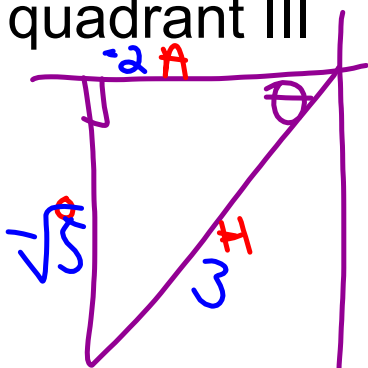


### Part III: Given information not on Unit Circle, Evaluate

Ex 7) If  $\cos \theta = -\frac{2}{3}$ , find  $\sin \theta$  if  $\theta$  is in quadrant III



SOHCAHTOA

$$(-2)^2 + b^2 = 3^2$$

$$4 + b^2 = 9$$

$$b^2 = 5$$

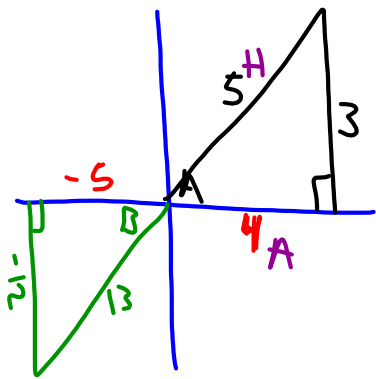
$$b = \sqrt{5}$$

$$\sin \theta = \frac{-\sqrt{5}}{3}$$

Ex 8) Given  $\sin A = \frac{3}{5}$  and  $\sin B = \frac{-12}{13}$ , and

$\angle A$  is in QI, and  $\angle B$  is in QIII.

Find  $\cos(A+B)$  and  $\tan(A+B)$



$$\tan A = \frac{3}{4}$$

$$\tan B = \frac{-12}{-5} = \frac{12}{5}$$

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

$$\cos A \cos B - \sin A \sin B$$

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

$$\frac{-20}{65} + \frac{+36}{65}$$

$$\frac{-20+36}{65} = \boxed{\frac{16}{65}}$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$= \frac{5 \cdot \left(\frac{3}{4}\right) + \left(\frac{12}{5}\right) \cdot 4}{1 - \left(\frac{3}{4}\right)\left(\frac{12}{5}\right)} = \frac{\frac{15}{20} + \frac{48}{20}}{1 - \frac{36}{20}}$$

$$= \frac{\frac{63}{20}}{\frac{-16}{20}} = \frac{63}{-16} = -\frac{63}{16} \text{ or } -\frac{63}{16}$$

Ex 9) Given  $\cos A = \frac{\sqrt{2}}{4}$  and  $\sin B = \frac{-\sqrt{5}}{6}$ , and

$\angle A$  and  $\angle B$  are in QIV.

Find  $\cos(A+B)$  and  $\sin(A-B)$

$$(\sqrt{2})^2 + b^2 = 4^2$$

$$2 + b^2 = 16$$

$$\sqrt{b^2} = \sqrt{14}$$

$$a^2 + (-\sqrt{5})^2 = 6^2$$

$$a^2 + 5 = 36$$

$$\sqrt{a^2} = \sqrt{31}$$

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

$$\left(\frac{-\sqrt{14}}{4}\right)\left(\frac{\sqrt{31}}{6}\right) + \left(\frac{\sqrt{2}}{4}\right)\left(\frac{-\sqrt{5}}{6}\right)$$

$$\frac{-\sqrt{434}}{24} + \frac{-\sqrt{10}}{24}$$

$$\frac{-\sqrt{434} - \sqrt{10}}{24}$$

