Derek White
MATH 1236
1.3

11.) *Sketch an angle θ in standard position such that θ has the least positive measure, and the given point is on the terminal side of θ. Then find the values of the six trigonometric functions for each angle. Rationalize denominators when applicable.*

$(5, -12)$

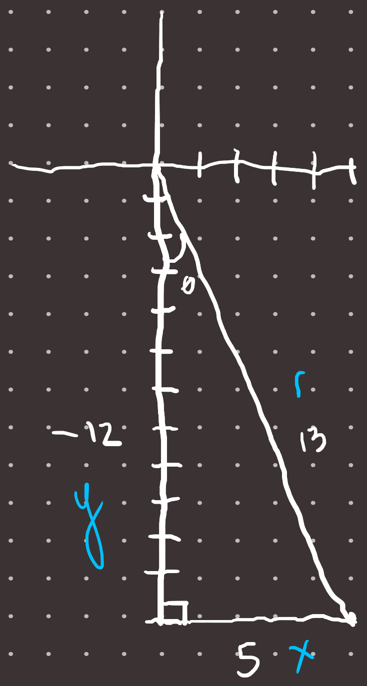
$r = \sqrt{x^2 + y^2}$

$r = \sqrt{5^2 + -12^2}$

$r = \sqrt{25 + 144}$

$r = \sqrt{169}$

$r = 13$

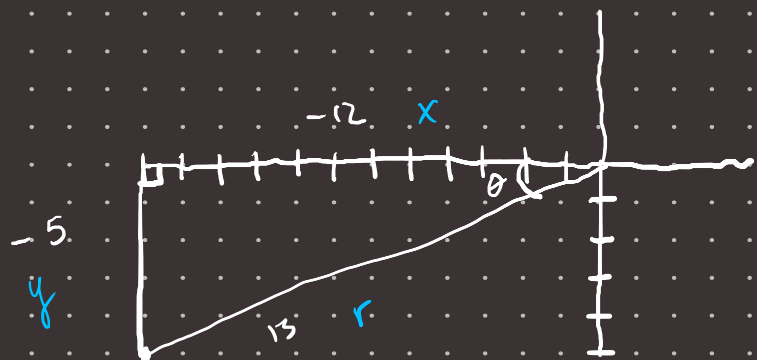


$\sin\theta = \frac{y}{r} = \frac{-12}{13}$ $\quad \csc\theta = \frac{r}{y} = \frac{13}{-12}$

$\cos\theta = \frac{x}{r} = \frac{5}{13}$ $\quad \sec\theta = \frac{r}{x} = \frac{13}{5}$

$\tan\theta = \frac{y}{x} = \frac{-12}{5}$ $\quad \cot\theta = \frac{x}{y} = \frac{5}{-12}$

12.) $(-12, -5)$



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

$r = \sqrt{-12^2 + -5^2}$

$r = \sqrt{144 + 25}$

$r = \sqrt{169}$

$r = 13$

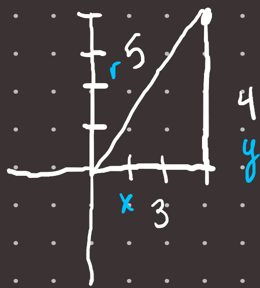
$\sin\theta = \frac{y}{r} = \frac{-5}{13}$ $\quad \csc\theta = \frac{r}{y} = \frac{13}{-5}$

$\cos\theta = \frac{x}{r} = \frac{-12}{13}$ $\quad \sec\theta = \frac{r}{x} = \frac{13}{-12}$

$\tan\theta = \frac{y}{x} = \frac{-5}{-12}$ $\quad \cot\theta = \frac{x}{y} = \frac{-12}{-5}$

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

13.) $(3, 4)$



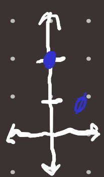
$r = \sqrt{x^2 + y^2}$
$r = \sqrt{3^2 + 4^2}$
$r = \sqrt{9 + 16}$
$r = \sqrt{25}$
$r = 5$

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

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

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

19.) $(0, 2)$



$x = 0$
$y = 2$
$r = 2$

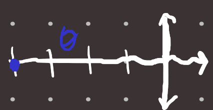
$\sin\theta = \frac{y}{r} = \frac{2}{2} = 1$ $\csc\theta = \frac{r}{y} = \frac{2}{2} = 1$

$\cos\theta = \frac{x}{r} = \frac{0}{2} = 0$ $\sec\theta = \frac{r}{x} = \frac{2}{0} =$ undefined

$\tan\theta = \frac{y}{x} = \frac{2}{0} =$ undefined $\cot\theta = \frac{x}{y} = \frac{0}{2} = 0$

21.) $(-4, 0)$

$x = -4$
$y = 0$
$r = \sqrt{x^2 + y^2}$
$r = \sqrt{-4^2 + 0^2}$
$r = \sqrt{16 + 0}$
$r = \sqrt{16}$
$r = 4$



$\sin\theta = \frac{y}{r} = \frac{0}{4} = 0$ $\csc\theta = \frac{r}{y} = \frac{4}{0} =$ undefined

$\cos\theta = \frac{x}{r} = \frac{-4}{4} = -1$ $\sec\theta = \frac{r}{x} = \frac{4}{-4} = -1$

$\tan\theta = \frac{y}{x} = \frac{0}{-4} = 0$ $\cot\theta = \frac{x}{y} = \frac{-4}{0} =$ undefined

