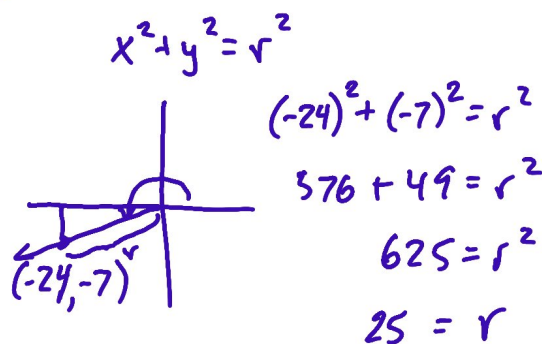
## WARMUP

The terminal side of an angle drawn in standard form passes through  $(-24, -7)$ . Find the six trig ratios.

$$\sin \theta = \frac{y}{r} = \frac{-7}{25} \quad \csc \theta = \frac{r}{y} = -\frac{25}{7}$$

$$\cos \theta = \frac{x}{r} = \frac{-24}{25} \quad \sec \theta = \frac{r}{x} = -\frac{25}{24}$$

$$\tan \theta = \frac{y}{x} = \frac{7}{24} \quad \cot \theta = \frac{x}{y} = \frac{24}{7}$$



p396 57-81 odd

p11-412 5-75 multiples of 5

$$69) \sin 1 = 0.8415$$

↑  
no degree  
implies radians  
radian mode

$$71) \sin 1^\circ = 0.0175$$

degree  
mode

$$79) (-3, -2)$$

$$x^2 + y^2 = r^2$$
$$(-3)^2 + (-2)^2 = r^2$$

$$9 + 4 = r^2$$

$$13 = r^2$$

$$r = \sqrt{13}$$

$$\sin \theta = \frac{y}{r} = \frac{-2}{\sqrt{13}} = -\frac{2\sqrt{13}}{13}$$

$$\csc \theta = \frac{r}{y} = -\frac{\sqrt{13}}{2}$$

$$\cos \theta = \frac{x}{r} = \frac{-3}{\sqrt{13}} = -\frac{3\sqrt{13}}{13}$$

$$\sec \theta = \frac{r}{x} = -\frac{\sqrt{13}}{3}$$

$$\tan \theta = \frac{y}{x} = \frac{2}{3}$$

$$\cot \theta = \frac{x}{y} = \frac{3}{2}$$

$$81) \left(\frac{1}{3}, -\frac{1}{4}\right)$$

$$\left(\frac{1}{3}\right)^2 + \left(-\frac{1}{4}\right)^2 = r^2$$

$$\frac{1}{9} + \frac{1}{16} = r^2$$

$$\frac{16+9}{9 \cdot 16} = r^2$$

$$\frac{25}{144} = r^2$$

$$\frac{5}{12} = r$$

$$\sin \theta = \frac{-\frac{1}{4}}{\frac{5}{12}} = -\frac{1}{4} \cdot \frac{12}{5} = -\frac{3}{5} \quad \csc \theta = -\frac{5}{3}$$

$$\cos \theta = \frac{\frac{1}{3}}{\frac{5}{12}} = \frac{1}{3} \cdot \frac{12}{5} = \frac{4}{5} \quad \sec \theta = \frac{5}{4}$$

$$\tan \theta = \frac{-\frac{1}{4}}{\frac{1}{3}} = -\frac{1}{4} \cdot \frac{3}{1} = -\frac{3}{4} \quad \cot \theta = -\frac{4}{3}$$

$$\sin^2 \theta = (\sin \theta)^2$$

40 p412

WAY 1: identities

$$\sin \theta = -\frac{2}{3} \quad \pi < \theta < \frac{3\pi}{2}$$

QIII

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{+\frac{2}{3}}{+\frac{\sqrt{5}}{3}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5} = \tan \theta$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\left(-\frac{2}{3}\right)^2 + \cos^2 \theta = 1$$

$$\frac{4}{9} + \cos^2 \theta = 1$$

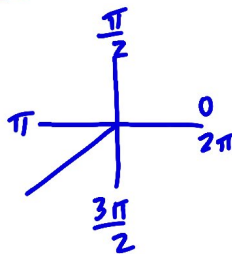
$$\cos^2 \theta = \frac{5}{9}$$

$$\cos \theta = -\sqrt{\frac{5}{9}} = -\frac{\sqrt{5}}{3} = \cos \theta$$

$$\csc \theta = \frac{1}{\sin \theta} = -\frac{3}{2}$$

$$\sec \theta = \frac{1}{\cos \theta} = -\frac{3}{\sqrt{5}} = -\frac{3\sqrt{5}}{5}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{-\frac{\sqrt{5}}{3}}{-\frac{2}{3}} = \frac{\sqrt{5}}{2}$$



WAY 2

$$\sin \theta = -\frac{2}{3} \quad \pi < \theta < \frac{3\pi}{2}$$

$$= \frac{y}{r} = \frac{-2}{3}$$

$$x^2 + (-2)^2 = 3^2$$

$$x^2 + 4 = 9$$

$$x^2 = 5$$

$$x = -\sqrt{5}$$

$$\sin \theta = -\frac{2}{3}$$

$$\cos \theta = -\frac{\sqrt{5}}{3}$$

$$\tan \theta = \frac{-2}{-\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

$$\csc \theta = -\frac{3}{2}$$

$$\sec \theta = -\frac{3\sqrt{5}}{5}$$

$$\cot \theta = \frac{\sqrt{5}}{2}$$

$$45) \tan \theta = \frac{3}{4} \quad \sin \theta < 0 \quad \text{Q III}$$

$$\frac{-3}{-4} = \frac{y}{x}$$

$$r = 5$$

$$(-4)^2 + (-3)^2 = r^2$$

$$16 + 9 = r^2$$

$$25 = r^2$$

$$5 = r$$

$$\sin \theta = -\frac{3}{5}$$

$$\cos \theta = -\frac{4}{5}$$

$$\tan \theta = \frac{3}{4}$$

$$\csc \theta = -\frac{5}{3}$$

$$\sec \theta = -\frac{5}{4}$$

$$\cot \theta = \frac{4}{3}$$

$$70) \tan 10^\circ \cot 10^\circ = \tan 10^\circ \cdot \frac{1}{\tan 10^\circ} = 1$$