

# Trigonometric Functions

Sol<sup>n</sup>

## Review Practice

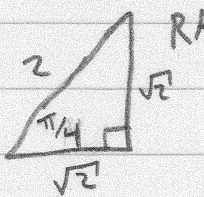
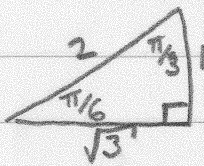
$$\begin{aligned} 1a) \quad \frac{5\pi}{6} &= \frac{5\pi}{6} \times \frac{180^\circ}{\pi} \\ &= \frac{900^\circ}{6} \\ &= 150^\circ \end{aligned}$$

$$\begin{aligned} b) \quad \frac{9\pi}{4} &= \frac{9\pi}{4} \times \frac{180^\circ}{\pi} \\ &= \frac{1620^\circ}{4} \\ &= 405^\circ \end{aligned}$$

$$\begin{aligned} 2a) \quad 315^\circ &= 315^\circ \times \frac{\pi}{180^\circ} \\ &= \frac{315\pi}{180} \\ &= \frac{7\pi}{4} \end{aligned}$$

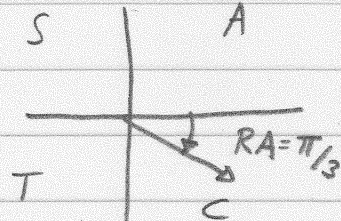
$$\begin{aligned} b) \quad -90^\circ &= -90^\circ \times \frac{\pi}{180^\circ} \\ &= -\frac{90\pi}{180} \\ &= -\frac{\pi}{2} \end{aligned}$$

$$3. a) \quad \sin\left(\frac{7\pi}{6}\right)$$



$$\begin{aligned} & \begin{array}{c} S \\ | \\ A \\ \hline T \\ | \\ C \end{array} \\ & \text{RA} = \pi/6 \\ & = -\sin(\pi/6) \\ & = -\frac{1}{2} \end{aligned}$$

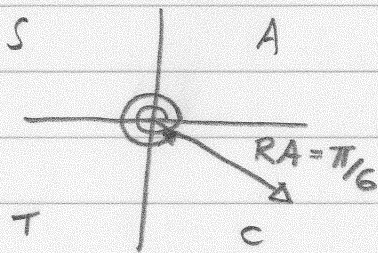
$$b) \quad \cos\left(-\frac{\pi}{3}\right)$$



$$\begin{aligned} & \begin{array}{c} S \\ | \\ A \\ \hline T \\ | \\ C \end{array} \\ & \text{RA} = \pi/3 \\ & = \cos(\pi/3) \\ & = \frac{1}{2} \end{aligned}$$

\*

$$c) \tan\left(\frac{23\pi}{6}\right)$$



$$= -\tan\left(\frac{\pi}{6}\right)$$

$$= -\frac{1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}}$$

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

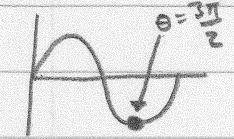
$$d) \cot\left(\frac{3\pi}{2}\right)$$

$$= \frac{\cos\left(\frac{3\pi}{2}\right)}{\sin\left(\frac{3\pi}{2}\right)}$$

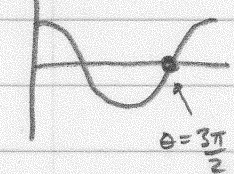
$$= \frac{0}{-1}$$

$$= \emptyset$$

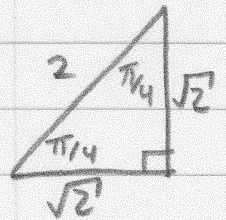
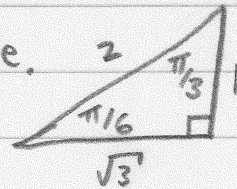
$$y = \sin \theta$$



