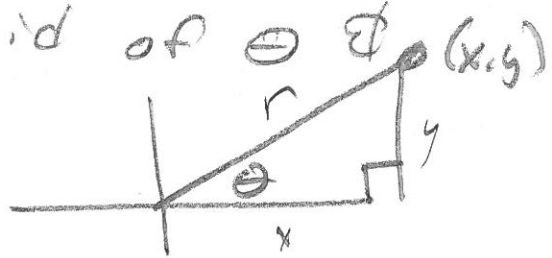


122 51.4

10 points Context

* 1.6 θ is standard position, (x, y) a point on the terminal side of θ

$$r = \sqrt{x^2 + y^2} \neq 0 \Rightarrow$$



① $\sin \theta = \frac{y}{r}$

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

③ $\tan \theta = \frac{y}{x}$

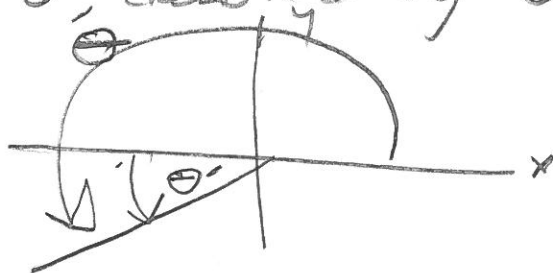
④ $\sec \theta = \frac{r}{x}$

⑤ $\frac{x}{r} = \cos \theta$

⑥ $\frac{x}{y} = \frac{1}{\tan \theta} = \cot \theta$

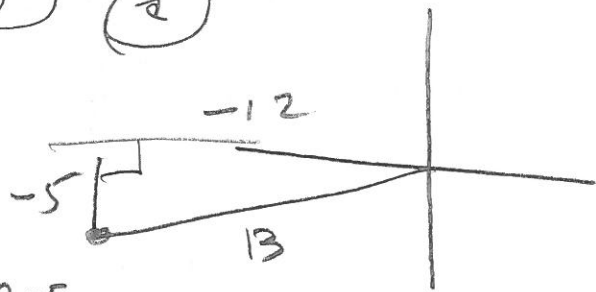
⑦ Because $r = \sqrt{x^2 + y^2}$ can't be zero,
the sine & cosine functions are real $\forall \theta \in \mathbb{R}$

⑧ The acute positive angle formed by the terminal side of an angle θ & the horizontal axis is called the reference angle of θ , denoted by θ'



#5 9-12, Find exact values of the 6 trig

(10) (a)



$(-12, 5)$

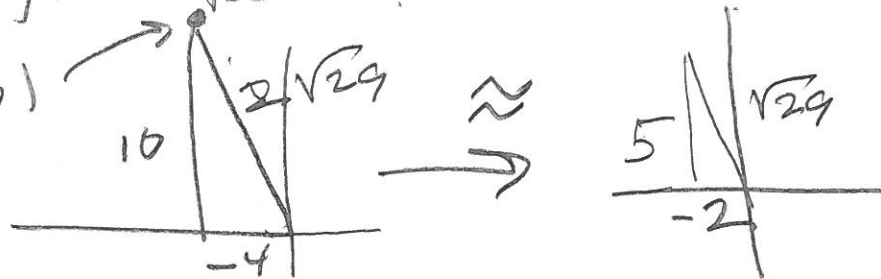
$$5^2 + 12^2 = 25 + 144 = 169 = 13^2$$

$\sin \theta = -\frac{5}{13}$	$\csc \theta = -\frac{13}{5}$
$\cos \theta = -\frac{12}{13}$	$\sec \theta = -\frac{13}{12}$
$\tan \theta = \frac{5}{12}$	$\cot \theta = \frac{12}{5}$

3pts Dig 1 pt if they neglect the argument θ . "sin" is a crime against God.

#5 13-18 Determine the 6 trig associated with the given point.

