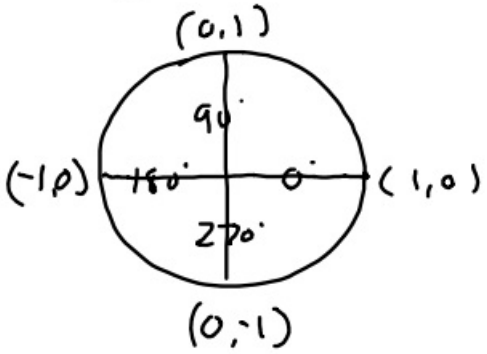
3-29-18 1st Trig



$$\cos(90^\circ + 90^\circ) \stackrel{?}{=} \cos 90^\circ + \cos 90^\circ$$

$$\cos 180^\circ = \cos 90^\circ + \cos 90^\circ$$

$$-1 = 0 + 0$$

Not true

$$\cos(\theta + \alpha) = \cos\theta \cdot \cos\alpha - \sin\theta \cdot \sin\alpha$$

$$\cos(\theta - \alpha) = \cos\theta \cdot \cos\alpha + \sin\theta \cdot \sin\alpha$$

$$\downarrow$$

$$\cos(\theta \pm \alpha) = \cos\theta \cdot \cos\alpha \mp \sin\theta \cdot \sin\alpha$$

$$\sin(\theta \pm \alpha) = \sin\theta \cdot \cos\alpha \pm \sin\alpha \cdot \cos\theta$$

① Find $\cos 15^\circ$

$$\cos(45^\circ - 30^\circ) = \cos 45 \cdot \cos 30^\circ + \sin 45^\circ \cdot \sin 3$$

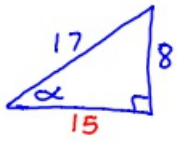
$$\cos(15^\circ) = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$$

$$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$$

$$\cos(15^\circ) = \frac{\sqrt{6}+\sqrt{2}}{4}$$

① If $\sin\alpha = \frac{8}{17}$ and $\tan\beta = \frac{24}{7}$, find $\cos(\alpha+\beta)$.

α triangle



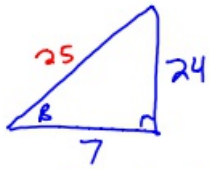
$a^2 + 8^2 = 17^2$

$a^2 + 64 = 289$

$a^2 = 225$

$a = 15$

β triangle



$7^2 + 24^2 = c^2$

$49 + 576 = c^2$

$625 = c^2$

$c = 25$

$\cos(\alpha+\beta) = \cos\alpha\cdot\cos\beta - \sin\alpha\cdot\sin\beta$

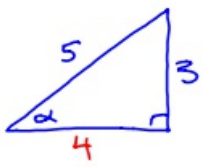
$\frac{15}{17}\cdot\frac{7}{25} - \frac{8}{17}\cdot\frac{24}{25}$

$\frac{105}{425} - \frac{192}{425}$

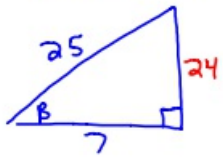
$\frac{-87}{425}$

② If $\sin\alpha = \frac{3}{5}$ and $\cos\beta = \frac{7}{25}$, and $\cos(\alpha-\beta)$.

α triangle



β triangle



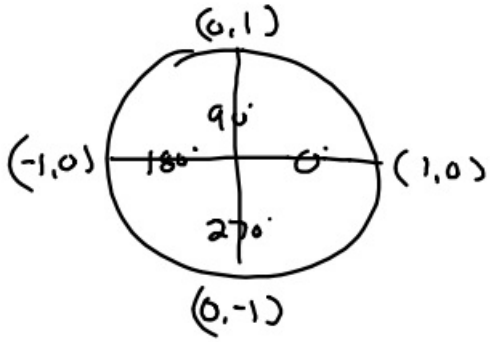
$\cos(\alpha-\beta) = \cos\alpha\cdot\cos\beta + \sin\alpha\cdot\sin\beta$

