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

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

$$\sin(2A)=2\sin A\cos A$$

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

$$\cos(2A)=\cos^2 A-\sin^2 A$$

$$\cos(2A)=1-\sin^2 A-\sin^2 A$$

$$\cos(2A)=\cos^2 A-(1-\cos^2 A)$$

$$\cos(2A)=1-2\sin^2 A$$

$$\cos(2A)=2\cos^2 A-1$$

These are called the **Double Angle Identities for Sine & Cosine** (pg 121)

$$\sin(2A) = 2\sin A \cos A$$

$$\cos(2A) = \cos^2 A - \sin^2 A$$

$$\cos(2A) = 2\cos^2 A - 1$$

$$\cos(2A) = 1 - 2\sin^2 A$$

$$\sin(2A) = 2\sin A\cos A$$

$$\sin(60°) = 2\sin 30°\cos 30°$$

$$\sin(60°) = \cancel{2}\left(\frac{1}{\cancel{2}}\right)\left(\frac{\sqrt{3}}{2}\right)$$

$$\sin(60°) = \frac{\sqrt{3}}{2}$$

$$\cos(2A) = \cos^2 A - \sin^2 A$$

$$\cos(60°) = \cos^2 30° - \sin^2 30°$$

$$\cos(60°) = \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2$$

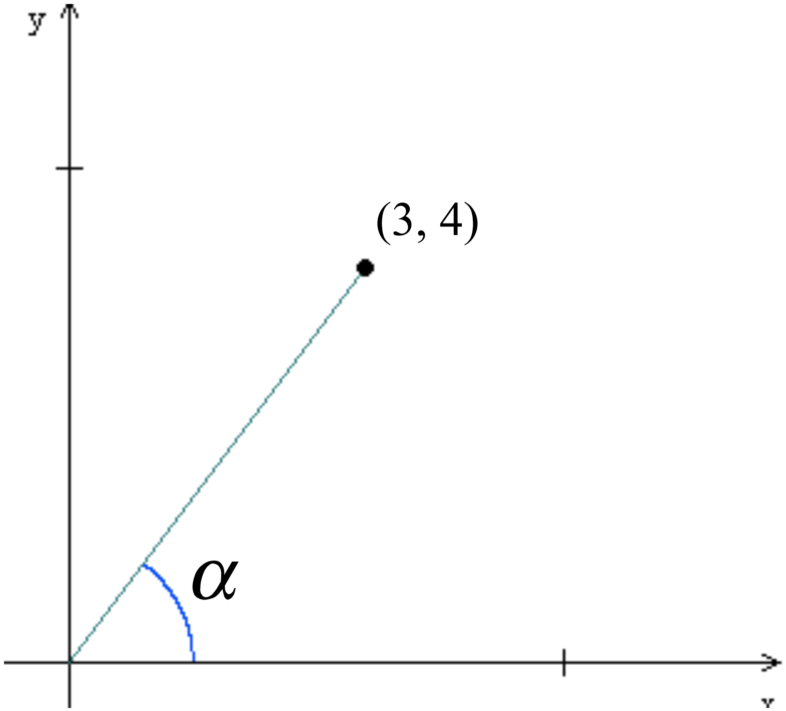
$$\cos(60°) = \frac{3}{4} - \frac{1}{4} = \frac{1}{2}$$

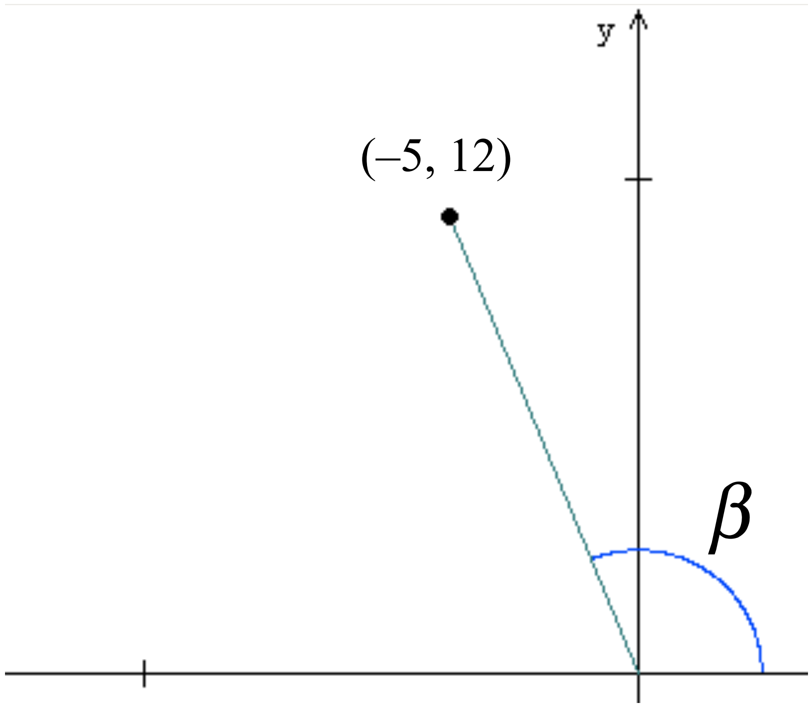
$$\cos(60°) = 1 - 2\sin^2 30°$$

$$\cos(60°) = 1 - 2\left(\frac{1}{2}\right)^2 = \frac{1}{2}$$

$$\cos(60°) = 2\cos^2 30° - 1$$

$$\cos(60°) = 2\left(\frac{\sqrt{3}}{2}\right)^2 - 1 = \frac{1}{2}$$





$$\sin\alpha = \frac{4}{5}$$

$$\sin\beta = \frac{12}{13}$$

$$\cos\alpha = \frac{3}{5}$$

$$\cos\beta = -\frac{5}{13}$$

Use the answers you have and the composite identities to solve the given problems

$\sin\alpha = \frac{4}{5}$ $\cos\alpha = \frac{3}{5}$ $\sin\beta = \frac{12}{13}$ $\cos\beta = -\frac{5}{13}$

$$\sin(2\alpha) = 2\sin\alpha\cos\alpha = 2\cdot\frac{4}{5}\cdot\frac{3}{5} = \frac{24}{25}$$

$$\sin(2\beta) = 2\sin\beta\cos\beta = 2\cdot\frac{12}{13}\cdot\left(-\frac{5}{13}\right) = -\frac{120}{169}$$

$$\cos(2\alpha) = \cos^2\alpha - \sin^2\alpha = \left(\frac{3}{5}\right)^2 - \left(\frac{4}{5}\right)^2 = \frac{9}{25} - \frac{16}{25} = -\frac{7}{25}$$

$$\cos(2\beta) = \cos^2\beta - \sin^2\beta = \left(-\frac{5}{13}\right)^2 - \left(\frac{12}{13}\right)^2 = \frac{25}{169} - \frac{144}{169} = -\frac{119}{169}$$

This is consistent with 2α being a 2nd quadrant angle

This is consistent with 2β being a 3rd quadrant angle

Pg. 124 #1, 2, 4, 9