(16) $(-4, 10)$



$$4^2 + 10^2 = 116$$

$$\sqrt{116} = 2\sqrt{29}$$

$$\sin \theta = \frac{10}{2\sqrt{29}} = \frac{5}{\sqrt{29}} \quad \csc \theta = \frac{\sqrt{29}}{5}$$

$$\cos \theta = -\frac{4}{2\sqrt{29}} = -\frac{2}{\sqrt{29}} \quad \sec \theta = -\frac{\sqrt{29}}{2}$$

$$\tan \theta = -\frac{5}{2} \quad \cot \theta = -\frac{2}{5}$$

(18) Done in class. See 1/30/19 notes.
 #s 19-22 state the quadrant in which
 (the terminal side of) θ lies

(19) $\sin \theta > 0$ & $\cos \theta > 0$
 $y > 0$ $x > 0$

Q I

(20) $\sin \theta < 0$
 & $\cos \theta < 0$
 $(-, -)$

Q III

$(-, +)$ II	I $(+, +)$
$(-, -)$ III	IV $(+, -)$

lots each

(21) $\sin \theta > 0$ & $\cos \theta < 0$
 $(-, +)$

Q II

(22) $\sec \theta > 0$ $\cot \theta < 0$
 $x > 0$ $(\tan \theta < 0)$

$(+, +)$	$(+, +)$
$(+, -)$	$(-, -)$

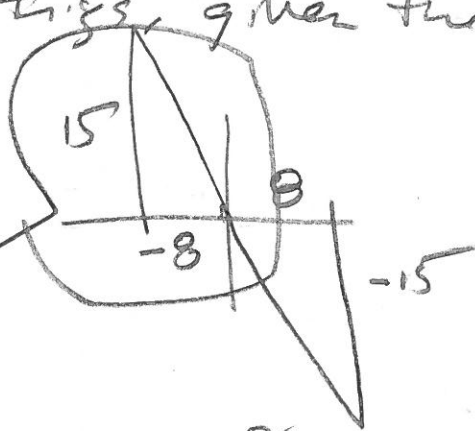
Q IV

~~#s 23-32 Rad 6~~

#s 23-32 Rad six trig, given the info:

(23) $\tan \theta = -\frac{15}{8}$

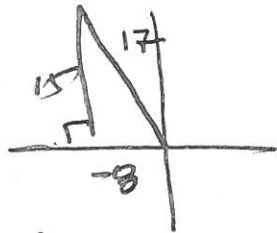
$\sin \theta > 0$



$8^2 + 15^2 = 64 + 225 = 289 = 17^2$

Draw pics:

2 pts



$\sin \theta = \frac{15}{17}$ $\csc \theta = \frac{17}{15}$

$\cos \theta = -\frac{8}{17}$

$\sec \theta = -\frac{17}{8}$

$\tan \theta = -\frac{15}{8}$ $\cot \theta = -\frac{8}{15}$

Nail 6 trig

3 pts

(25) $\sin \theta = \frac{3}{5}$, $\theta \in \text{QII}$

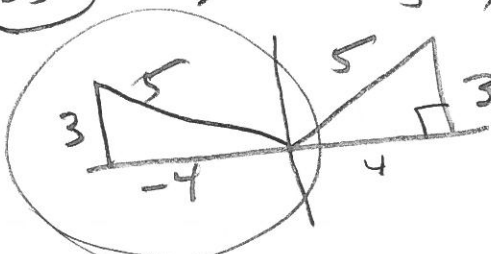
$5^2 - 3^2 = 25 - 9 = 16 = 4^2$

Draw both triangles

Get the right one

6 trig 3 pts

1 pt
1 pt



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

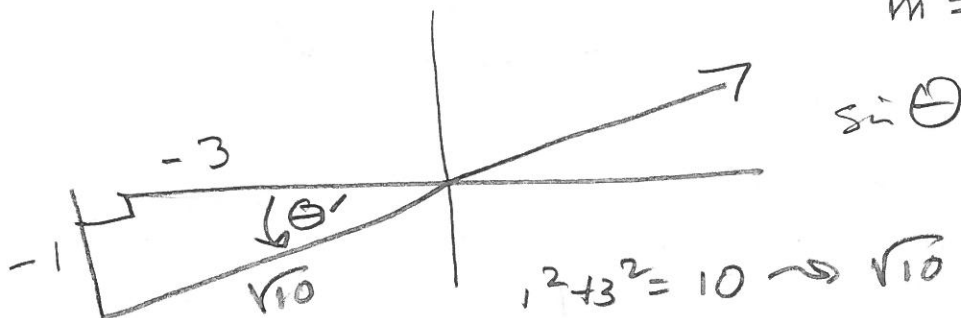
$\cos \theta = -\frac{4}{5}$ $\sec \theta = -\frac{5}{4}$

