

Alg. 2 - BE WEDNESDAY 1-6-10

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

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

$$7y = 14$$

$$\boxed{y = 2}$$

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

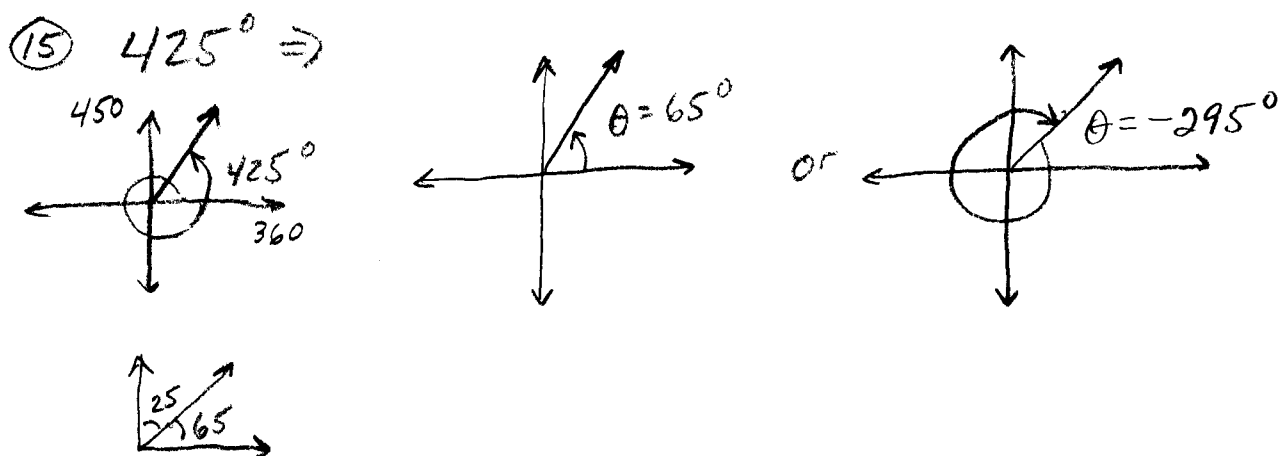
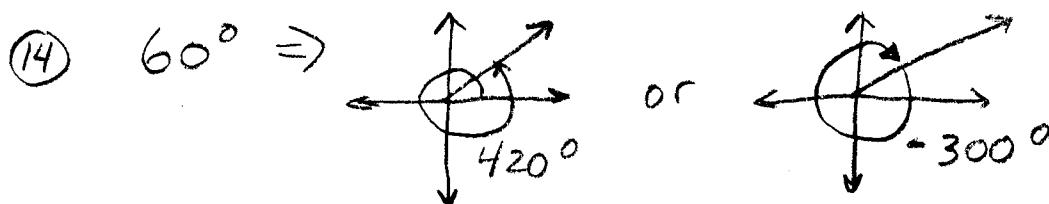
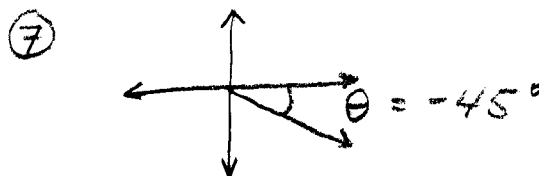
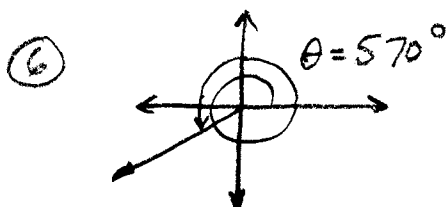
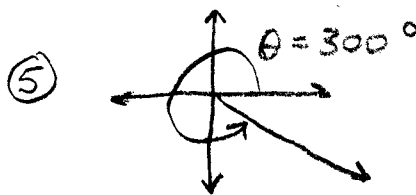
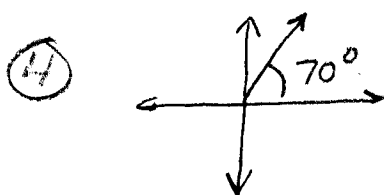
$$3x = 21$$