$$y = \cos \theta$$

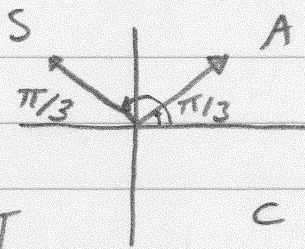


4. Use exact values if possible.



$$a) \sin \theta = \frac{\sqrt{3}}{2}$$

$$R.A. = \frac{\pi}{3}$$

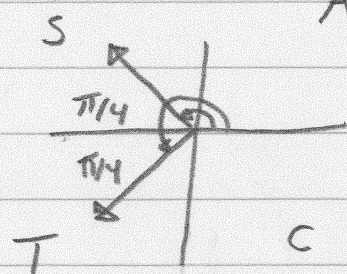


$$\theta_1 = \frac{\pi}{3}$$

$$\theta_2 = \pi - \frac{\pi}{3} = \frac{2\pi}{3}$$

$$b) \cos \theta = -\frac{\sqrt{2}}{2}$$

$$R.A. = \frac{\pi}{4}$$

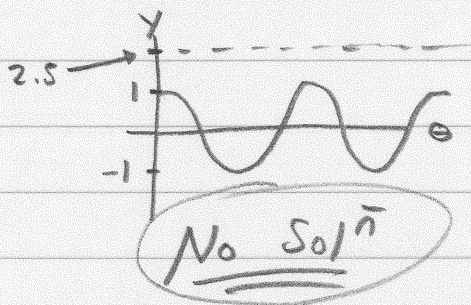


$$\theta_1 = \pi - \frac{\pi}{4} = \frac{3\pi}{4}$$

$$\theta_2 = \pi + \frac{\pi}{4} = \frac{5\pi}{4}$$

5a)  $\cos \theta = 2.5$

$y = \cos \theta$   
 set  $y = 2.5$  &  
 solve for  $\theta$

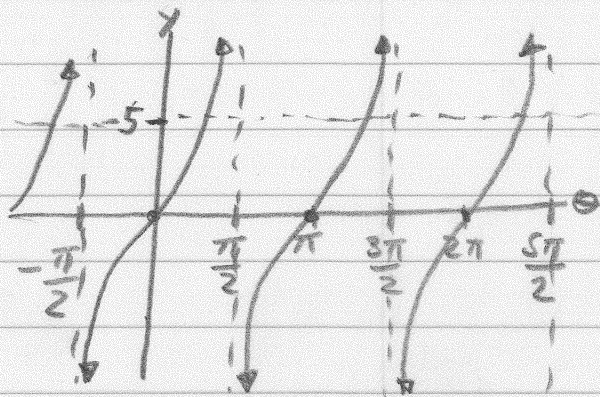


Also...  $\cos \theta = \frac{x}{r}$ ...

For  $\frac{x}{r} = 2.5$ ,  
 $x$  would have to  
 be greater than  
 $r$ ... not possible.

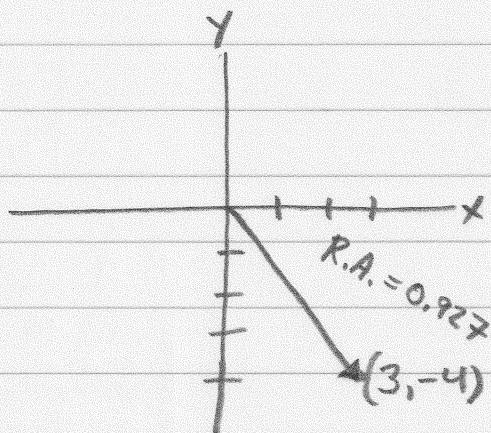
b)  $\tan \theta = 5$

$y = \tan \theta$   
 set  $y = 5$  and  
 solve for  $\theta$



@  $y = 5$ , there are  
 an infinite number  
 of solutions for  $\theta$

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

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

$\theta = \tan^{-1}\left(\frac{-4}{3}\right)$

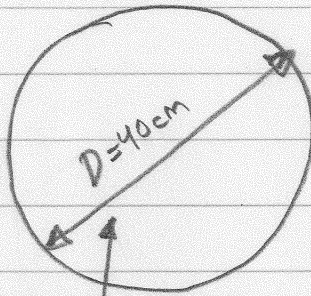
$\theta \approx -0.927$

but  $0 \leq \theta < 2\pi$

so...  $\theta = 2\pi - 0.927$

$\approx 5.356$

7.



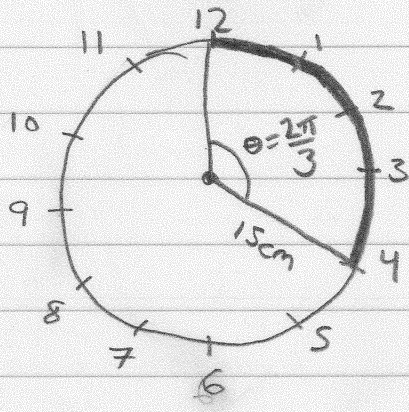
Diameter is irrelevant.

$$\omega = \frac{\Delta\theta}{\Delta t}$$

$$= \frac{20 (2\pi \text{ rads})}{1 \text{ second}}$$

$$= 40\pi \text{ rads/s}$$

8.



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

$$\frac{2\pi}{3} = \frac{a}{15\text{cm}}$$

$$\frac{3a}{3} = \frac{30\pi}{3}$$

$$a = 10\pi \text{ cm} \text{ or } \approx 31.4 \text{ cm}$$