

Sample Questions Set 16

1. $\cos(x) = \frac{1}{2}$ $0 < x < 2\pi$

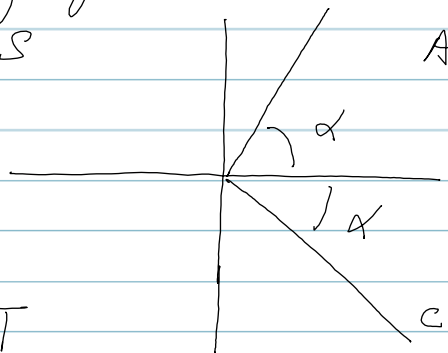
Notes: (1) Reference angle

(2) Unit definition of Trig functions.

Eg, $\cos(x) = \frac{1}{2} > 0$
 $= + \cos \alpha$

$$\cos \alpha = \frac{1}{2}$$

$$\Rightarrow \alpha = \dots$$



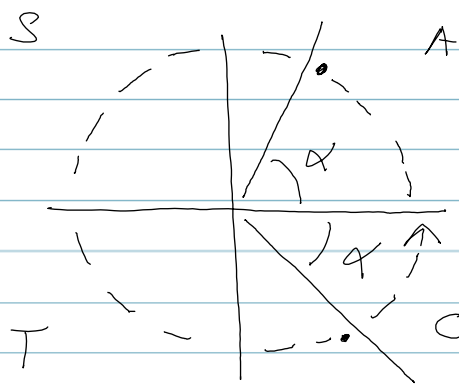
$$\cos(x) = \frac{1}{2} > 0 \quad 0 < x < 2\pi$$
$$= + \cos \alpha$$

$$\cos \alpha = \frac{1}{2} \Rightarrow \alpha = \frac{\pi}{3}$$

$$\underline{0 < x < 2\pi}$$

$$x = \frac{\pi}{3}, \quad 2\pi - \frac{\pi}{3}$$

$$= \frac{\pi}{3}, \quad \frac{5\pi}{3}$$



$$2. \quad \cos(x) = -\frac{1}{2} < 0 \quad 0 < x < 3\pi$$
$$\quad \quad \quad = -\cos(\alpha)$$

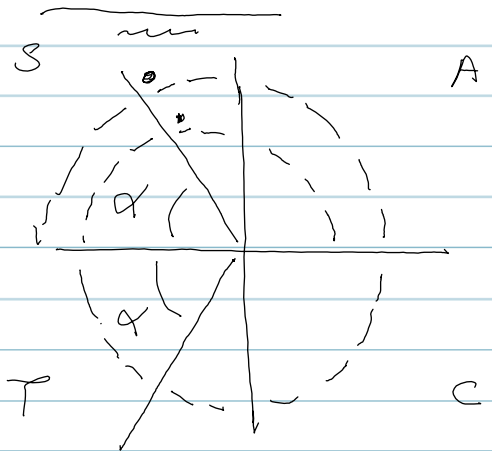
$$\cos \alpha = \frac{1}{2} \Rightarrow \alpha = \frac{\pi}{3}$$

$$0 < x < 3\pi$$

$$x = \pi - \frac{\pi}{3}, \quad \pi + \frac{\pi}{3}$$

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

$$= \frac{2}{3}\pi, \quad \frac{4}{3}\pi, \quad \frac{8}{3}\pi$$



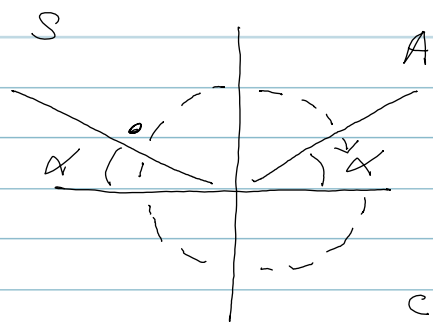
3. $\csc x = 2$ $-2\pi \leq x \leq 2\pi$
(positive and negative values)
 $\frac{1}{\sin x} = 2 \Rightarrow \sin x = \frac{1}{2} \leftarrow$

• $\sin x = \frac{1}{2} > 0$ $-2\pi \leq x \leq 0$
 $= +\sin \alpha$

$\Rightarrow \alpha = \pi/6$

$-2\pi \leq x \leq 0$
(clockwise direction)

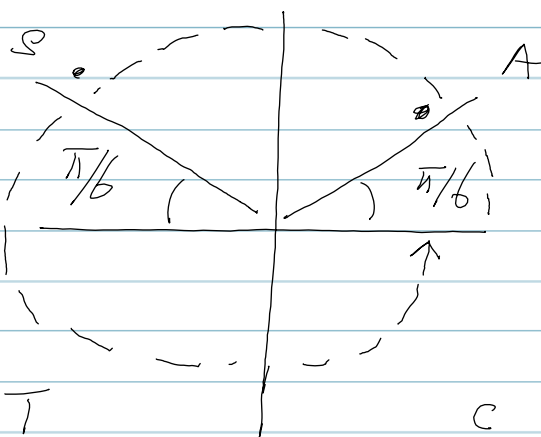
$x = -\pi - \frac{\pi}{6}, -2\pi + \frac{\pi}{6}$
 $= -\frac{7}{6}\pi, -\frac{11}{6}\pi$



• $\sin x = \frac{1}{2}$ $0 \leq x \leq 2\pi$

$0 \leq x \leq 2\pi$
(counter-clockwise)

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



$x = -\frac{11}{6}\pi, -\frac{7}{6}\pi, \frac{1}{6}\pi, \frac{5}{6}\pi$