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

#s 33-36. The line thru the origin in has terminal side of θ in the given quadrant. Find the 6 trig

(34) $y = \frac{1}{3}x$, Q III

$m = \frac{y}{x} = \frac{1}{3}$



$\sin \theta = -\frac{1}{\sqrt{10}}$

$\csc \theta = -\sqrt{10}$

$\cos \theta = -\frac{3}{\sqrt{10}}$

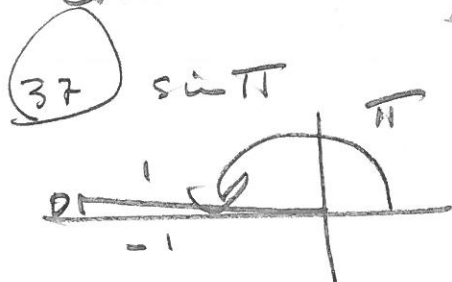
$\sec \theta = -\frac{\sqrt{10}}{3}$

$\tan \theta = \frac{1}{3}$

$\cot \theta = 3$

(3 pts) 6 trig
(2 pts) P.I.C

#s 37-44 Evaluate the trig func of Quadrant angle, if possible

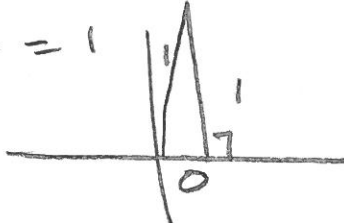


$\sin \pi = \frac{0}{1} \neq 0 = \sin \theta$

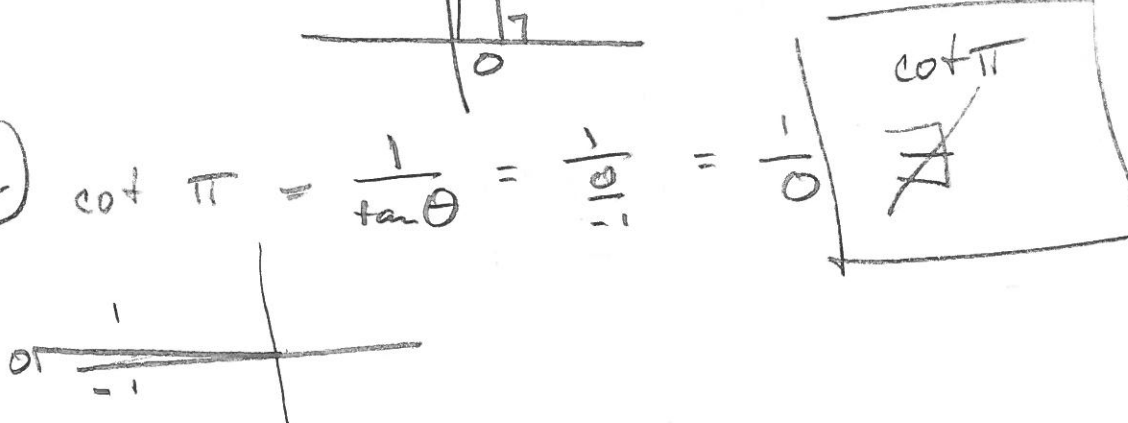
(1 pt) P.I.C 37-42
(1 pt) value $\frac{37-42}{2}$

(38) $\csc \frac{3\pi}{2} = \frac{1}{\sin \theta} = \frac{1}{-1} = -1 = \csc \theta$

