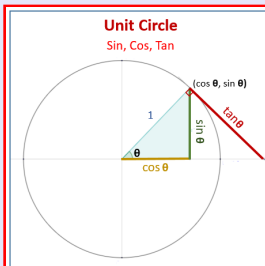


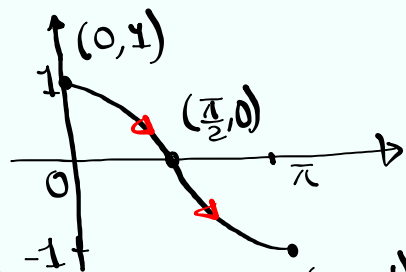
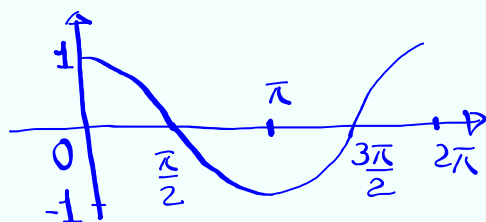
Trigonometry

Lecture 41



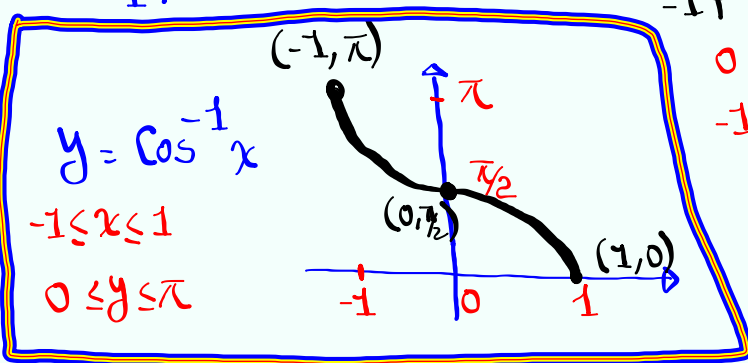
Feb 19-8:47 AM

$$y = \cos x$$

