Unit Review...

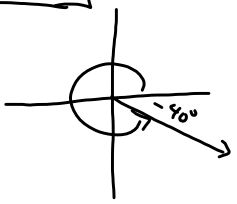
What topics have we covered??

→ Radians ↔ Degrees

→ Calculations: $\theta = \frac{a}{r}$ Must be Radians

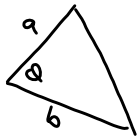
→ Principal Angles

→ Co-terminal Angles

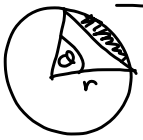


→ Formula:

Triangle: $A = \frac{1}{2}ab\sin\theta$



Sector: Degrees $A = \left(\frac{\theta}{360}\right)\pi r^2$ OR Radians $A = \frac{\theta r^2}{2}$

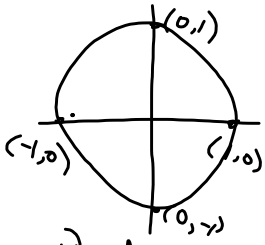


Segment: $A_{Seg.} = A_{Sector} - A_{Triangle}$

Angular Velocity $V_A = \frac{\theta}{t}$

Trigonometry of Rotation Angles

⇒ Special Angles in Radians



$\left(\frac{\pi}{6}\right)$ 30° ⇒ $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$\left(\frac{\pi}{3}\right)$ 60° ⇒ $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\left(\frac{\pi}{4}\right)$ 45° ⇒ $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

Quadrantals

Trig. Equations

→ Linear

→ Quadratic

→ Ugly Linear!!

Review:

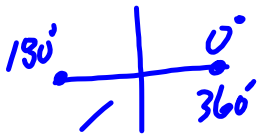
Pg. 215

#1, 2, 3, 4, 5, 6, 12, 13, 14, 15, 16, 18, 20, 21, 23

Pg. 218

#1, 2, 3, 5, 6, 12, 13, 15, 16

Review...



$3\sin\theta(2\sin\theta-1)=0$

$\frac{3\sin\theta}{3}=\frac{0}{3}$ or $\sin\theta=\frac{1}{2}$ $(\pi,\frac{1}{2})$

$\sin\theta=0$ Ref $\frac{\pi}{6}$, 1, 2

$\theta=30°, 150°$

Solve: $6\sin^2\theta-3\sin\theta=0$, $0\le\theta\le360°$

[A] $0°, 30°, 180°, 330°, 360°$

[B] $0°, 30°, 180°, 150°, 360°$

[C] $30°, 90°, 120°, 270°$

[D] $0°, 180°, 210°, 330°, 360°$

If $\csc\theta<0$ and $\tan\theta>0$, then which of the following could be a possible measure of angle θ?

[A] $\frac{11\pi}{6}$ Q4

[B] $\frac{4\pi}{3}$ Q3

[C] $\frac{3\pi}{4}$ Q2

[D] $\frac{\pi}{2}$

What is the principal angle of $-\frac{25\pi}{4}$?

[A] $\frac{3\pi}{4}$

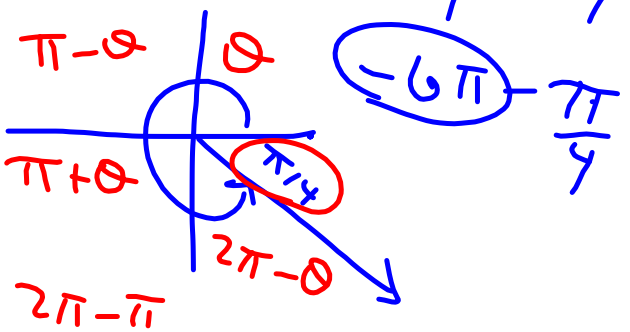
[B] $\frac{\pi}{4}$

[C] $-\frac{\pi}{4}$

[D] $\frac{7\pi}{4}$

$-\frac{25\pi}{4}=-\frac{24\pi}{4}-\frac{\pi}{4}$

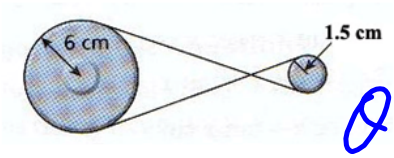
-6π $-\frac{\pi}{4}$



$2\pi-\frac{\pi}{4}$

$=\frac{7\pi}{4}$

If the belt in the pulley system below travels 30 cm, what is the angle of rotation of the smaller pulley?



