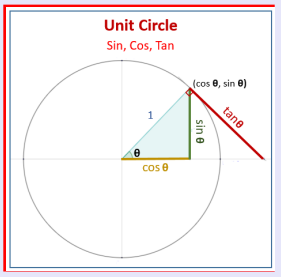
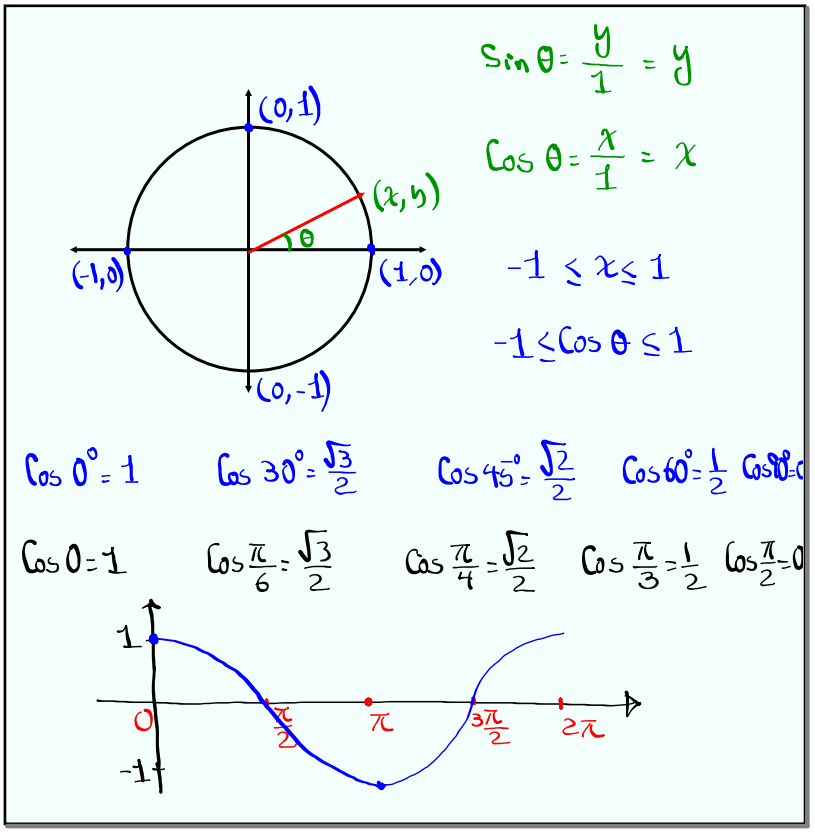
Trigonometry

Lecture 31



Feb 19-8:47 AM



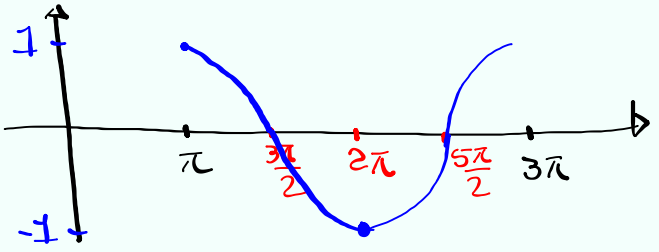
Oct 21-10:29 AM

Graph $y = \cos(x - \pi)$

$0 \le x - \pi \le 2\pi$

$\pi \le x \le 3\pi$

S.P. E.P.



Oct 22-10:34 AM

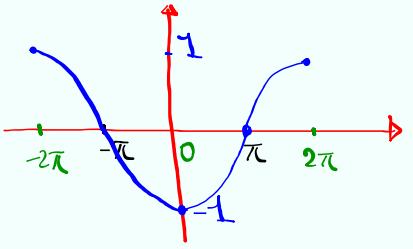
$y = \cos\left(\frac{1}{2}x + \pi\right)$

$0 \le \frac{1}{2}x + \pi \le 2\pi$

$0 \le x + 2\pi \le 4\pi$

$-2\pi \le x \le 2\pi$

S.P. E.P.



