Friday, May 1, 2026 11:28 AM

Final Exam Tues 5/5 @ 8am

LD136

Supplementary $\Rightarrow$ Add to 180°

2a $\begin{cases} \alpha + \beta = 180^\circ & (1) \\ \alpha = \beta + 18^\circ & (2) \end{cases}$

$$\beta + 18^\circ + \beta = 180^\circ$$

$$2\beta + 18^\circ = 180^\circ$$

$$2\beta = 162^\circ$$

$$\beta = 81^\circ$$

$$\alpha = \beta + 18^\circ$$

$$= 81^\circ + 18^\circ = 99^\circ$$

3a $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \theta$

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

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

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

3d $\tan^{-1}(-1) = \theta$

$-1 = \tan\theta$

$\theta = -\frac{\pi}{4}$

$\tan^{-1}$ is defined on $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

3f $\tan^{-1}\Big(\underbrace{\sin\left(\tfrac{\pi}{6}\right)}_{1/2}\Big) = \tan^{-1}\left(\frac{1}{2}\right) = \theta$

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

θ isn't an exact value

$\theta \approx \tan^{-1}\left(\frac{1}{2}\right)$

3h $\cos\Big(\underbrace{\sin^{-1}\left(\tfrac{\sqrt{3}}{2}\right)}_{\theta}\Big)$

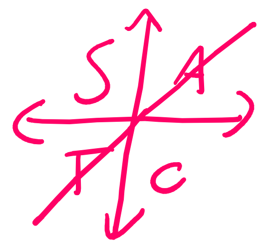
θ

$\sin\theta = \frac{\sqrt{3}}{2} \Rightarrow \theta = \frac{\pi}{3}$

$= \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$

4a $\tan(\theta) = \sqrt{3}$

$\theta = \frac{\pi}{3} + \pi n$

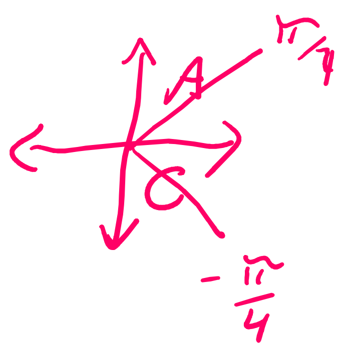


where n is a integer

4b $\cos\theta = \frac{\sqrt{2}}{2}$

$\theta_1 = \frac{\pi}{4} + 2\pi n$

$\theta_2 = -\frac{\pi}{4} + 2\pi n$



4d $\sec(x) - \frac{1}{2} = 0$

$\sec(x) = \frac{1}{2}$

$\frac{1}{\cos(x)} = \frac{1}{2}$

$$\frac{1}{\cos(x)} = \frac{1}{2}$$

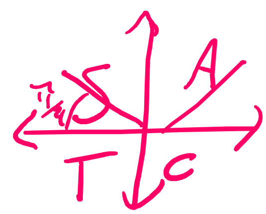
$$\cos(x) = 2$$

No solution b/c
cosine is defined $[-1, 1]$

4h-j Isolate the trig function.

4h $$\frac{2\sin\left(\frac{x}{5}\right)}{2} = \frac{\sqrt{2}}{2}$$

$$\sin\underbrace{\left(\frac{x}{5}\right)}_{\theta} = \frac{\sqrt{2}}{2}$$



$$\begin{cases} \frac{x}{5} = \theta_1 = \frac{\pi}{4} + 2\pi n \\ \frac{x}{5} = \theta_2 = \frac{3\pi}{4} + 2\pi n \end{cases}$$

$$\begin{cases} x = \frac{5\pi}{4} + 10\pi n \\ x = \frac{15\pi}{4} + 10\pi n \end{cases}$$

$\frac{8\pi}{4}$

Answer need to be in $[0, 2\pi)$

$x = 5\pi, 10\pi n$

$x = \frac{5\pi}{4} + 10\pi n$

Final Answer $x = \frac{5\pi}{4}$ ✓

$x = \frac{15\pi}{4} + 10\pi n$

Final Answer

$x = \frac{15\pi}{4} - \frac{8\pi}{4} = \frac{7\pi}{4}$

$\sin^2\theta + \cos^2\theta = 1$

4 m $\cos^2(x)\left[\cos(x)+1\right] + \sin^2(x)\left[\cos(x)+1\right] = 0$

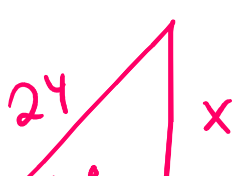
$$\underbrace{\left(\cos^2(x)+\sin^2(x)\right)}_{1}\left[\cos(x)+1\right] = 0$$

$\cos(x) + 1 = 0$

$\cos(x) = -1$

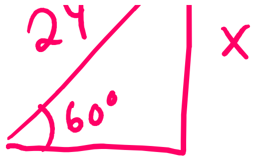
$x = \pi$

5a



$\sin(60^\circ) = \frac{x}{24}$

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



$$\frac{\sqrt{3}}{2} = \frac{x}{24}$$

$$\frac{24\sqrt{3}}{2} = x$$

$$12\sqrt{3} = x \approx 20.8$$

(6a) $x \to -4^{-} \to$ Left

$x \to -4^{+} \to$ Right

$x \to -4$: Check the two above match if so that the answer if not it isn't the answer it is DNE

$f(-4)$ where is the solid dot

(7) Check the left values and the right approach the same number.

(a) $\lim_{x \to 2} f(x) = 5$

(c) $\lim_{x \to 3} f(x)$ DNE

(b) $\lim f(x) = 1$

(d) $\lim f(x)$ DNE

(b) $\lim_{x \to 0} f(x) = 1$ (d) $\lim_{x \to 0} f(x)$ DNE

(8) (r, θ)

$r \to$ radius, $\theta \to$ angle

Remember angles repeat every 2π.

$\frac{\pi}{4}, \frac{9\pi}{4}$

(a) $(2, \pi) \to (2, \pi + 2\pi) \to (2, 3\pi)$

or

$\to (2, \pi - 2\pi) \to (2, -\pi)$

(9) (a) $(3, 0)$

(b) $(2, \frac{\pi}{2})$

(c) $(4, \pi)$

(d) $(5, 3\pi/2)$