25.) $(1, \sqrt{3})$

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

$r = \sqrt{1^2 + \sqrt{3}^2}$

$r = \sqrt{1+3}$

$r = \sqrt{4}$

$r = 2$

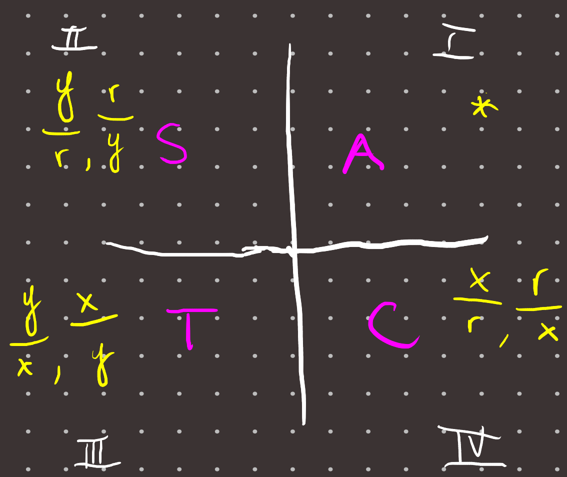
$\sin\theta = \dfrac{y}{r} = \dfrac{\sqrt{3}}{2}$ $\quad \csc\theta = \dfrac{r}{y} = \dfrac{2}{\sqrt{3}}$

$\cos\theta = \dfrac{x}{r} = \dfrac{1}{2}$ $\quad \sec\theta = \dfrac{r}{x} = \dfrac{2}{1} = 2$

$\tan\theta = \dfrac{y}{x} = \dfrac{\sqrt{3}}{1} = \sqrt{3}$ $\quad \cot\theta = \dfrac{x}{y} = \dfrac{1}{\sqrt{3}}$

31.) Suppose that the point (x, y) is in the indicated quadrant. Determine whether the given ratio is positive or negative. Recall that r = sqrt(x^2 + y^2).

Quadrant II, $\dfrac{x}{r}$, Negative



32.) Quadrant III, $\dfrac{y}{r}$, Negative

33.) Quadrant IV, $\dfrac{y}{x}$, Negative

34.) Quadrant IV, $\dfrac{x}{y}$, Negative

35.) Quadrant II, $\dfrac{y}{r}$, Positive

36.) Quadrant III, $\dfrac{x}{r}$, Negative

37.) Quadrant IV, $\dfrac{x}{r}$, Positive

38.) Quadrant II, $\dfrac{y}{r}$, Negative

39.) Quadrant II, $\dfrac{x}{y}$, Negative

40.) Quadrant II, $\dfrac{y}{x}$, Negative

41.) Quadrant III, $\dfrac{y}{x}$, Positive

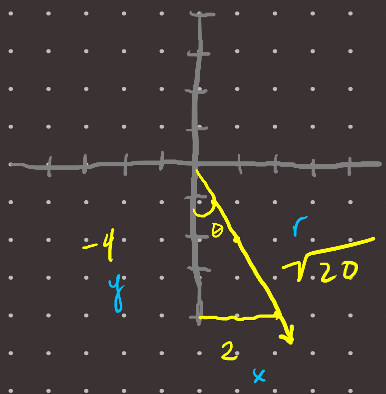
42.) Quadrant III, $\dfrac{x}{y}$, Positive

51.) *An equation of the terminal side of an angle θ in standard position is given with a restriction on x. Sketch the least positive such angle θ, and find the values of the six trigonometric functions of θ.*

$2x + y = 0, \quad x \geq 0$

$-2x \qquad -2x$

$y = -2x$



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

$r = \sqrt{2^2 + -4^2}$

$r = \sqrt{4 + 16}$

$r = \sqrt{20}$

$\sin\theta = \frac{y}{r} = \frac{-4}{\sqrt{20}}$ $\qquad \csc\theta = \frac{r}{y} = \frac{\sqrt{20}}{-4}$

$\cos\theta = \frac{x}{r} = \frac{2}{\sqrt{20}}$ $\qquad \sec\theta = \frac{r}{x} = \frac{\sqrt{20}}{2}$

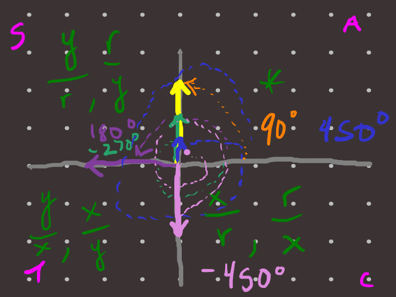
$\tan\theta = \frac{y}{x} = \frac{-4}{2} = \frac{-2}{1} = -2$ $\qquad \cot\theta = \frac{x}{y} = \frac{2}{-4} = \frac{1}{-2}$

66.) *Find the indicated function value. If it is undefined, say so.*

$\cot 90°$

$x = 0$
$y = 1$

$\cot 90° = \frac{x}{y} = \frac{0}{1} = 0$



$x = 0 \quad y = 1$ $\qquad x = 0 \quad y = 1$

$x = -1 \quad y = 0$ $\qquad x = 0 \quad y = 1$

$x = 0 \quad y = -1$

67.) $\sec 180°$

$x = -1$
$y = 0$

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

$r = \sqrt{-1^2 + 0^2}$

$r = \sqrt{1 + 0}$

$r = \sqrt{1}$

$r = 1$

$\sec 180° = \frac{r}{x} = \frac{1}{0}$ = undefined

69.) $\sin(-270°)$

$x = 0$
$y = 1$

$\sin(-270°) = \frac{y}{r} = \frac{1}{1} = 1$

72.) $\tan 450^\circ$

$x=0$
$y=1$

$$\tan 450^\circ = \frac{y}{x} = \frac{1}{0} = \text{undefined}$$

73.) $\csc(-450^\circ)$

$x=0$
$y=-1$

$$\csc(-450) = \frac{r}{y} = \frac{1}{-1} = -1$$

79.) $\sec 1800^\circ$

$x=1$

$y=0$

$$\sec 1800^\circ = \frac{y}{1} = \frac{0}{1} = 0$$