[A] $\frac{\pi}{9}$ radians [B] 20°

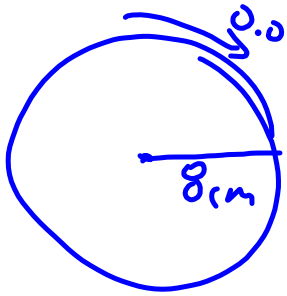
[C] 20 radians [D] 5°

$\theta = \frac{a}{r}$

$\theta = \frac{30cm}{1.5cm} = 20\ Rad$

Nibbles the hamster is running at 0.02 m/s on an exercise wheel of radius 8 cm. What is the angular velocity of this wheel?

[A] 0.15 rad/minute [B] 240 rad/minute [C] 0.25 rad/minute [D] 15 radians/minute



$\theta = \frac{a}{r}$

$\theta = \frac{0.02\ m}{0.08\ m}$

$\theta = 0.25\ Rad$

$V_A = \frac{\theta}{t}$

$V_A = \frac{0.25\ Rad}{Sec}$

$= 0.25 \frac{Rad}{s} \times \frac{60s}{1\ Min}$

$-2\pi \le \theta \le 4\pi$

Solve: $2(1-\sin\theta)^2 + \sin\theta = 2(3-4\sin^2\theta)$, ~~$-360° \le \theta \le 720°$~~

$2(1-2\sin\theta+\sin^2\theta)+\sin\theta = 6-8\sin^2\theta$

$2-4\sin\theta+2\sin^2\theta+\sin\theta = 6-8\sin^2\theta$

$10\sin^2\theta - 3\sin\theta - 4 = 0$ (−40)

$10\sin^2\theta - 8\sin\theta + 5\sin\theta - 4 = 0$

$2\sin\theta(5\sin\theta-4)+1(5\sin\theta-4)=0$

$(5\sin\theta-4)(2\sin\theta+1)=0$ . . . $-2\pi \le \theta \le 4\pi$

$\sin\theta = \frac{4}{5}$ (Ref $\measuredangle$ 0.93, Q1,2)

$\sin\theta = -\frac{1}{2}$ (Ref $\measuredangle$ $\pi/6$, Q3,4)

$\pi-\theta$	θ
$\pi+\theta$	$2\pi-\theta$

$\theta = 0.93, 2.21, 8.49, 7.21$

$-5.35, -4.07$

$\theta = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{19\pi}{6}, \frac{23\pi}{6}$

$-\frac{5\pi}{6}, -\frac{\pi}{6}$

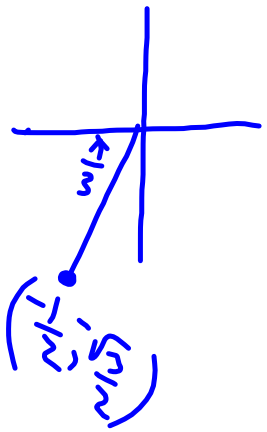
5. Evaluate the following expression without using a calculator: (***Sketch must be provided for each angle***) [12]

$$\sin\left(-\frac{2\pi}{3}\right)\sec\left(\frac{107\pi}{6}\right)-5\cos(-33\pi)-2\csc^2\left(\frac{19\pi}{4}\right)+\cot\left(\frac{37\pi}{2}\right)$$

