30. Determine the signs of trigonometric functions of an angle in standard position with the given measure

$195^\circ = \tan\theta \,/\, \cot\theta$

$0 : 90 = \text{I}$ A

$90 : 180 = \text{II}$ S

$180 : 270 = \text{III}$ T

$270 : 360 = \text{IV}$ C

32. $125^\circ = \sin\theta \,/\, \csc\theta$

34. $855^\circ = \sin\theta \,/\, \csc\theta$

39. Identify the quadrant (Or possible quadrants) of an angle θ that satisfies the given conditions.

$\sin\theta > 0,\ \csc\theta > 0 = \text{I, II}$

47. $\sec\theta < 0,\ \csc\theta < 0 = \text{III}$

65. Use identities to solve each of the following. Rationalize denominators when applicable.

find $\cos\theta$, given that $\sin\theta = \frac{3}{5}$ and θ is in Quadrant II

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

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

$\sqrt{x^2 + 3^2} = 5$

$\sqrt{x^2 + 9} = 5$

$\sqrt{16 + 9} = 5$

$\sqrt{25} = 5$

$25 - 9 = 16 = x^2$

$\sqrt{16} = 4 = x$

74. Give all six trigonometric function values for each angle θ. Rationalize denominators when possible.

$\cos\theta = -\frac{3}{5}$, θ in Quadrant III

$\sin\theta = \frac{y}{r} = -\frac{4}{5}$

$\cos\theta = \frac{x}{r} = -\frac{3}{5}$

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

$\csc\theta = \frac{r}{y} = -\frac{5}{4}$

$\sec\theta = \frac{r}{x} = -\frac{5}{3}$

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

$\sqrt{-3^2 + y^2} = 5$

$\sqrt{9 + y^2} = 5$

$\sqrt{9 + 16} = 5$

$\sqrt{25} = 5$

$y = 4$

77. $\cot \theta = \frac{\sqrt{3}}{8}$, θ in I

$\sqrt{\sqrt{3}^2 + 8^2} = r$

$\sqrt{3+64} = r$

$\sqrt{67} = r$

$\sin \theta = \frac{y}{r} = \frac{8}{\sqrt{67}}$

$\cos \theta = \frac{x}{r} = \frac{\sqrt{3}}{\sqrt{67}}$

$\tan \theta = \frac{y}{x} = \frac{8}{\sqrt{3}}$

$\csc \theta = \frac{r}{y} = \frac{\sqrt{67}}{8}$

$\sec \theta = \frac{r}{x} = \frac{\sqrt{67}}{\sqrt{3}}$

$\cot \theta = \frac{x}{y} = \frac{\sqrt{3}}{8}$

79. $\sin \theta = \frac{\sqrt{2}}{6}$, $\cos \theta < 0$

$\sqrt{x^2 + \sqrt{2}} = 6$

$\sqrt{x^2 + 2} = 6$

$6^2 = 36$

$\sqrt{34+2} = 6$

$36 - 2 = 34$

$x^2 = 34$

$\sqrt{36} = 6$

$\sin \theta = \frac{y}{r} = \frac{\sqrt{2}}{6}$

$\cos \theta = \frac{x}{r} = -\frac{\sqrt{34}}{6}$

$\tan \theta = \frac{y}{x} = -\frac{\sqrt{2}}{\sqrt{34}}$

$\csc \theta = \frac{r}{y} = \frac{6}{\sqrt{2}}$

$\sec \theta = \frac{r}{x} = -\frac{6}{\sqrt{34}}$

$\cot \theta = \frac{x}{y} = -\frac{\sqrt{34}}{\sqrt{2}}$

85. *Work the problem.*

Derive the identity $1 + \cot^2\theta = \csc^2\theta$ by dividing $x^2 + y^2 = r^2$ by y^2.

$r = \sqrt{x^2 + y^2}$

$r^2 = x^2 + y^2$

$\frac{r^2}{r^2} = \frac{x^2 + y^2}{r^2}$

$1 = \frac{x^2}{r^2} + \frac{y^2}{r^2}$

$1 + \cot^2\theta = \csc^2\theta$

$- \cot^2\theta \quad - \cot^2\theta$

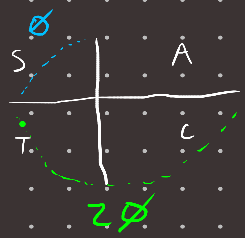
$\csc^2\theta - \cot^2\theta = 1$

$1 = \left(\frac{r}{y}\right)^2 - \left(\frac{x}{y}\right)^2$

$1 = \csc^2\theta - \cot^2\theta$

89. *Suppose that 90° < θ < 180°. Find the sign of each function value.*

$\sin 2\theta$ = Negative



100. *Suppose that -90° < θ < 90°. Find the sign of each function value.*

$\cos(\theta + 180)$ = Negative