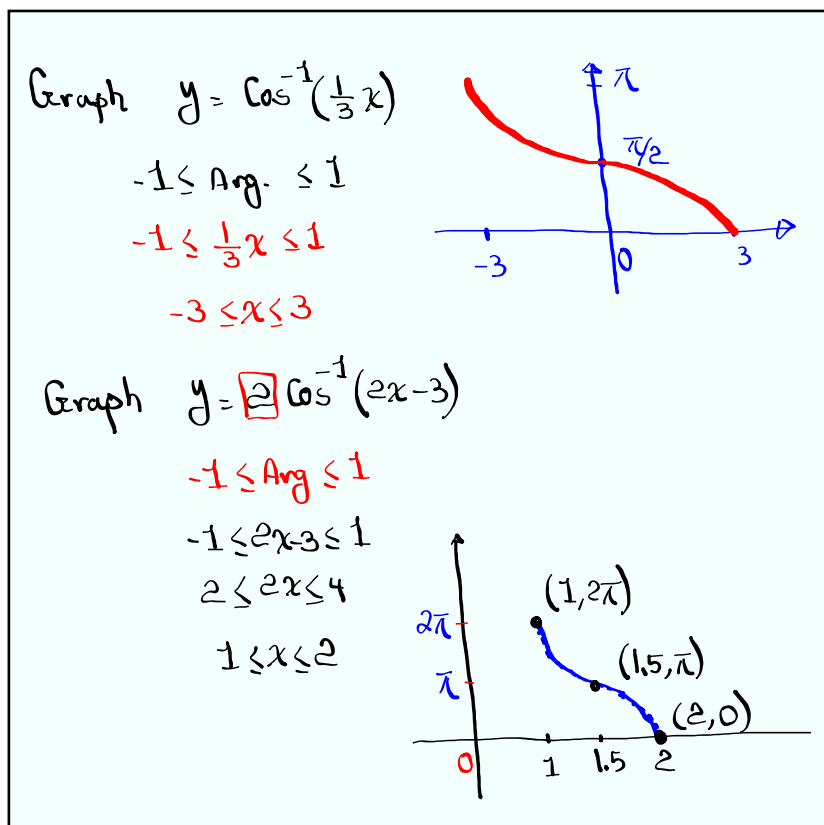


$$0 \leq x \leq \pi$$

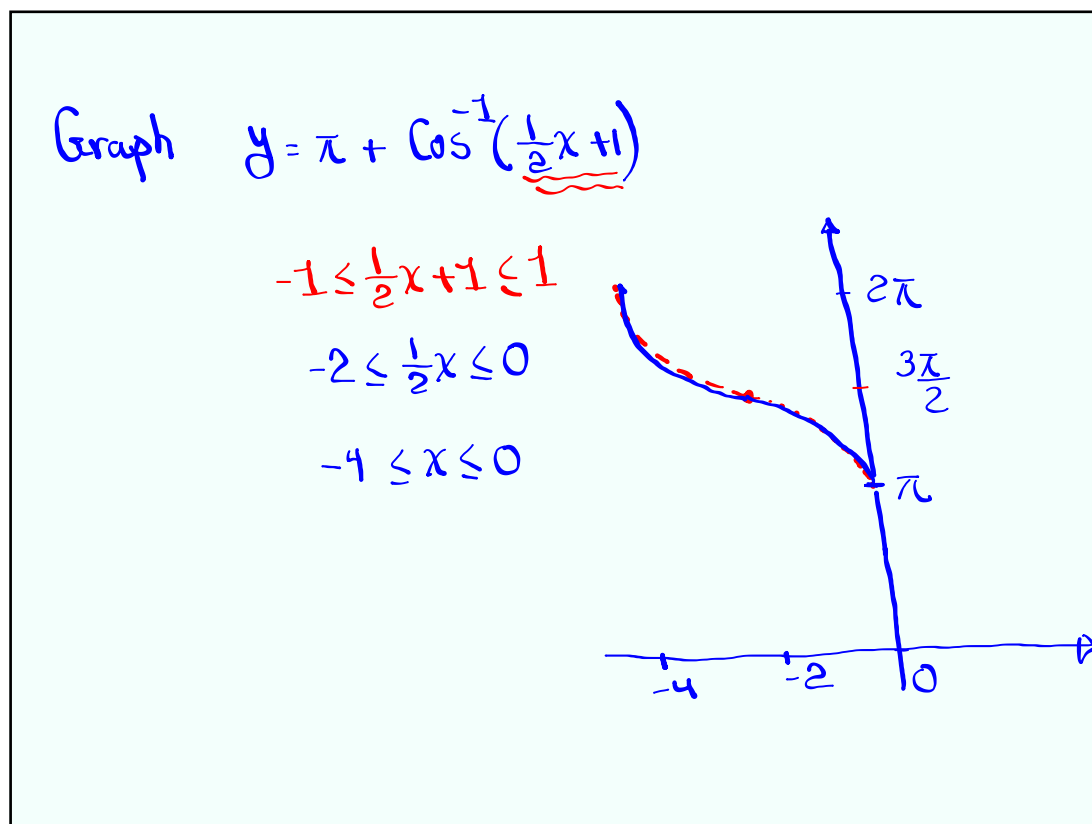
$$-1 \leq y \leq 1$$



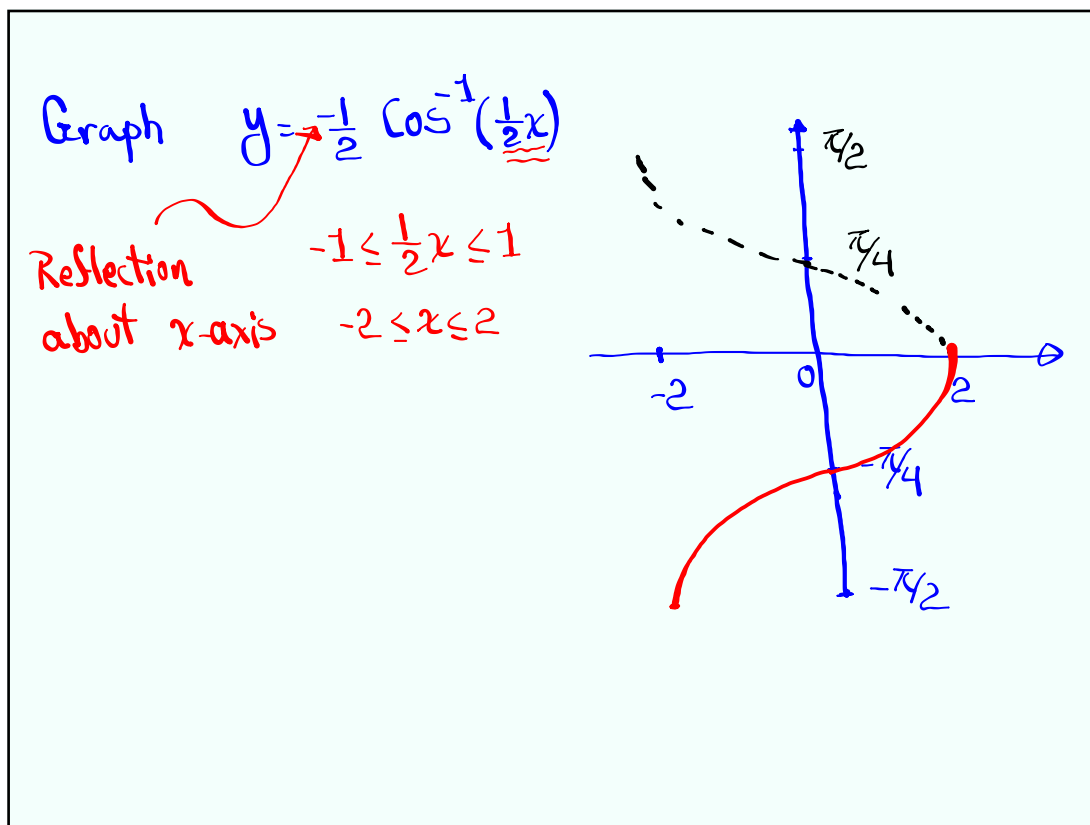
Nov 13-10:27 AM



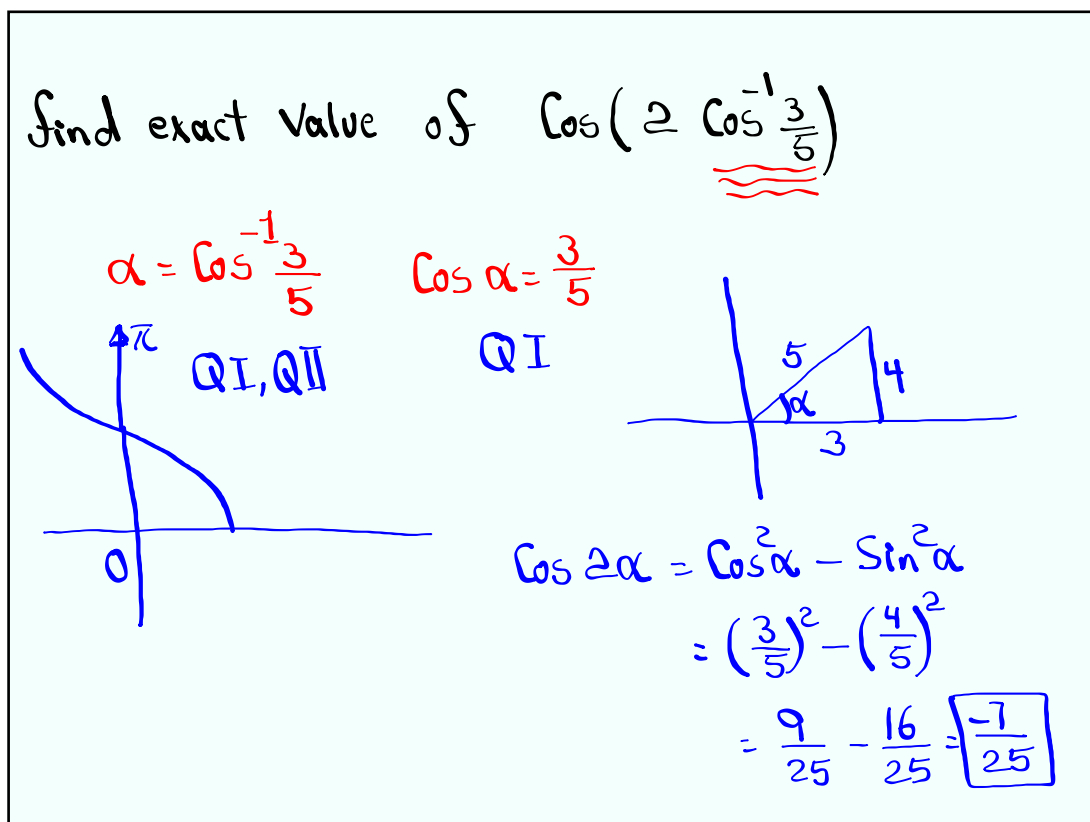
Nov 13-10:33 AM



Nov 13-10:40 AM



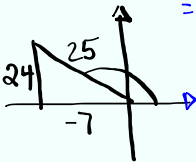
Nov 13-10:44 AM



Nov 13-10:49 AM

$$\cos\left(\frac{1}{2}\cos^{-1}\frac{-7}{25}\right) = \cos\left(\frac{1}{2}\alpha\right) = \pm \sqrt{\frac{1+\cos\alpha}{2}}$$