$\frac{-2\pi}{3}$

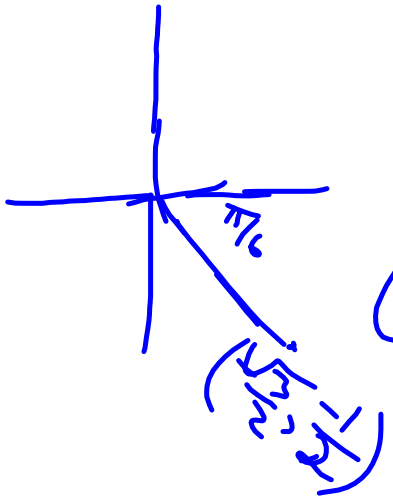
$= -\frac{3\pi}{3} + \frac{\pi}{3}$

$-1\pi + \frac{\pi}{3}$

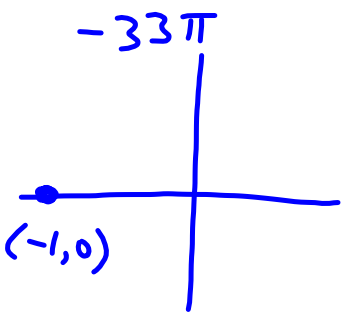


$\frac{108\pi}{6} - \frac{\pi}{6}$

$18\pi - \frac{\pi}{6}$

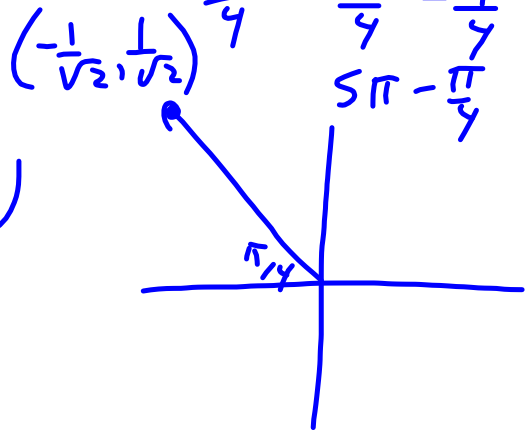


-33π



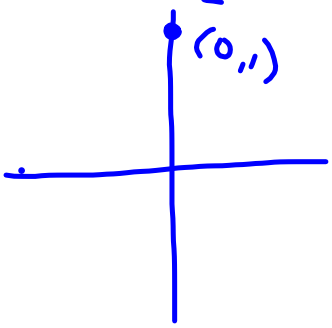
$\frac{19\pi}{4} = \frac{20\pi}{4} - \frac{\pi}{4}$

$5\pi - \frac{\pi}{4}$



$\frac{38\pi}{2} - \frac{\pi}{2}$

$19\pi - \frac{\pi}{2}$



$= \left(-\frac{\sqrt{3}}{2}\right)\left(\frac{2}{\sqrt{3}}\right) - 5(-1) - 2(\sqrt{2})^2 - 0$

$= -1 + 5 - 2(2) - 0$

$= -1 + 5 - 4 - 0$

$= 0$

$$-2.5 = 4\sin\left(\frac{\pi}{6}(t-3)\right) - 1$$

$$\frac{-2.5+1}{4} = \frac{4\sin\left[\frac{\pi}{6}(t-3)\right]}{4}$$

$$-0.375 = \sin\left[\frac{\pi}{6}(t-3)\right]$$

$$\sin^{-1}(-0.375) = \sin^{-1}\left(\sin\left[\frac{\pi}{6}(t-3)\right]\right)$$

$$\sin^{-1}(-0.375) = \frac{\pi}{6}(t-3)$$

(Ref ± 0.38, Q3, 4)

