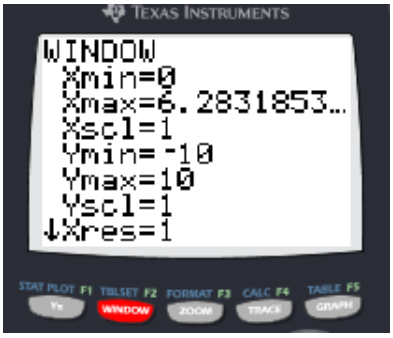
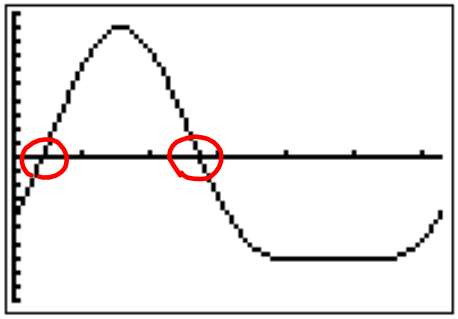
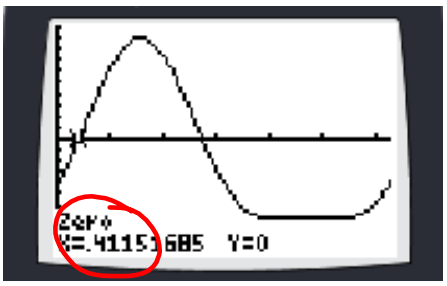
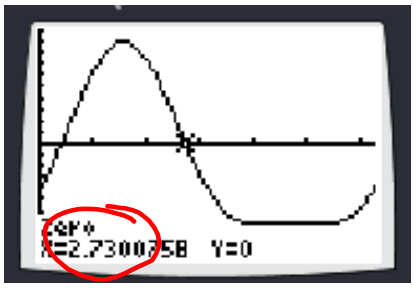
$$y = 5\sin^2 x + 8\sin x - 4$$









May 6-12:29 PM

5.4 Sum and Difference Formulas

Sum and Difference Formulas

$$\sin(u + v) = \sin u \cos v + \cos u \sin v$$

$$\sin(u - v) = \sin u \cos v - \cos u \sin v$$

$$\cos(u + v) = \cos u \cos v - \sin u \sin v$$

$$\cos(u - v) = \cos u \cos v + \sin u \sin v$$

$$\tan(u + v) = \frac{\tan u + \tan v}{1 - \tan u \tan v} \qquad \tan(u - v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$$

May 5-7:19 PM

Find the exact value.

1.) $\cos 75^\circ$

$$\cos(30+45) = \cos 30 \cos 45 - \sin 30 \sin 45$$

$$= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

$$= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$$

May 5-7:24 PM

Find the exact value.

2.) $\sin\left(\frac{\pi}{12}\right)$

$$\sin\left(\frac{\pi}{3} - \frac{\pi}{4}\right) = \sin\frac{\pi}{3} \cos\frac{\pi}{4} - \cos\frac{\pi}{3} \sin\frac{\pi}{4}$$

$$= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

$$= \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$$

May 5-7:25 PM

Find the exact value.

3.) $\dfrac{\tan 80 + \tan 55}{1 - \tan 80 \tan 55}$

$\hookrightarrow \tan(80+55) = \tan(135)$

$= -1$

May 5-7:26 PM

Find the exact values of sine, cosine, and tangent of the angle.

4.) 165°

Hint: $165^\circ = 135^\circ + 30^\circ$

May 5-7:27 PM

4.) 165°

Hint: $165^\circ = 135^\circ + 30^\circ$

$\sin(135+30) = \sin 135 \cos 30 + \cos 135 \sin 30$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + -\frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

$\cos(135+30) = \cos 135 \cos 30 - \sin 135 \sin 30$

$-\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$

Feb 20-9:23 AM

$\tan(135+30) = \frac{\tan 135 + \tan 30}{1 - \tan 135 \tan 30} = \frac{-1 + \frac{\sqrt{3}}{3}}{1 - \boxed{(-1)(\sqrt{3}/3)}}$

$= \frac{-1 + \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}} = \frac{-\frac{3}{3} + \frac{\sqrt{3}}{3}}{\frac{3}{3} + \frac{\sqrt{3}}{3}} = \frac{\frac{-3+\sqrt{3}}{3}}{\frac{3+\sqrt{3}}{3}} = \frac{-3+\sqrt{3}}{\cancel{3}} \cdot \frac{\cancel{3}}{3+\sqrt{3}}$

$= \frac{-3+\sqrt{3}}{3+\sqrt{3}} \cdot \frac{3-\sqrt{3}}{3-\sqrt{3}} = \frac{-9+3\sqrt{3}+3\sqrt{3}-3}{9-3} = \frac{-12+6\sqrt{3}}{6}$

