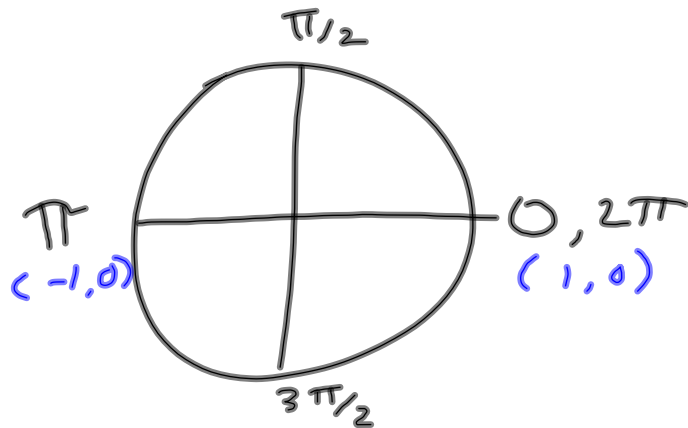


5-6-14
3rd Trig



$$\cos(\pi + \pi) = \cos 2\pi$$

$$\cos(\pi + \pi) \stackrel{?}{=} \cos \pi + \cos \pi$$

$$\cos 2\pi = -1 + -1$$

$$1 \neq -2$$

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

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

↓

Put into 1 formula

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

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

$$\cos 15^\circ = ?$$

Without a calculator
how can I figure it
out?

$$\cos(45^\circ - 30^\circ)$$

$$= \cos 45^\circ \cdot \cos 30^\circ + \sin 45^\circ \sin 30^\circ$$

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

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

$$\cdot 9659 \quad \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\sin 15^\circ$$

$$\sin(45^\circ - 30^\circ)$$

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

$$= \sin 45^\circ \cdot \cos 30^\circ - \sin 30^\circ \cdot \cos 45^\circ$$

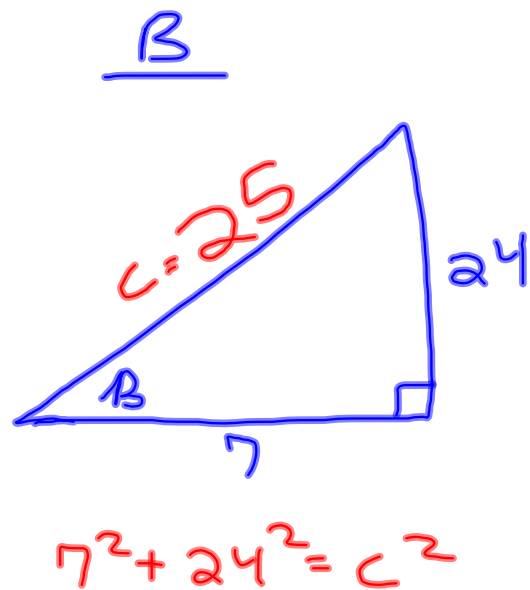
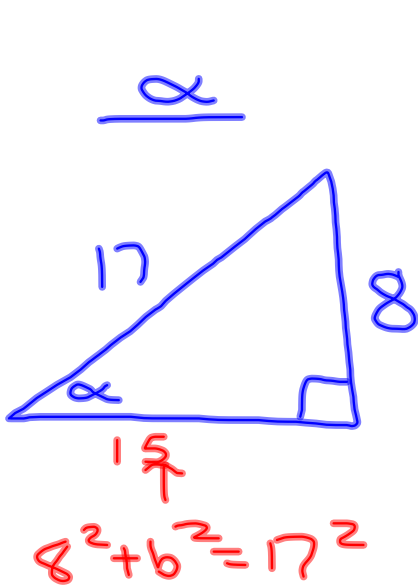
$$\downarrow \qquad \qquad \downarrow$$
$$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