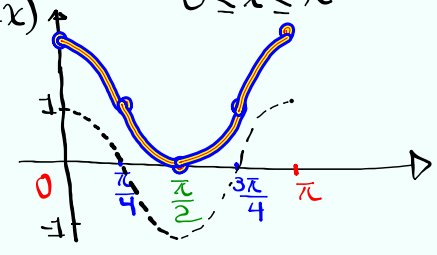
$y = \cos(2x) + 1$

$0 \le 2x \le 2\pi$

$0 \le x \le \pi$

$y = 1 + \cos(2x)$

shift up 1 unit



Oct 22-10:37 AM

Graph $y = 2\cos(2x - \pi)$

Cause shift (stretch) by factor of 2

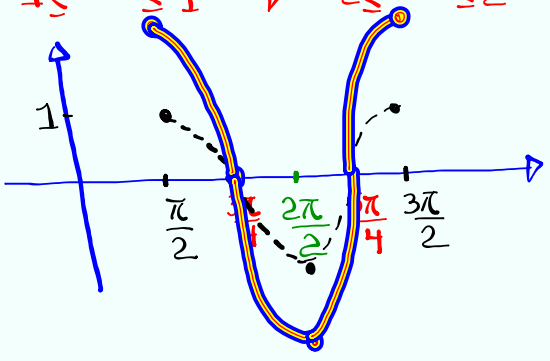
Impact starting & Ending Points

$0 \le 2x - \pi \le 2\pi$

$\pi \le 2x \le 3\pi$

$\frac{\pi}{2} \le x \le \frac{3\pi}{2}$

$-1 \le \quad \le 1 \rightarrow -2 \le \quad \le 2$



Oct 22-10:47 AM

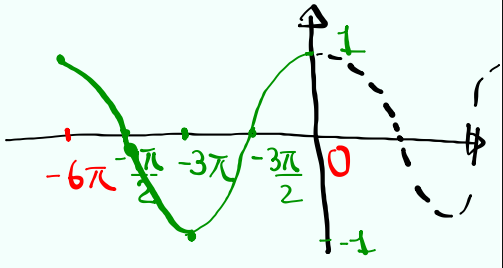
Graph $y = \cos\left(\frac{1}{3}x\right)$

