Alg. 2 - BE WEDNESDAY 1-5-11

① SOLVE $\begin{cases} 3x - 4y = 13 \\ -2x + 5y = -4 \end{cases}$

$$3x - 4y = 13 \xrightarrow{(2)} 6x - 8y = 26$$
$$-2x + 5y = -4 \xrightarrow{(3)} -6x + 15y = -12$$

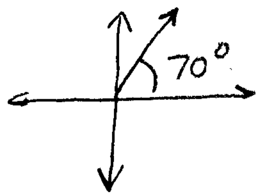
$$7y = 14$$
$$y = 2$$

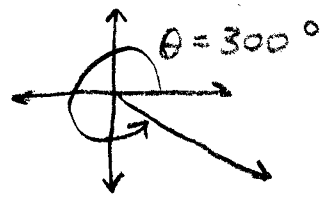
$$\therefore\ 3x - 4(2) = 13$$
$$3x = 21$$
$$x = 7$$

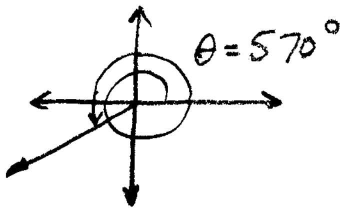
$$\boxed{(7, 2)}$$

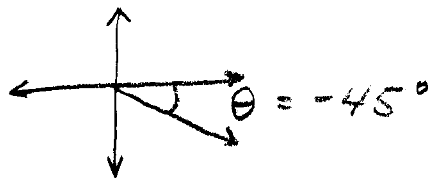
· Homework review → NEXT PG

Alg. 2 HW ⇒ Ch. 13-2 ⇒ Pg 712 # 4-7, 14, 15, 17

(4) 

(5) 

(6) 

(7) 

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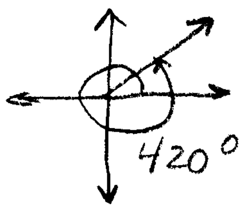
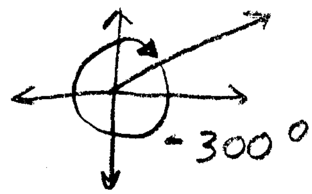
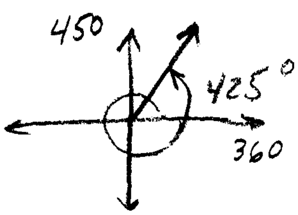
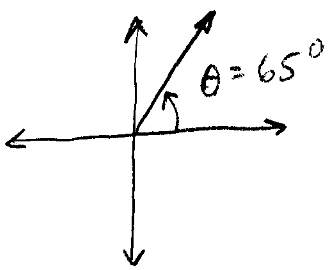
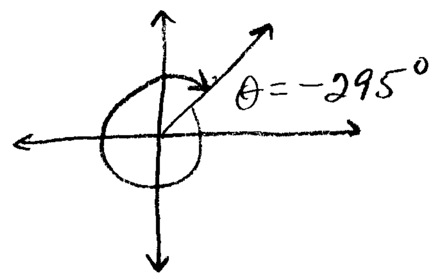
(14) 60° ⇒ 

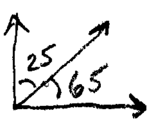
or 

(15) 425° ⇒





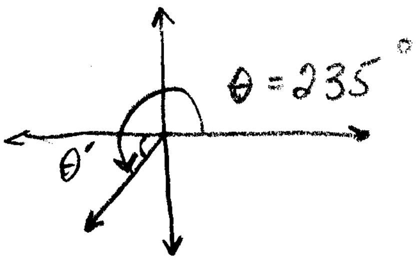
or 



(17) $\frac{315}{\cancel{360}_{15}} \cdot \cancel{24}^{1} = \boxed{21 \text{ hours}}$

Alg. 2 HW ⇒ Ch. 13-3 ⇒ Pg. 722 # 7, 9, 10

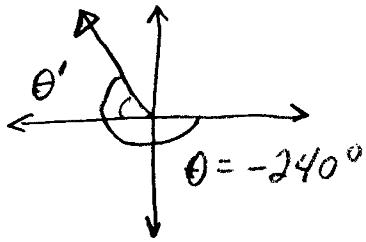
(7)



θ' = reference angle

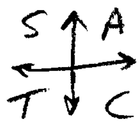
$$\theta' = \begin{array}{r} 235 \\ -180 \\ \hline \boxed{55^\circ} \end{array}$$

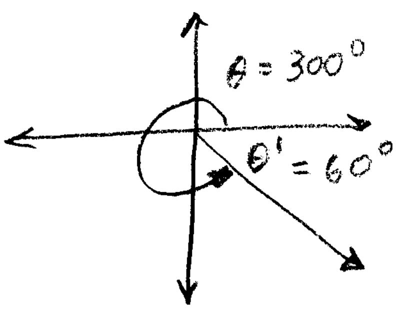
(9.)