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

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

$$\text{--- } \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

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



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

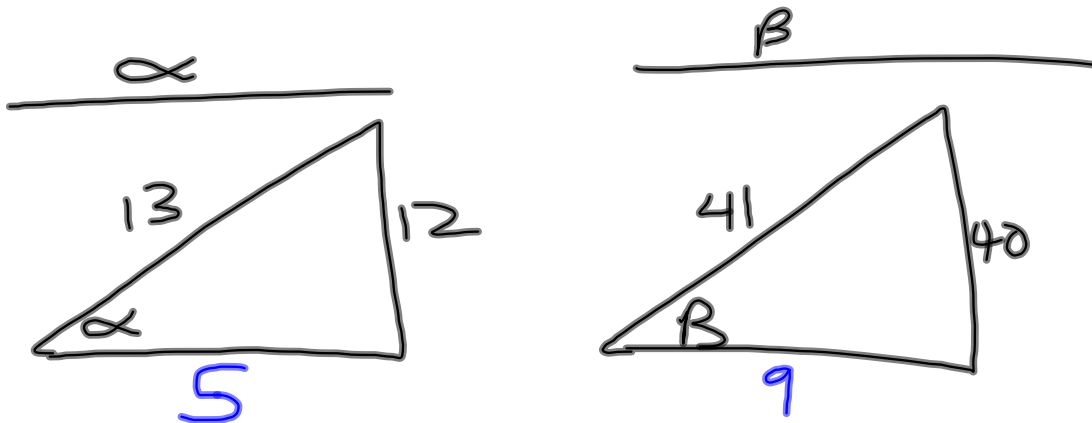
$$\downarrow$$

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

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

$$\frac{-87}{425}$$

② If $\sin \alpha = \frac{12}{13}$ and $\sin B = \frac{40}{41}$,
find $\cos(\alpha - B)$.



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

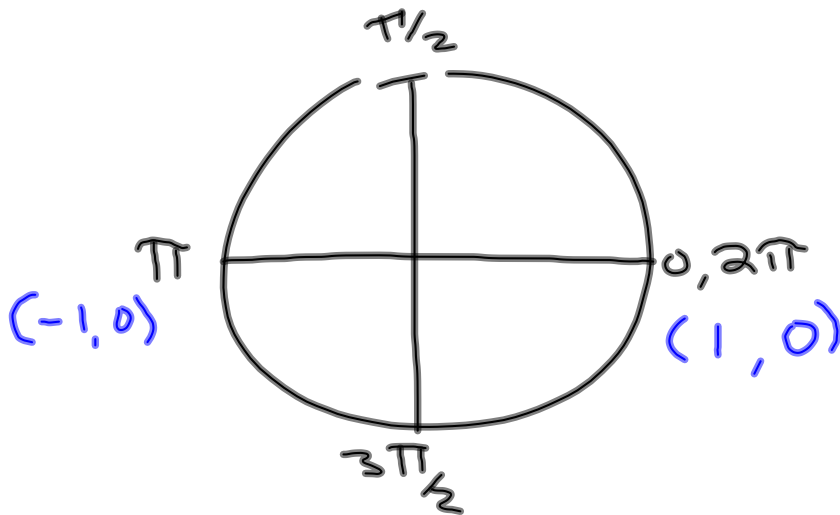
$$\begin{array}{c} \downarrow \quad \downarrow \\ \frac{5}{13} \cdot \frac{9}{41} + \frac{12}{13} \cdot \frac{40}{41} \end{array}$$

$$\frac{45}{533} + \frac{480}{533}$$

$$\frac{525}{533}$$

5-6-14

4th Trig



$$\cos(\pi + \pi) \stackrel{?}{=} \cos \pi + \cos \pi$$
$$\cos 2\pi \stackrel{?}{=} -1 + -1$$

↓

$$1 \neq -2$$

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

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

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

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

$$\cos 15^\circ$$

↓

$$\cos(45^\circ - 30^\circ)$$

$$= \cos 45^\circ \cdot \cos 30^\circ + \sin 45^\circ \cdot \sin 30^\circ$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ \frac{\sqrt{2}}{2} & \cdot \frac{\sqrt{3}}{2} & + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \end{array}$$