$0 \le \frac{1}{3}x \le 2\pi$

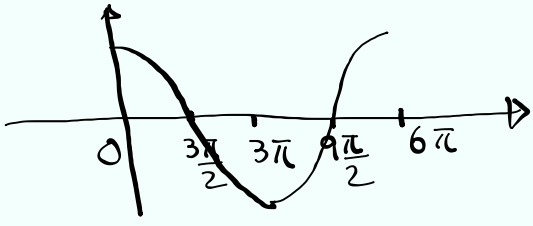
$0 \le -x \le 6\pi$

$0 \ge x \ge -6\pi$

$-6\pi \le x \le 0$



$y = \cos\frac{1}{3}x$



Recall

$\cos(-\alpha) = \cos\alpha$

$\cos\left(-\frac{1}{3}x\right) = \cos\left(\frac{1}{3}x\right)$

Oct 22-10:53 AM

$y = -\cos(-2x - 2\pi)$

$\cos(-\alpha) = \cos\alpha$

$-2x - 2\pi$

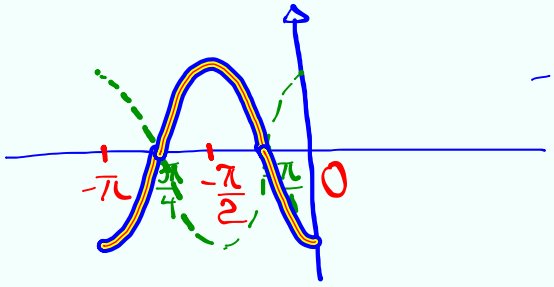
$\cos[-(2x + 2\pi)] = \cos(2x + 2\pi)$

Reflection about x-axis

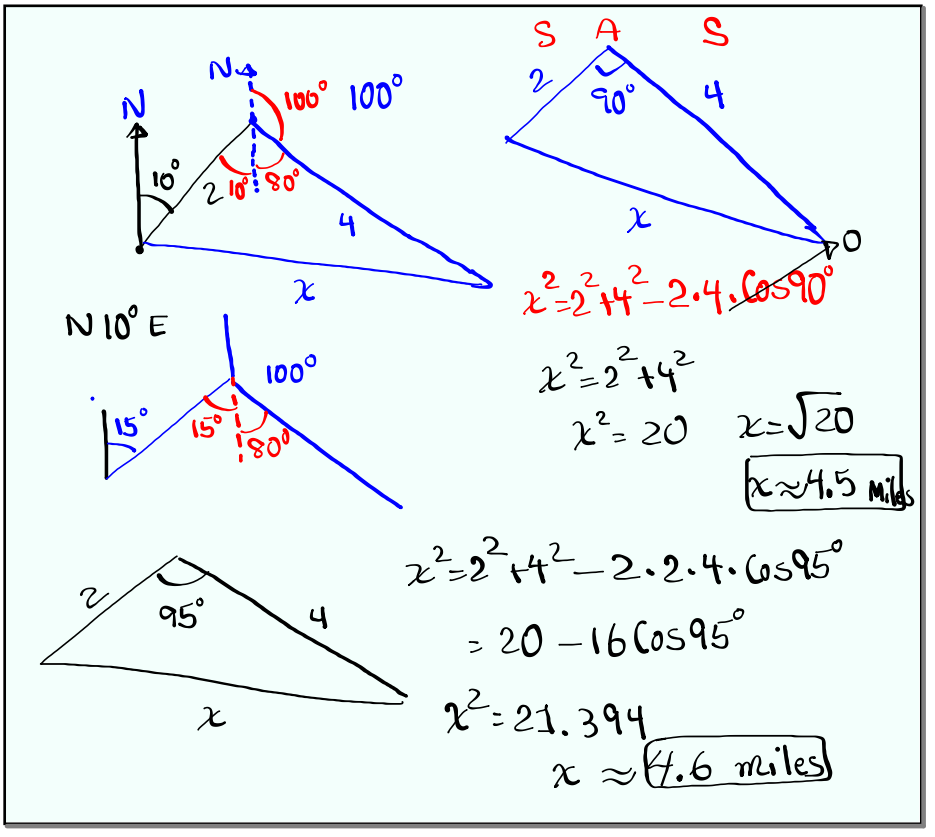
$0 \le 2x + 2\pi \le 2\pi$

$-2\pi \le 2x \le 0$

$-\pi \le x \le 0$

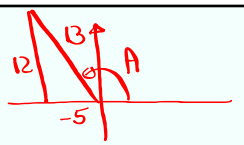


Oct 22-10:58 AM



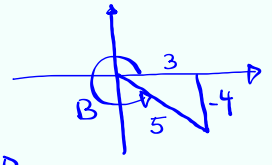
Oct 22-11:03 AM

$\sin A = \frac{12}{13}$, A is in QII



$\cos B = \frac{3}{5}$, B is in QIV

Exact Ans.



$\sin(A+B) = \sin A\cos B + \cos A \sin B$

$= \frac{12}{13}\cdot\frac{3}{5} + \frac{-5}{13}\cdot\frac{-4}{5} = \boxed{\frac{56}{65}}$

$\cos(A-B) = \cos A \cos B + \sin A \sin B$

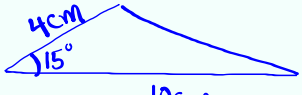
$= \frac{-5}{13}\cdot\frac{3}{5} + \frac{12}{13}\cdot\frac{-4}{5} = \boxed{\frac{-63}{65}}$

$\tan\frac{B}{2} = \frac{1-\cos B}{\sin B} = \frac{\sin B}{1+\cos B}$

$\tan\frac{B}{2} = \frac{\frac{-4}{5}}{1+\frac{3}{5}} = \frac{-4}{5+3} = \frac{-4}{8} = \boxed{\frac{-1}{2}}$

Oct 22-11:12 AM

Find the area of triangle below

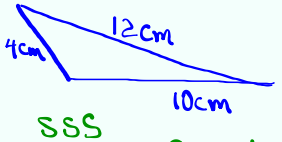


SAS

$A = \frac{1}{2}ab\sin C$

$= \frac{1}{2}\cdot 4\cdot 10\cdot \sin 15°$

$= 20\sin 15° \approx \boxed{5.2\text{cm}^2}$



SSS

Heron's Formula

$P = 4+10+12 = 26$

$S = \frac{P}{2} = \frac{26}{2} = 13$

$\text{Area} = \sqrt{S(S-a)(S-b)(S-c)}$

$= \sqrt{13(13-4)(13-10)(13-12)}$

$= \sqrt{13(9)(3)(1)}$

$= \sqrt{351}$

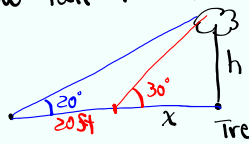
$\approx 18.7\text{ cm}^2$

Oct 22-11:19 AM

Alejandro's angle of elevation to the top of tree was 20°.

He walked 20 ft towards the tree, new angle of elevation is 30°.

How tall is the tree?



$\tan 30° = \frac{h}{x}$

$h = x \tan 30°$

$\tan 20° = \frac{h}{20+x}$

$h = (20+x) \cdot \tan 20°$

$x \tan 30° = 20 \tan 20° + x \tan 20°$

$x \tan 30° - x \tan 20° = 20 \tan 20°$

$x = \frac{20 \tan 20°}{\tan 30° - \tan 20°}$

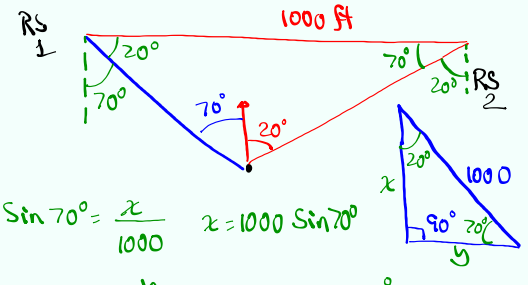
$h = \frac{20 \tan 20° \tan 30°}{\tan 30° - \tan 20°} \approx$ **19.7 ft**

Oct 22-11:25 AM

Two radar stations are 1000 ft apart. on a straight line.

Diego's bearing to one is N 20° E, and N 70° W to the other one.

How far is Diego from each radar Stations?



$\sin 70° = \frac{x}{1000}$ $x = 1000 \sin 70°$

$\sin 20° = \frac{y}{1000}$ $y = 1000 \sin 20°$

Oct 22-11:33 AM