10/31/2012 - Sec 4.3 cont.

Math 1060

Quad II ↙ Quad I ↓

#8 Find $\cos(\alpha-\beta)$ Given $\sin\alpha = \frac{3}{5}$, $\sin\beta = \frac{5}{13}$

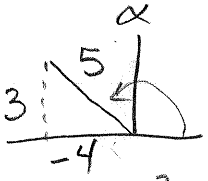
$\cos\alpha\cos\beta + \sin\alpha\sin\beta$

$\left(\frac{-4}{5}\right)\left(\frac{12}{13}\right) + \left(\frac{3}{5}\right)\left(\frac{5}{13}\right)$

$\frac{-48}{65} + \frac{15}{65}$

$\frac{-48+15}{65}$

$\frac{-33}{65}$



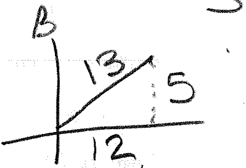
$3^2 + x^2 = 5^2$

$9 + x^2 = 25$

$-9 \qquad -9$

$\sqrt{x^2} = \sqrt{16}$

$x = \overset{+}{\ominus}4$



$5^2 + x^2 = 13^2$

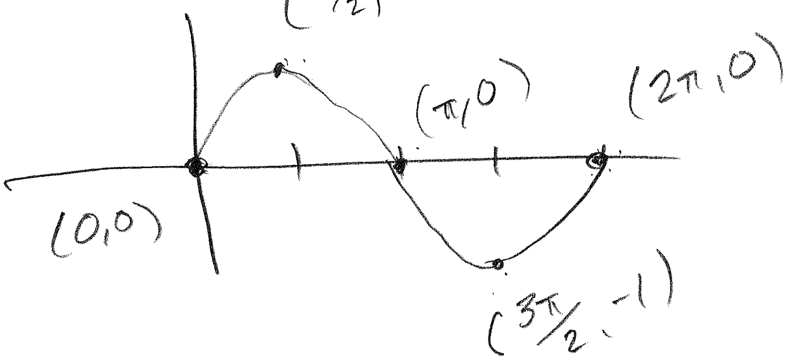
$25 + x^2 = 169$

$-25 \qquad -25$

$\sqrt{x^2} = \sqrt{144}$

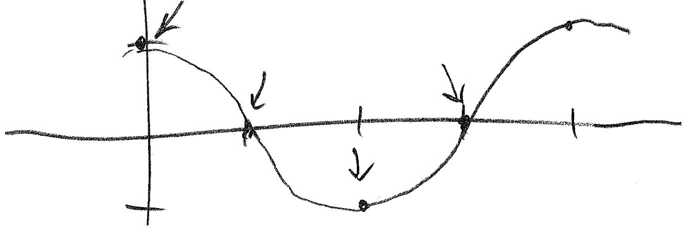
$x = \underset{-}{\oplus}12$

Sine



x	y
0	0
π/2	1
π	0
3π/2	-1
2π	0

cosine



#10 $\sin\left(\frac{\alpha}{2}\right)$

Given $\sin\alpha = 3/5$

$$= \overset{\textcircled{+}}{-}\sqrt{\frac{1-\cos\alpha}{2}}$$

$$= \sqrt{\frac{1-(^{-4}/_{5})}{2}}$$

$$= \sqrt{\frac{\frac{5}{5}+{}^{4}/_{5}}{2}}$$

$$\sqrt{\frac{{}^{9}/_{5}\cdot{}^{1}/_{2}}{2\cdot{}^{1}/_{2}}}$$

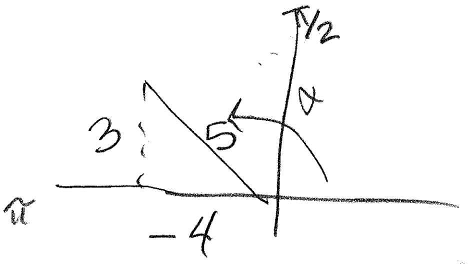
$$\sqrt{\frac{9}{10}}$$

$$\frac{\sqrt{9}}{\sqrt{10}}$$

$$\frac{3\cdot\sqrt{10}}{\sqrt{10}\cdot\sqrt{10}}$$

$$\boxed{\frac{3\sqrt{10}}{10}}$$

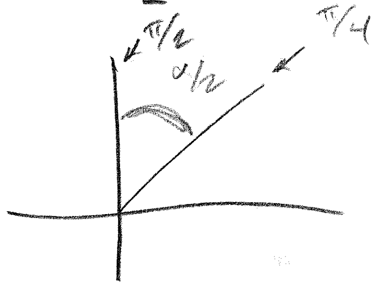
Given $\frac{\pi}{2} < \alpha < \pi$



$\cos\alpha = \frac{-4}{5}$

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

$$\frac{\pi}{4} < \frac{\alpha}{2} < {}^{\pi}/_{2}$$



Exam:	1	2	3	F
Case 1	75	85	80	85
Case 2	75	80	83	72

78. $f(x) = \cos^{-1}(x+4)$

$y = \cos^{-1}(x+4)$

$x = \cos^{-1}(y+4)$

$\cos x = y + 4$

$\quad -4$

$-4 + \cos x = y$

$f^{-1}(x) = -4 + \cos x$

$= \cos(x) - 4$

D for f

for $-5 \le x \le -3$

R: $[0, \pi]$ ← angles in Quad I & II

D: $[0, \pi]$

R: $-5 \le y \le -3$

$[-5, -3]$

74 $f(x) = 1 + \tan(\frac{\pi}{2}x)$

$y = 1 + \tan(\frac{\pi}{2}x)$

$x = 1 + \tan(\frac{\pi}{2}y)$

$-1 \quad -1$

$x - 1 = \tan(\frac{\pi}{2}y)$

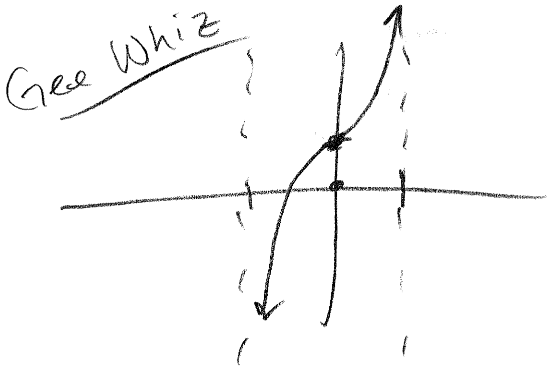
$\frac{2}{\pi} \cdot \tan^{-1}(x-1) = \frac{2}{\pi} \cdot \frac{\pi}{2} y$

$\frac{2}{\pi}\tan^{-1}(x-1) = y$

$f^{-1}(x) = \frac{2}{\pi}\tan^{-1}(x-1)$