$$\boxed{x = 7}$$

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

- Homework review $\rightarrow$ next 09

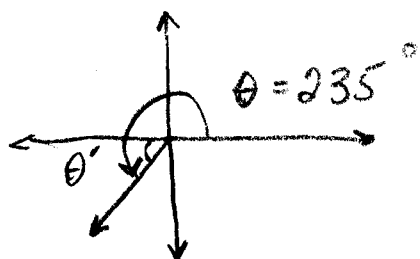
Alg. 2 HW $\Rightarrow$ Ch. 13-2 $\Rightarrow$ Pg 712 #4-7, 14, 15, 17



⑰ $\frac{315}{360} \cdot 24 = \boxed{21 \text{ hours}}$

Alg. 2 HW $\Rightarrow$ Ch. 13-3 $\Rightarrow$ Pg. 722 # 7, 9, 10

7.



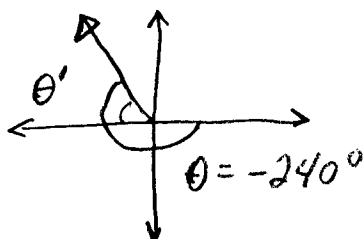
$\theta' = \text{reference angle}$

$$\theta' = 235$$

$$-180$$

$$\boxed{55^\circ}$$

9.



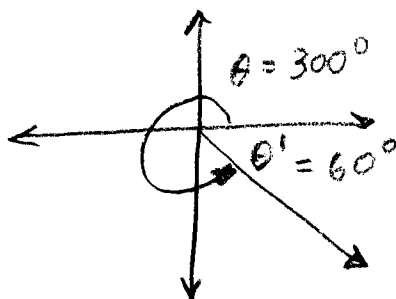
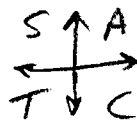
$$\theta' = 240$$

$$-180$$

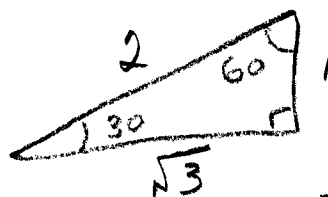
$$\boxed{60^\circ}$$

10.

$$\sin 300^\circ = ?$$



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



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

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

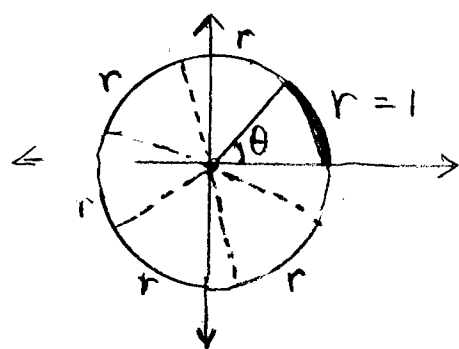
NOTE: $\sin 300^\circ = -0.8660$ APPROXIMATE

ANOTHER way TO measure angles, the "RADIAN"

DEFINITION: Use A unit circle $\Rightarrow r = 1$

$$\text{Since } C = 2\pi r \quad \Rightarrow C = 2\pi$$

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



$$C = 2\pi$$

$$\therefore 2\pi \text{ radians} = 360^\circ$$

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

↑
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

$$360^\circ = 2\pi \text{ radians}$$

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

(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.

$$\frac{\pi}{6} \text{ radians} \cdot \frac{180 \text{ deg.}}{\pi \text{ radians}} = \frac{180}{6} = \boxed{30^\circ}$$