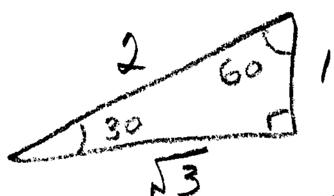
$$\theta' = \begin{array}{r} 240 \\ -180 \\ \hline \boxed{60^\circ} \end{array}$$

(10.) $\sin 300^\circ = ?$





$\therefore \sin 300^\circ = -\sin 60^\circ$



$\sin 60^\circ = \frac{\sqrt{3}}{2}$

$\therefore \boxed{\sin 300^\circ = -\frac{\sqrt{3}}{2}}$ EXACT

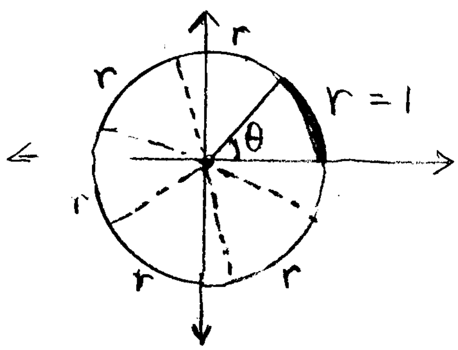
NOTE: $\sin 300^\circ = -.8660$ Approximate

ANOTHER WAY TO measure Angles, the "RADIAN"

Definition: Use a unit circle $\Rightarrow r = 1$

Since $C = 2\pi r \quad \Rightarrow C = 2\pi$

A radian is the angle formed by an arc length of 1 radius on the circumference of a circle.



$C = 2\pi$

$\therefore$ 2π radians $= 360^\circ$

$$1 \text{ radian} \approx \frac{360^\circ}{2\pi} \approx 57.29577951 \text{ degrees}$$

irrational (only approximate)

RADIANS ARE A MORE FUNDAMENTAL UNIT OF MEASURE SINCE THEY ARE made from A basic Property of circles.

Degrees are "arbitrary" $\Rightarrow$ lets $\div$ a $\odot$ into 360 parts.

To change from degrees to radians or radians to degrees, since

$360° = 2\pi$ radians

$$\Rightarrow \frac{360 \text{ deg.}}{2\pi \text{ radians}} = \boxed{\frac{180 \text{ deg}}{\pi \text{ radians}}} \text{ OR } \boxed{\frac{\pi \text{ radians}}{180 \text{ deg}}}$$

Ex Change $45°$ to radians

$$45 \text{ deg} \cdot \frac{\pi \text{ radians}}{180 \text{ deg}} = \boxed{\frac{\pi}{4} \text{ radians}}$$

NOTE: WHEN ANGLES ARE GIVEN WITH NO UNITS, THEY ARE UNDERSTOOD TO BE RADIANS.

Ex Change $\frac{\pi}{6}$ radians to deg.

$$\frac{\pi}{6} \text{ radians} \cdot \frac{180 \text{ deg}}{\pi \text{ radians}} = \frac{180}{6} = \boxed{30°}$$

Look at the circle on Pg. 711. You should learn the important angles in Quadrant I in radians. Some key angles.

$90^\circ = \frac{\pi}{2}$	$180^\circ = \pi$	$270^\circ = \frac{3\pi}{2}$	$360^\circ = 2\pi$
$45^\circ = \frac{\pi}{4}$			
$30^\circ = \frac{\pi}{6}$	$60^\circ = \frac{\pi}{3}$		

Ex Change 120° to radians

$$120 \text{ deg} \cdot \frac{\pi \text{ radians}}{180 \text{ deg}} = \frac{12\pi}{18} = \boxed{\frac{2\pi}{3}}$$

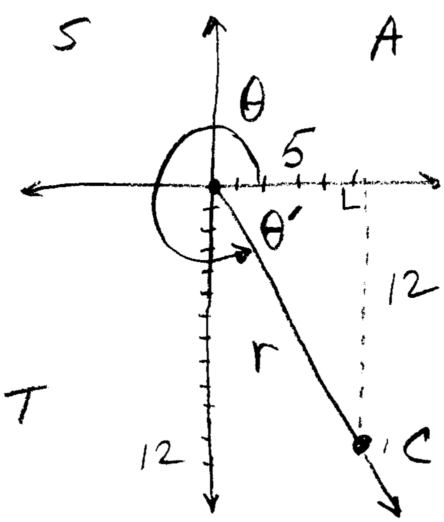
Ex Change -20° to radians

$$-20 \text{ deg} \cdot \frac{\pi \text{ radians}}{180 \text{ deg}} = \boxed{\frac{-\pi}{9}}$$