Q3 $\pi+0$ $2\pi-0$ Q4

(6) $3.52 = \frac{\pi}{6}(t-3)(6)$

$$\frac{6(3.52)}{\pi} = \frac{\pi(t-3)}{\pi}$$

$$\frac{6(3.52)}{\pi} = t-3$$

$$\frac{6(3.52)}{\pi} + 3 = t$$

$t = 9.72$

$$5.90 = \frac{\pi}{6}(t-3)\left(\frac{6}{\pi}\right)$$

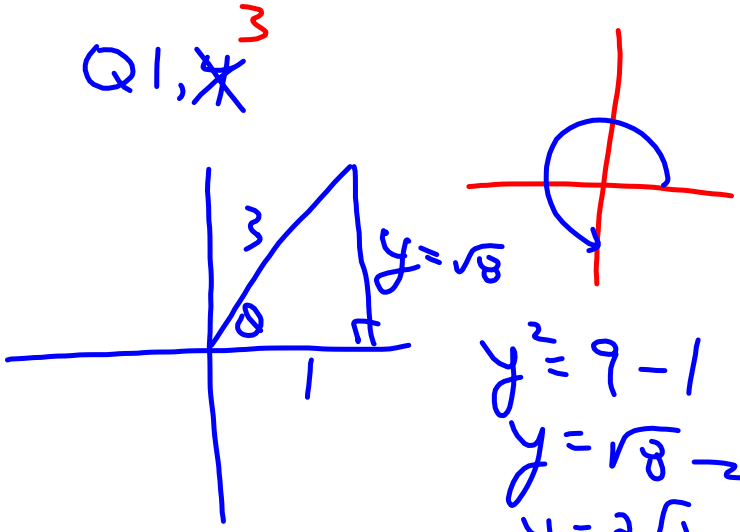
$$\frac{5.90(6)}{\pi} = t-3$$

$$\frac{5.90(6)}{\pi} + 3 = t$$

$t = 14.27$

12. $\cos\theta = \frac{1}{3}$ ④ $0^\circ \leq \theta \leq 270^\circ$

Q1, ~~4~~



$y^2 = 9 - 1$

$y = \sqrt{8} \rightarrow \sqrt{4 \times 2}$

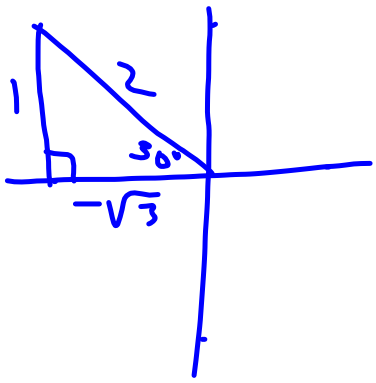
$y = 2\sqrt{2}$ $2\sqrt{2}$

$\sec\theta = 3$

$\sin\theta = \frac{2\sqrt{2}}{3}$ $\csc\theta = \frac{3}{2\sqrt{2}}$

$\tan\theta = \frac{2\sqrt{2}}{1}$ $\cot\theta = \frac{1}{2\sqrt{2}}$

$\sec(-210°) = -\frac{2}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)$



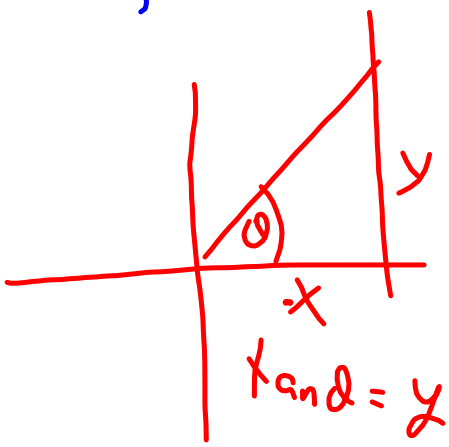
$= -\frac{2\sqrt{3}}{3}$

14 d) $\csc\theta = 9.5$ $\quad -270° \leq \theta \leq 90°$

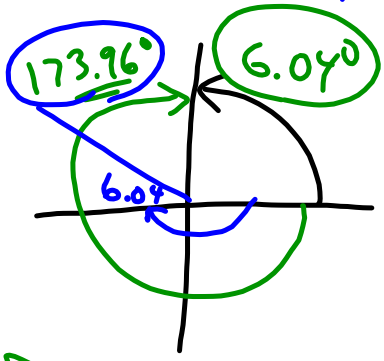
(Ref $\angle$ 6.04, Q1,2)

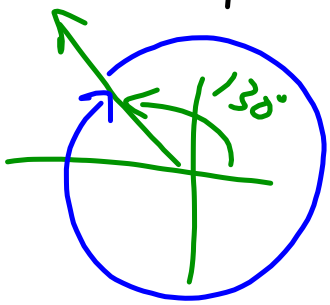
Q1

$\theta = 6.04, -186.04°$



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





$-360°$

Attachments

Worksheet - Sketching Angles in Radians.doc