for D: $-1 < x < 1$

R: $(-\infty, \infty)$



D: $(-\infty, \infty)$

R: $(-1, 1)$

Ex: $\cos\left(\frac{\alpha}{3}\right) = \frac{1}{2}$ $\qquad 0 \le \alpha \le 2\pi$

$$\frac{\alpha}{3} = \cos^{-1}\left(\frac{1}{2}\right)$$

$$3\cdot\frac{\alpha}{3} = \overset{3\cdot}{\frac{\pi}{3}} + \overset{3\cdot}{2k\pi}$$

$$\alpha = \pi + 6k\pi$$

$\cancel{k=-1}$ $\qquad k=0$ $\qquad \cancel{k=1}$

$\cancel{\pi + -6\pi}$ $\qquad \pi + 0\pi$ $\qquad \cancel{\pi + 6\pi}$

$\cancel{-5\pi}$ $\qquad \boxed{\pi}$ $\qquad \cancel{7\pi}$

$$\boxed{\alpha = \pi}$$

$$3\cdot\frac{\alpha}{3} = \overset{3\cdot}{\frac{-\pi}{3}} + \overset{3\cdot}{2k\pi}$$

$$\alpha = -\pi + 6k\pi$$

$\cancel{k=-1}$ $\qquad \cancel{k=0}$ $\qquad \cancel{k=1}$ $\qquad \cancel{k=2}$

$\cancel{-\pi - 6\pi}$ $\qquad \cancel{-\pi + 0\pi}$ $\qquad \cancel{-\pi + 6\pi}$ $\qquad \cancel{-\pi + 12\pi}$

$\cancel{-7\pi}$ $\qquad \cancel{-\pi}$ $\qquad \cancel{5\pi}$ $\qquad \cancel{11\pi}$

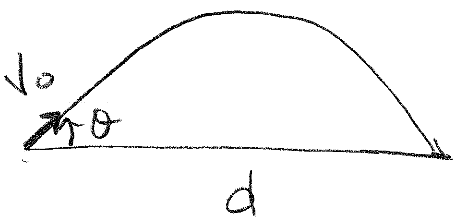
Solve $\sec\left(\frac{\alpha}{3}\right) = 2$ ✓ $\qquad 0 \le \alpha \le 2\pi$

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

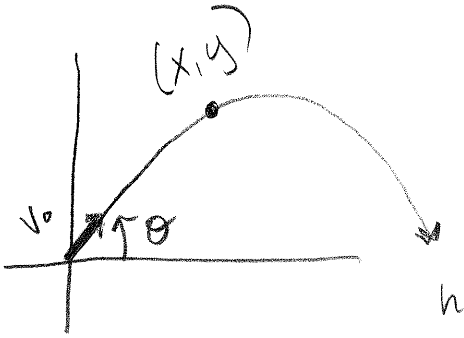
$$\cos\left(\frac{\alpha}{3}\right) = \frac{1}{2}$$ ✓

See above to solve

$$\boxed{\alpha = \pi}$$



$$\underset{\substack{\uparrow\\\text{initial}\\\text{velocity}\\\text{in ft/sec}}}{V_0^2}\sin 2\overset{\substack{\text{angle}\\\text{of}\\\text{elevation}\\\downarrow}}{\theta} = 32\underset{\substack{\uparrow\\\text{distance}\\\text{traveled}\\\text{in }\underline{\text{feet}}}}{d}$$



$$\underset{\substack{\nearrow\\\text{horizontal}\\\text{distance}}}{x} = \overset{\substack{\text{Initial}\\\text{velocity}\\\swarrow}}{V_0}\underset{\substack{\uparrow\\\text{time}}}{t}\cos\overset{\substack{\text{angle}\\\text{of}\\\text{elevation}\\\swarrow}}{\theta}$$

$$\underset{\substack{\nearrow\\\text{vertical}\\\text{distance}}}{y} = -16\overset{\substack{\text{time}\\\swarrow}}{t^2} + \underset{\substack{\uparrow\\\text{initial}\\\text{velocity}}}{V_0}\overset{\substack{\searrow}}{t}\sin\overset{\substack{\text{angle of}\\\text{elevation}\\\swarrow}}{\theta}$$