Ex Change $\frac{17\pi}{2}$ to deg

$$\frac{17\cancel{\pi}}{2} \cdot \frac{180 \text{ deg}}{\cancel{\pi} \text{ rad}} = 17 \cdot 90 = \boxed{1530^\circ}$$

Ex 1 Pg 717 Finding Trig. Function for any point $\Rightarrow$ find the exact value of the 6 trig. functions if the terminal side of θ contains the point $(5, -12)$



$r^2 = 5^2 + 12^2$

$r^2 = 25 + 144 = 169$

$r = 13$

$\Rightarrow$ Sin, Csc negative
Cos, Sec positive
Tan, Cot negative

$\sin\theta = \frac{-12}{13}$ $\qquad$ $\csc\theta = -\frac{13}{12}$

$\cos\theta = \frac{5}{13}$ $\qquad$ $\sec\theta = \frac{13}{5}$

$\tan\theta = \frac{-12}{5}$ $\qquad$ $\cot\theta = -\frac{5}{12}$

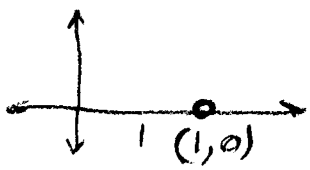
Quadrantal Angles

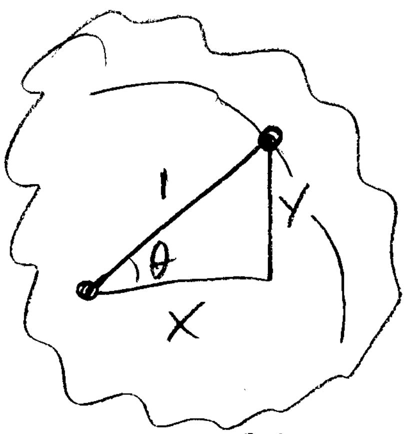
The terminal side of θ is on X or Y axis

$\Rightarrow \quad \theta = 0^\circ \quad \theta = 90^\circ \quad \theta = 180^\circ \quad \theta = 270^\circ$

$= 0$ radians $\quad = \frac{\pi}{2}$ radians $\quad = \pi$ radians $\quad = \frac{3\pi}{2}$ radians

$0^\circ \Rightarrow$





UNIT CIRCLE

$\sin(0) = \frac{Y}{1} = \frac{0}{1} = 0$

$\csc(0) = \frac{1}{0} =$ UNDEFINED

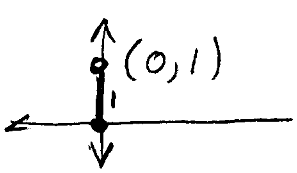
$\cos(0) = \frac{X}{1} = \frac{1}{1} = 1$

$\sec(0) = \frac{1}{1} = 1$

$\tan(0) = \frac{Y}{X} = \frac{0}{1} = 0$

$\cot(0) = \frac{1}{0} =$ UNDEFINED

$90^\circ \Rightarrow$

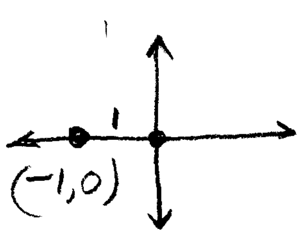


$\sin(90^\circ) = \frac{Y}{1} = \frac{1}{1} = 1$

$\cos(90^\circ) = \frac{X}{1} = \frac{0}{1} = 0$

$\tan(90^\circ) = \frac{Y}{X} = \frac{1}{0} =$ UNDEFINED

$180^\circ \Rightarrow$



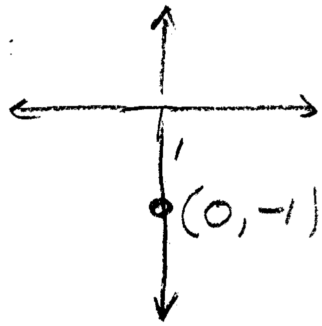
$\sin(180^\circ) = \frac{Y}{1} = \frac{0}{1} = 0$