(41) $\sin \frac{\pi}{2} = \frac{1}{1} = 1$

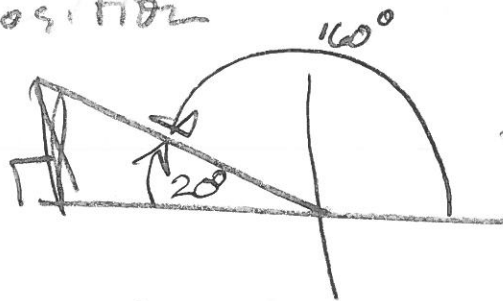


(42) $\cot \pi = \frac{1}{\tan \theta} = \frac{1}{\infty} = \frac{1}{0}$



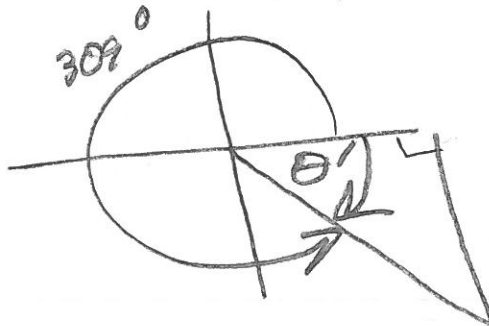
*§ 45-52 Find θ' & sketch θ & θ' in standard position

(45) $\theta = 160^\circ$
 $\theta' = 20^\circ$

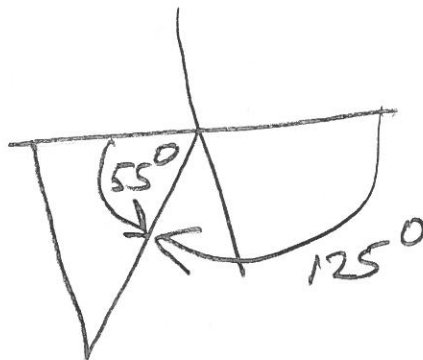


*§ 45-52
 1st quad
 1st θ'

(46) $\theta = 309^\circ$
 $360^\circ - 309^\circ$
 $= 51^\circ = \theta'$

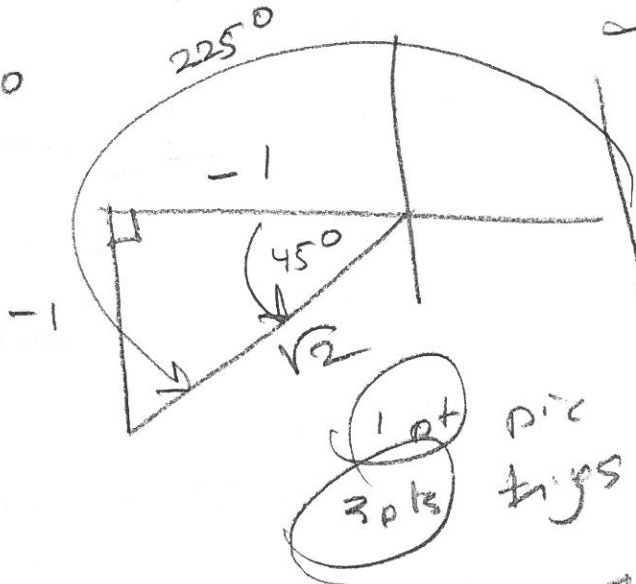


(47) $\theta = -125^\circ$
 $\theta' = 180^\circ - 125^\circ$
 $\theta' = 55^\circ$



#53-68 Eval sine, cosine & tangent w/ a calculator.