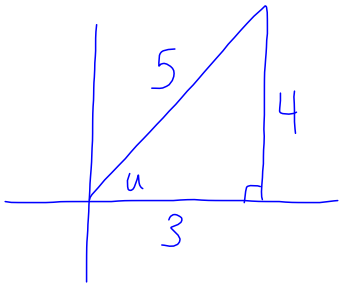
$\boxed{= -2+\sqrt{3}}$

Feb 20-9:33 AM

5.) *Evaluate* $\sin(u+v)$ *given*

$\sin u = \frac{4}{5}; 0 < u < \frac{\pi}{2}$ *and*

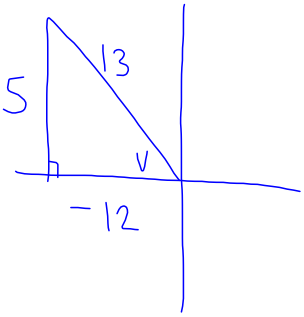
$\cos v = -\frac{12}{13}; \frac{\pi}{2} < v < \pi$



$\sin u \cos v + \cos u \sin v$

$\frac{4}{5} \cdot \frac{-12}{13} + \frac{3}{5} \cdot \frac{5}{13}$

$\frac{-48}{65} + \frac{15}{65} = \boxed{\frac{-33}{65}}$



May 5-7:29 PM

6.) *Evaluate* $\cos(u-v)$ *given*

$\cos u = -\frac{15}{17}; \ \pi < u < \frac{3\pi}{2}$ *and*

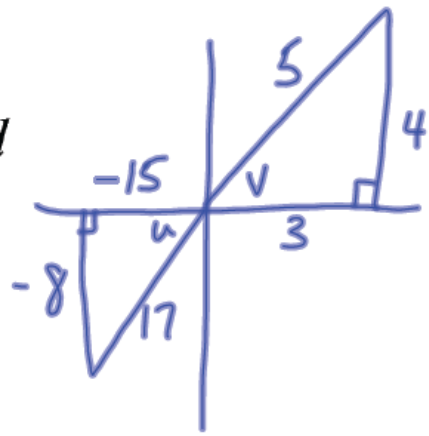
$\sin v = \frac{4}{5}; \ 0 < v < \frac{\pi}{2}$

May 5-7:32 PM

6.) *Evaluate* $\cos(u-v)$ *given*

$$\cos u = -\frac{15}{17};\ \pi < u < \frac{3\pi}{2} \quad \textit{and}$$

$$\sin v = \frac{4}{5};\ 0 < v < \frac{\pi}{2}$$



$\cos u \cos v + \sin u \sin v$

$$\frac{-15}{17}\cdot\frac{3}{5} + \frac{-8}{17}\cdot\frac{4}{5}$$

$$-\frac{45}{85} + \frac{-32}{85} = -77/85$$

Feb 20-9:49 AM

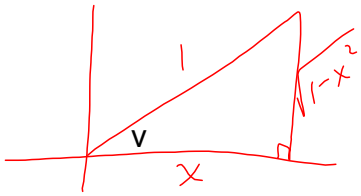
Write the expression as an algebraic expression.

7.) $\cos(\overset{u}{\arctan 1} + \overset{v}{\arccos x})$

$x^2 + b^2 = 1$

$b^2 = 1 - x^2$

$b = \sqrt{1-x^2}$



$\cos u \cos v - \sin u \sin v$

$\cos(\arctan 1)\cos(\arccos x) - \sin(\arctan 1)\sin(\arccos x)$

$\cos\frac{\pi}{4}\cos(\arccos x) - \sin\frac{\pi}{4}\sin(\arccos x)$

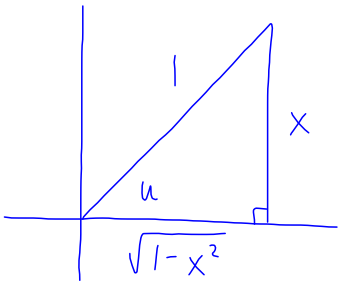
$$\frac{\sqrt{2}}{2}\cdot\frac{x}{1} - \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{1-x^2}}{1}$$

$$\boxed{= \frac{\sqrt{2}\left(x - \sqrt{1-x^2}\right)}{2}}$$

May 5-7:48 PM

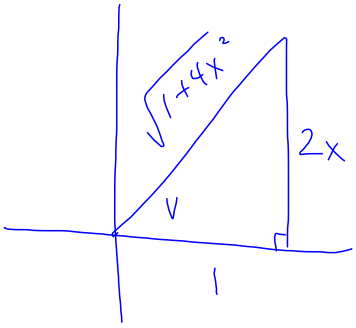
Write the expression as an algebraic expression.

8.) $\cos(\overset{u}{\arcsin x} - \overset{v}{\arctan 2x})$



$\cos u \cos v + \sin u \sin v$

$\sqrt{1-x^2} \cdot \frac{1}{\sqrt{1+4x^2}} + \frac{x \cdot 2x}{\sqrt{1+4x^2}}$



$$\boxed{= \frac{\sqrt{1-x^2} + 2x^2}{\sqrt{1+4x^2}}}$$

May 5-7:49 PM

24 $\sin 110 \cos 80 + \cos 110 \sin 80$

36 $\cos(v-u)$

$\sin u = \frac{5}{13}$

$\cos v = -3/5$

Both in Quad II

45 $\sin(\arctan 2x - \arccos x)$

Feb 20-10:07 AM

Dec 14-11:18 AM