$\frac{4}{5}\cdot\frac{7}{25} + \frac{3}{5}\cdot\frac{24}{25}$

$\frac{28}{125} + \frac{72}{125}$

$\frac{100}{125} = \frac{4}{5}$

3-29-18 3rd Trig



$\cos(90^\circ + 90^\circ) \stackrel{?}{=} \cos 90^\circ + \cos 90^\circ$

$\cos 180^\circ = \cos 90^\circ + \cos 90^\circ$

$-1 = 0 + 0$

False

$\cos(\alpha + \beta) = \cos\alpha \cdot \cos\beta - \sin\alpha \cdot \sin\beta$

$\cos(\alpha - \beta) = \cos\alpha \cdot \cos\beta + \sin\alpha \cdot \sin\beta$

$\cos(\alpha \pm \beta) = \cos\alpha \cdot \cos\beta \mp \sin\alpha \cdot \sin\beta$

$\sin(\alpha \pm \beta) = \sin\alpha \cdot \cos\beta \pm \sin\beta \cdot \cos\alpha$

$\cos 15^\circ = ?$

$\cos(45^\circ - 30^\circ) = \cos 45^\circ \cdot \cos 30^\circ + \sin 45^\circ \cdot \sin 30^\circ$

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

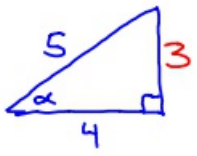
$= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$

$= \frac{\sqrt{6}+\sqrt{2}}{4}$

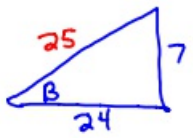
① If $\cos\alpha = \frac{4}{5}$ and $\tan\beta = \frac{7}{24}$,

then what is $\cos(\alpha - \beta)$?

α triangle



β triangle



$7^2 + 24^2 = c^2$

$c = 25$

$\cos(\alpha - \beta) = \cos\alpha \cdot \cos\beta + \sin\alpha \cdot \sin\beta$

$\frac{4}{5} \cdot \frac{24}{25} + \frac{3}{5} \cdot \frac{7}{25}$

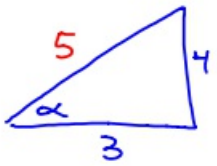
$\frac{96}{125} + \frac{21}{125}$

$\frac{117}{125}$

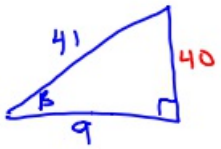
② If $\tan\alpha = \frac{4}{3}$ and $\cos\beta = \frac{9}{41}$,

then what is $\cos(\alpha + \beta)$?

α triangle



β triangle



$9^2 + b^2 = 41^2$

$81 + b^2 = 1681$

$b = 40$

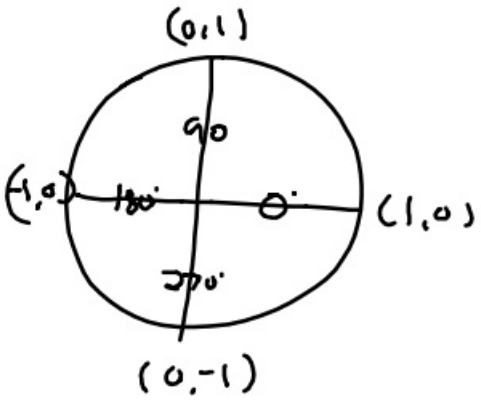
$\cos(\alpha + \beta) = \cos\alpha \cdot \cos\beta - \sin\alpha \cdot \sin\beta$

$\frac{3}{5} \cdot \frac{9}{41} - \frac{4}{5} \cdot \frac{40}{41}$

$\frac{27}{205} - \frac{160}{205}$

$\frac{-133}{205}$

3-29-18 4th Trig



$\cos(90° + 90°) \overset{?}{=} \cos 90 + \cos 90$

$\cos 180° = \cos 90° + \cos 90°$

$-1 = 0 + 0$

NOT TRUE

$\cos(\alpha + \beta) = \cos\alpha \cdot \cos\beta - \sin\alpha \cdot \sin\beta$

$\cos(\alpha - \beta) = \cos\alpha \cdot \cos\beta + \sin\alpha \cdot \sin\beta$

$\cos(\alpha \pm \beta) = \cos\alpha \cdot \cos\beta \mp \sin\alpha \cdot \sin\beta$