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

$$\left(90^\circ = \frac{\pi}{2} \right) \mid 180^\circ = \pi \mid 270^\circ = \frac{3\pi}{2} \mid 360^\circ = 2\pi$$

$$45^\circ = \frac{\pi}{4}$$

$$30^\circ = \frac{\pi}{6}$$

$$60^\circ = \frac{\pi}{3}$$

(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

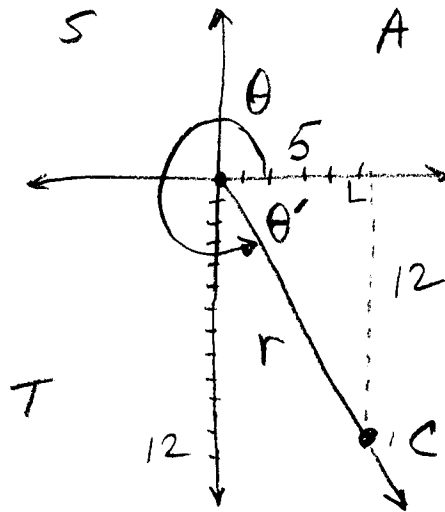
$$-20 \text{ deg} \cdot \frac{\pi \text{ radians}}{180 \text{ deg}} = \boxed{-\frac{\pi}{9}}$$

(EX) Change $\frac{17\pi}{2}$ to deg

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

Ext
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

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

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

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

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

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

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

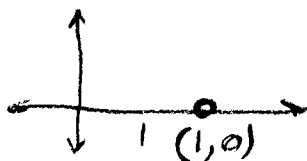
QUADRANTAL Angles

The terminal side of θ is on X or Y Axis

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

$$= 0 \text{ RADIANS} \quad = \frac{\pi}{2} \text{ RADIANS} \quad = \pi \text{ RADIANS} \quad = \frac{3\pi}{2} \text{ RADIANS}$$

$$0^\circ \Rightarrow$$



$$\sin(0) = \frac{y}{r} = \frac{0}{1} = 0$$

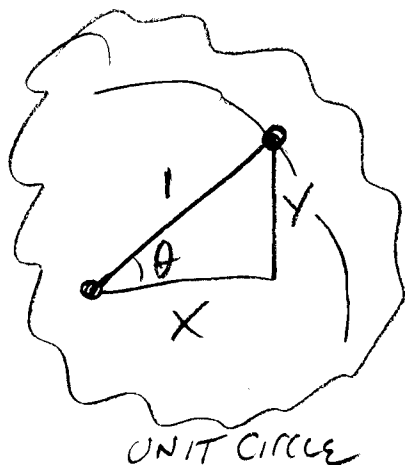
$$\csc(0) = \frac{1}{0} = \text{UNDEFINED}$$

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

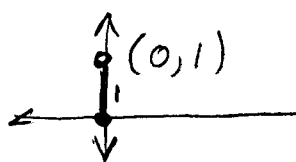
$$\sec(0) = \frac{1}{1} = 1$$

$$\tan(0) = \frac{y}{x} = \frac{0}{1} = 0$$

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



$$90^\circ \Rightarrow$$

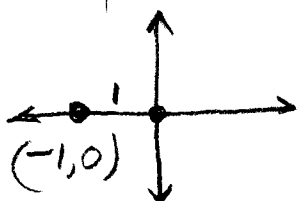


$$\sin(90^\circ) = \frac{y}{r} = \frac{1}{1} = 1$$

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

$$\tan(90^\circ) = \frac{y}{x} = \frac{1}{0} = \text{UNDEFINED}$$

$$180^\circ \Rightarrow$$



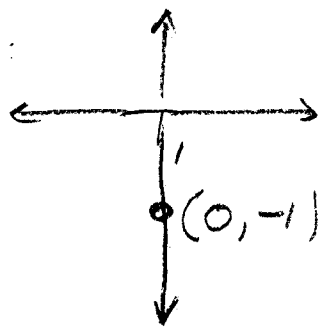
$$\sin(180^\circ) = \frac{y}{r} = \frac{0}{1} = 0$$