53 225°

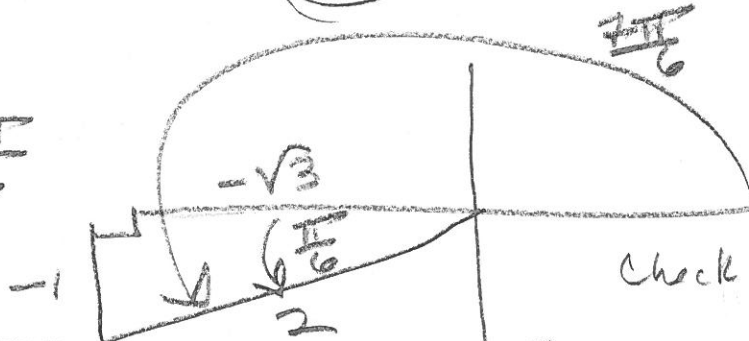


$$\sin 225^\circ = -\frac{1}{\sqrt{2}}$$

$$\cos 225^\circ = -\frac{1}{\sqrt{2}}$$

$$\tan 225^\circ = 1$$

62 $\frac{7\pi}{6}$



check degrees

$$\frac{7\pi}{6} = 210^\circ = 180^\circ + 30^\circ$$

$$\sin \frac{7\pi}{6} = -\frac{1}{2}$$

$$\cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$$

$$\tan \frac{7\pi}{6} = \frac{1}{\sqrt{3}}$$

1 pt
3 pts

* 575-90 Use a calculator to eval the trig func. Give answers in degrees

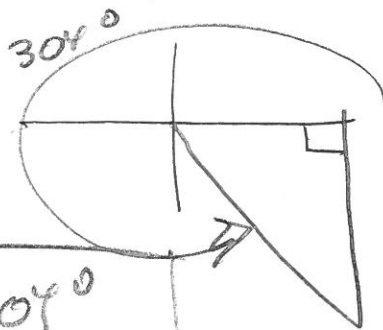
($\theta \in [0^\circ, 360^\circ)$) and radians ($\theta \in [0, 2\pi)$) rounded to 4 decimal places.

(79)

$$\tan 304^\circ$$

$$\approx -1.482560969$$

$$\approx \boxed{-1.4826 \approx \tan 304^\circ}$$



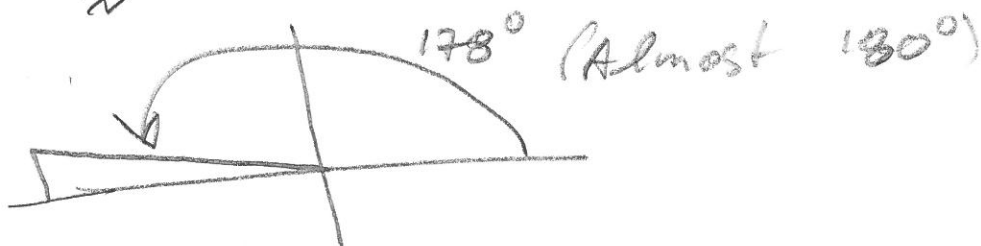
(1pt) pi r

(1pt) Ans.

(80)

$$\cot 178^\circ = \frac{1}{\tan 178^\circ} \approx \frac{1}{-0.03492076}$$

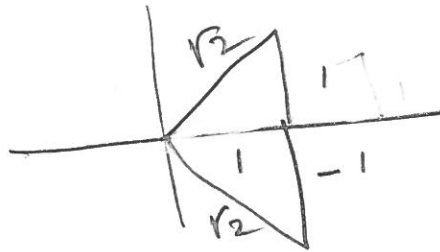
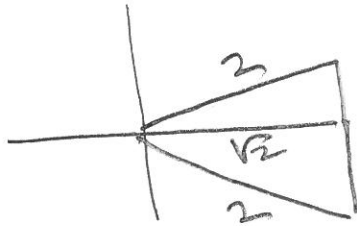
$$\approx -28.63625328 \approx \boxed{-28.6363 \approx \cot 178^\circ}$$



#s 92-96 Find 2 solns of each equation. Assume $\theta \in [0; 360^\circ] = [0, 2\pi)$

NO CALCULATOR!

(92) (a) $\cos \theta = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2}{2\sqrt{2}} = \frac{1}{\sqrt{2}}$
45-45 right!



$\theta = 45^\circ, 360^\circ - 45^\circ = 315^\circ$

#s 92, 93

$\theta \in \{45^\circ, 315^\circ\}$

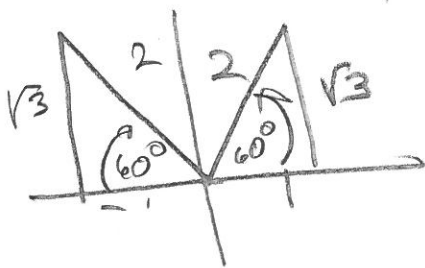
OR

$\theta \in \{\frac{\pi}{4}, \frac{7\pi}{4}\}$

1pt per
2pts results

(93) (a) $\csc \theta = \frac{2\sqrt{3}}{3} = \frac{2\sqrt{3}}{3} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2 \cdot 3}{3\sqrt{3}} = \frac{2}{\sqrt{3}}$

Aha! 30-60! $\Rightarrow \sin \theta = \frac{\sqrt{3}}{2}$



$\theta \in \{60^\circ, 120^\circ\}$

$= \{\frac{\pi}{3}, \frac{2\pi}{3}\}$

~~✗~~