$\alpha = \cos^{-1}\frac{-7}{25}$
 $\cos\alpha = \frac{-7}{25}$



$\frac{\pi}{2} < \alpha < \pi$
 $\frac{\pi}{4} < \frac{1}{2}\alpha < \frac{\pi}{2}$

QII
 $90^\circ < \alpha < 180^\circ$
 $45^\circ < \frac{1}{2}\alpha < 90^\circ$

QI

$$= \pm \sqrt{\frac{1 + \frac{-7}{25}}{2}} = \sqrt{\frac{25-7}{50}} = \sqrt{\frac{18}{50}} = \sqrt{\frac{9}{25}} = \frac{3}{5}$$

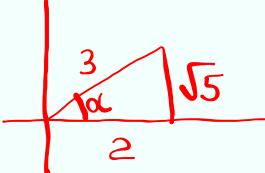
using Calc.

$$\cos\left(.5 \cdot \cos^{-1}(-.28)\right) = .6$$

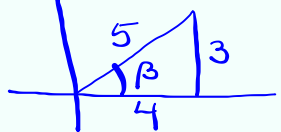
Nov 13-10:53 AM

Find exact value of $\cos\left(\cos^{-1}\frac{2}{3} - \sin^{-1}\frac{3}{5}\right)$

$\alpha = \cos^{-1}\frac{2}{3}$
 $\cos\alpha = \frac{2}{3}$



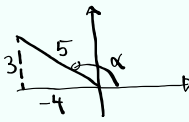
$\beta = \sin^{-1}\frac{3}{5}$
 $\sin\beta = \frac{3}{5}$



$\cos(\alpha - \beta)$
 $= \cos\alpha \cos\beta + \sin\alpha \sin\beta$
 $= \frac{2}{3} \cdot \frac{4}{5} + \frac{\sqrt{5}}{3} \cdot \frac{3}{5} = \frac{8 + 3\sqrt{5}}{15}$

Nov 13-11:01 AM

Find exact value of $\tan\left(\cos^{-1}\frac{4}{5} + \sin^{-1}\frac{7}{25}\right)$

$\alpha = \cos^{-1}\frac{4}{5}$  $\beta = \sin^{-1}\frac{7}{25}$

$\cos\alpha = \frac{4}{5}$ $\sin\beta = \frac{7}{25}$

$\tan(\alpha + \beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha \tan\beta}$

$\tan\alpha = \frac{3}{4}$ $\tan\beta = \frac{7}{24}$

$$\tan(\alpha + \beta) = \frac{\frac{3}{4} + \frac{7}{24}}{1 - \frac{3}{4} \cdot \frac{7}{24}} = \frac{\frac{9 \cdot 3 + 7}{24}}{1 - \frac{21}{96}} = \frac{24}{96} \cdot \frac{24}{96} = \frac{24(-3) - 4(7)}{96 - 21} = \frac{-100}{75} = \boxed{\frac{4}{3}}$$

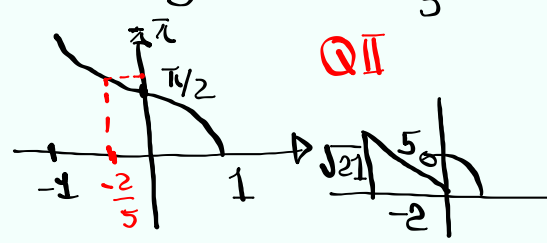
using Calc. $\tan(\cos^{-1}.8 + \sin^{-1}.28) = \boxed{\frac{4}{3}}$

Nov 13-11:05 AM

Find exact value of $\tan\left(\frac{1}{2} \cos^{-1}\frac{2}{5}\right)$

$\alpha = \cos^{-1}\frac{2}{5}$ $\cos\alpha = \frac{2}{5}$ $\tan\left(\frac{\alpha}{2}\right) = \frac{1 - \cos\alpha}{\sin\alpha} = \frac{\sin\alpha}{1 + \cos\alpha}$