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

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

$$\cos 75^\circ = \cos(45^\circ + 30^\circ)$$

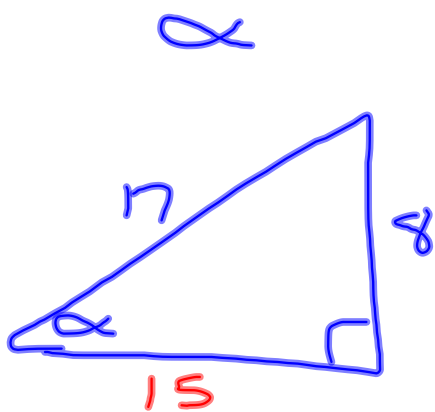
$$= \cos 45^\circ \cdot \cos 30^\circ - \sin 45^\circ \cdot \sin 30^\circ$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ \frac{\sqrt{2}}{2} & \cdot \frac{\sqrt{3}}{2} & - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \end{array}$$

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

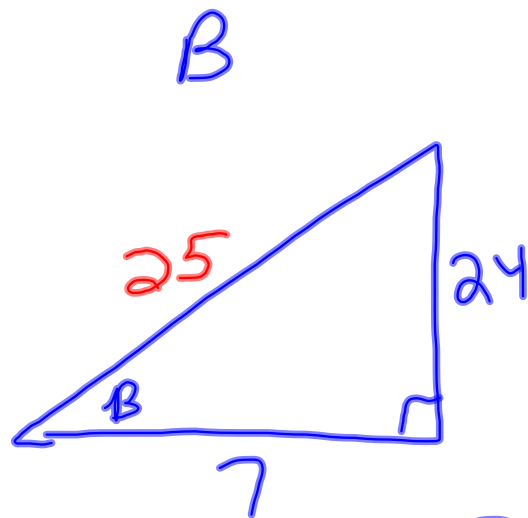
$$\frac{\sqrt{6} - \sqrt{2}}{4}$$

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



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

$$b = 15$$



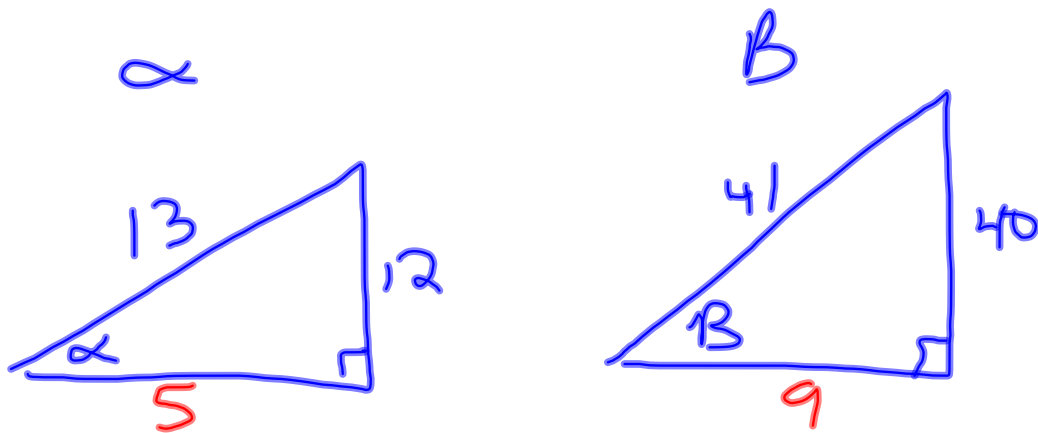
$$7^2 + 24^2 = c^2$$

$$c = 25$$

$$\begin{aligned} \cos(\alpha + B) &= \cos \alpha \cdot \cos B - \sin \alpha \cdot \sin B \\ &= \frac{15}{17} \cdot \frac{7}{25} - \frac{8}{17} \cdot \frac{24}{25} \\ &= \frac{105}{425} - \frac{192}{425} \\ &= \frac{-87}{425} \end{aligned}$$

Q If $\sin \alpha = \frac{12}{13}$ and $\sin B = \frac{40}{41}$,
find $\cos(\alpha - B)$.

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



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

$$\downarrow \quad \downarrow \quad + \quad \frac{12}{13} \cdot \frac{40}{41}$$

$$\frac{5}{13} \cdot \frac{9}{41} + \frac{12}{13} \cdot \frac{40}{41}$$

$$\frac{45}{533} + \frac{480}{533}$$

$$\frac{525}{533}$$