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

$$\tan(180^\circ) = \frac{y}{x} = \frac{0}{-1} = 0$$

EX 2
PS 718

$270^\circ \Rightarrow$



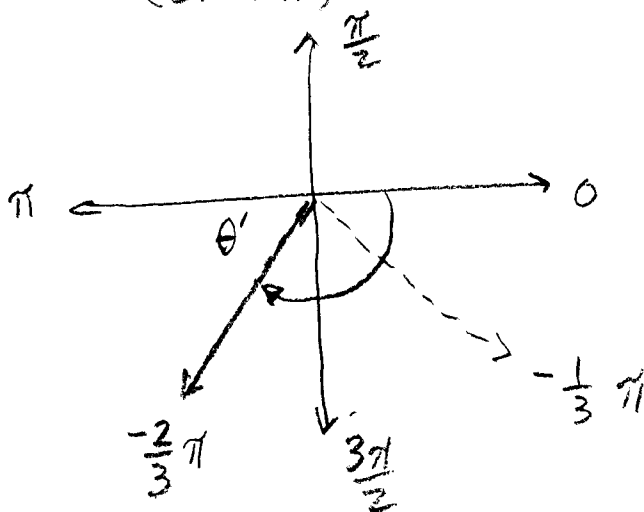
$$\sin(270^\circ) = \frac{y}{r} = \frac{-1}{1} = -1$$

$$\cos(270^\circ) = \frac{x}{r} = \frac{0}{1} = 0$$

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

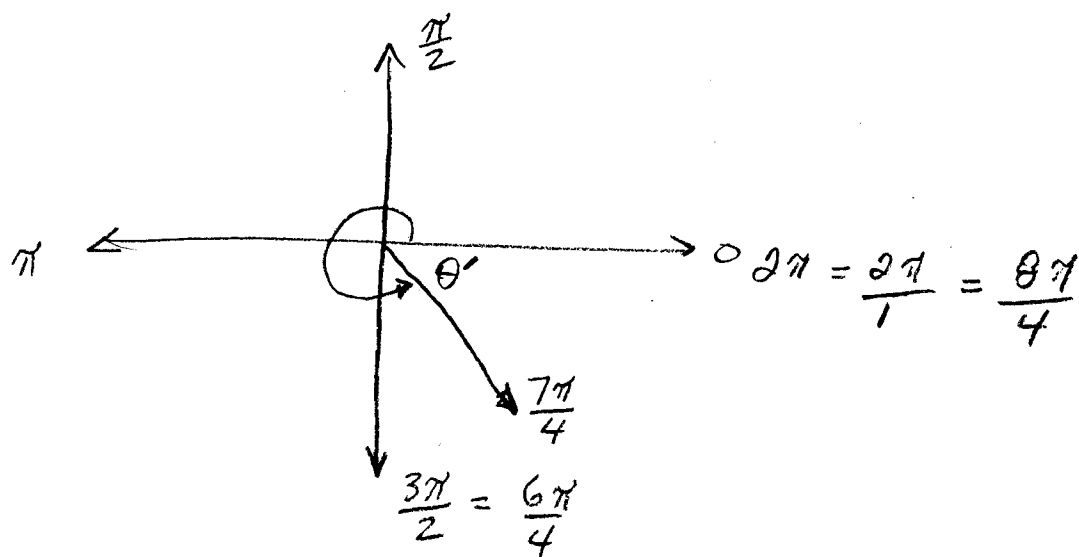
EX 3b
PS 719

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



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

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



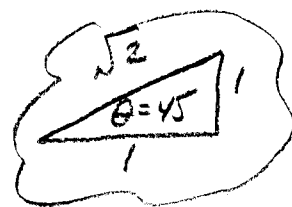
$$\therefore \theta' = \frac{8\pi}{4} - \frac{7\pi}{4} = \frac{\pi}{4}$$

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

SINCE $\begin{matrix} S & \uparrow & A \\ \leftarrow & & \rightarrow \\ T & \downarrow & C \end{matrix}$ THE TAN & COT ARE

NEGATIVE IN QUADRANT 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