$\cos 15° = ?$

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

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

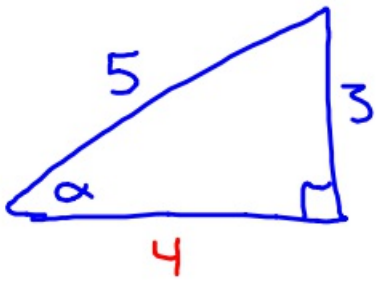
$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$

$\frac{\sqrt{6}+\sqrt{2}}{4}$

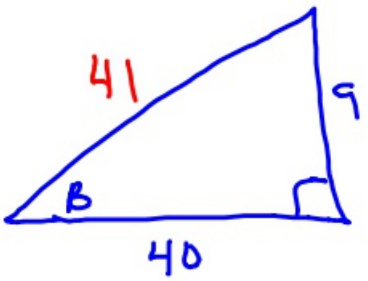
(1) If $\sin\alpha = \frac{3}{5}$ and $\tan B = \frac{9}{40}$.

what is $\cos(\alpha - B)$?

α triangle



B triangle



$40^2 + 9^2 = c^2$

$41 = c$

$\cos(\alpha - B) = \cos\alpha \cdot \cos B + \sin\alpha \cdot \sin B$

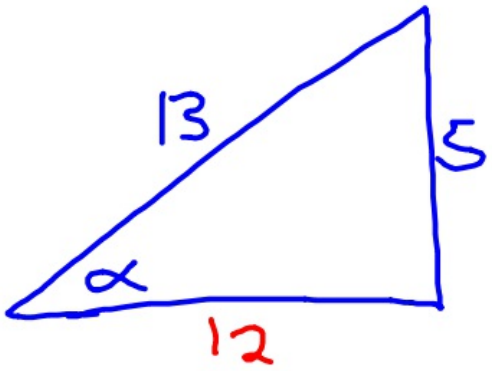
$\frac{4}{5} \cdot \frac{40}{41} + \frac{3}{5} \cdot \frac{9}{41}$

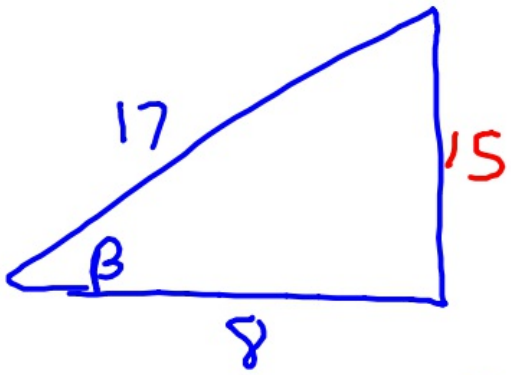
$\frac{160}{205} + \frac{27}{205}$

$\frac{187}{205}$

$\sin(\alpha \pm B) = \sin\alpha \cdot \cos B \pm \sin B \cdot \cos\alpha$

② If $\sin\alpha = \frac{5}{13}$ and $\cos\beta = \frac{8}{17}$, find $\cos(\alpha+\beta)$.





$a^2 + 5^2 = 13^2$

$a^2 = 144$

$a = 12$

$8^2 + b^2 = 17^2$

$64 + b^2 = 289$

$b = 15$

$\cos(\alpha+\beta) = \cos\alpha \cdot \cos\beta - \sin\alpha \cdot \sin\beta$

$\frac{12}{13} \cdot \frac{8}{17} - \frac{5}{13} \cdot \frac{15}{17}$

$\frac{96}{221} - \frac{75}{221}$

$\frac{21}{221}$