$\cos(180^\circ) = \frac{X}{1} = \frac{-1}{1} = -1$

$\tan(180^\circ) = \frac{Y}{X} = \frac{0}{-1} = 0$

Ex 2
Pg 718

$270° \Rightarrow$



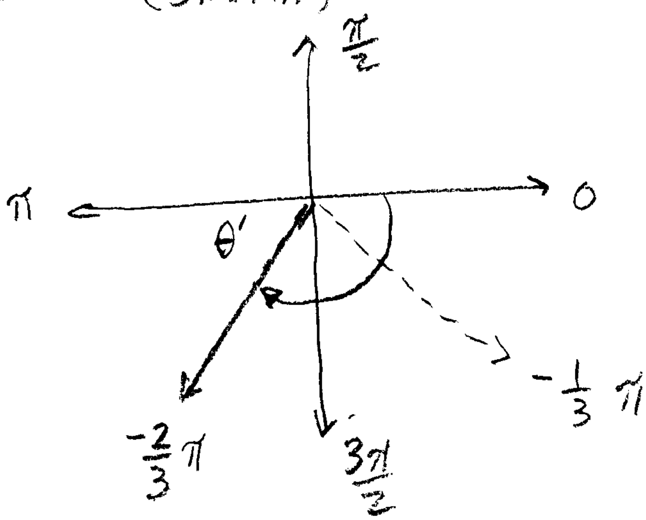
$\sin(270°) = \frac{y}{1} = \frac{-1}{1} = -1$

$\cos(270°) = \frac{x}{1} = \frac{0}{1} = 0$

$\tan(270°) = \frac{y}{x} = \frac{-1}{0} = \text{UNDEFINED}$

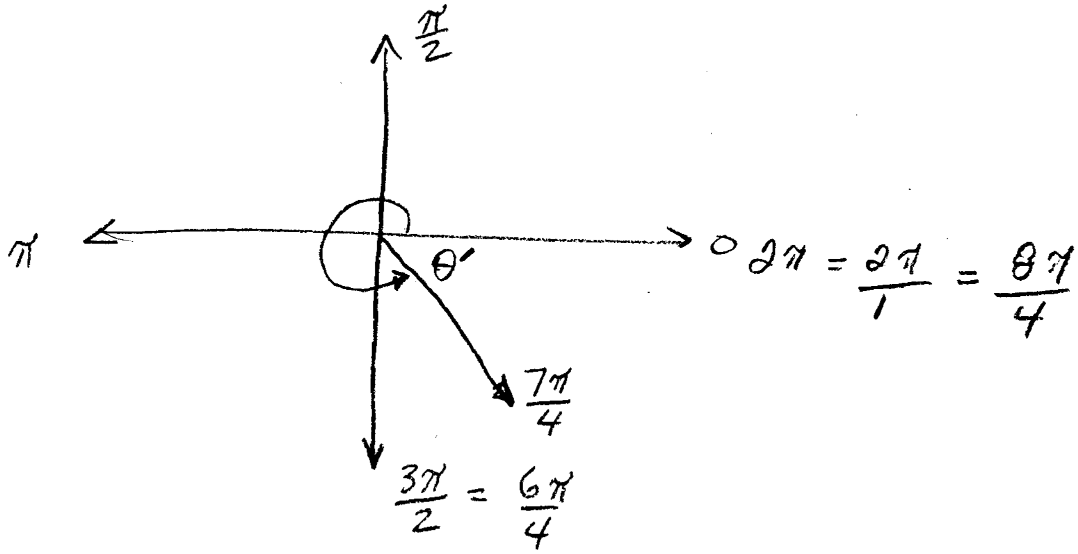
Ex 3b
Pg 719

FIND THE reference angle to $-\frac{2}{3}\pi$ (SKETCH)



$\theta' = \pi - \frac{2}{3}\pi = \frac{1}{3}\pi$ or $\boxed{\frac{\pi}{3}}$

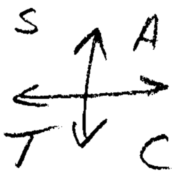
FIND THE EXACT VALUE OF $\cot \frac{7\pi}{4}$



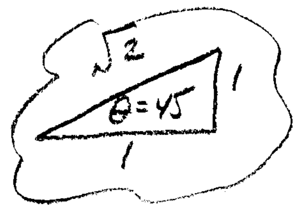
$$\therefore \theta' = \frac{8\pi}{4} - \frac{7\pi}{4} = \frac{\pi}{4}$$

$$\frac{\pi}{4} \cdot \frac{180^\circ}{\pi} = 45^\circ = \theta'$$

SINCE



THE TAN & COT ARE NEGATIVE IN QUADRANT $\underline{IV}$



$$\boxed{\cot\left(\frac{7\pi}{4}\right) = -1}$$

HOMEWORK: Pg. 713 # 27-31, 49, 56, 57

Pg 722 # 8, 11 to 13, 20