$\tan\frac{\alpha}{2} = \frac{1 - \frac{2}{5}}{\frac{\sqrt{21}}{5}} = \frac{5 + 2}{\sqrt{21}} = \frac{7}{\sqrt{21}} = \frac{7\sqrt{21}}{\sqrt{21} \cdot \sqrt{21}} = \frac{7\sqrt{21}}{21} = \boxed{\frac{\sqrt{21}}{3}}$



Nov 13-11:20 AM

Solve $\underline{\sin 2x} - \cos x = 0$ on $[0^\circ, 360^\circ)$

$$2 \sin x \cos x - \cos x = 0$$

$$\cos x (2 \sin x - 1) = 0$$

$$\cos x = 0$$

$$x = 90^\circ, 270^\circ$$

$$\sin x = \frac{1}{2} \quad \text{QI, QII}$$

$$\text{RA } 30^\circ$$

$$\text{QI} \rightarrow x = 30^\circ$$

$$\text{QII} \rightarrow x = 180^\circ - 30^\circ = 150^\circ$$

$$\{30^\circ, 90^\circ, 150^\circ, 270^\circ\}$$

Nov 13-11:26 AM

Find all general solutions for $\tan^2 3x - 3 = 0$

$$\tan^2 3x = 3$$

$$\tan 3x = \pm\sqrt{3}$$

$$\tan 3x = \sqrt{3} \quad \text{QI, QIII}$$

$$\tan 3x = -\sqrt{3} \quad \text{QII, QIV}$$

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

$$\text{QI} \quad 3x = 60^\circ + k \cdot 180^\circ \quad x = 20^\circ + k \cdot 60^\circ$$

$$\text{QII} \quad 3x = 180^\circ - 60^\circ + k \cdot 180^\circ \quad x = 40^\circ + k \cdot 60^\circ$$

$$\text{QIII} \quad 3x = 180^\circ + 60^\circ + k \cdot 180^\circ \quad x = 80^\circ + k \cdot 60^\circ$$

$$\text{QIV} \quad 3x = 360^\circ - 60^\circ + k \cdot 180^\circ \quad x = 100^\circ + k \cdot 60^\circ$$

$$k=0 \rightarrow 20^\circ, 40^\circ, 80^\circ, 100^\circ$$

$$k=1 \rightarrow \cancel{80^\circ}, \cancel{100^\circ}, 140^\circ, 160^\circ$$

$$k=2 \rightarrow \cancel{140^\circ}, \cancel{160^\circ}, 200^\circ, 220^\circ$$

$$k=3 \rightarrow \cancel{200^\circ}, \cancel{220^\circ}, 260^\circ, 280^\circ$$

$$k=4 \rightarrow \cancel{260^\circ}, \cancel{280^\circ}, 320^\circ, 340^\circ$$

$$\left\{ \begin{array}{l} 20^\circ, 40^\circ, 80^\circ, 100^\circ \\ 140^\circ, 160^\circ, 200^\circ \\ 220^\circ, 260^\circ, 280^\circ \\ 320^\circ, 340^\circ \end{array} \right\}$$

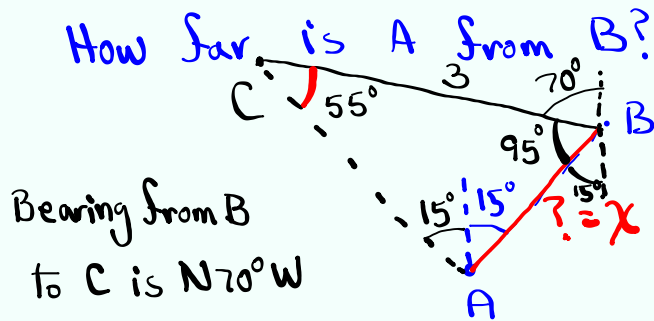
Nov 13-11:29 AM

Bearing from Point A to Point B is $N15^\circ E$.

Bearing from Point A to Point C is $N15^\circ W$.

B & C are 3 miles apart.

How far is A from B?



Bearing from B
to C is $N70^\circ W$

$$\frac{\sin 30^\circ}{3} = \frac{\sin C}{x}$$

$$\frac{\sin 30^\circ}{3} = \frac{\sin 55^\circ}{x}$$

$$x \approx \boxed{}$$

Nov 13-11:39 AM