

## Math 121 – Quiz 5 Solution

Given

$$\sin \theta = -\frac{1}{3}, \quad \pi < \theta < \frac{3\pi}{2} \quad \text{and} \quad \cos \beta = \frac{4}{5}, \quad 0 < \beta < \frac{\pi}{2}$$

compute the following:

(a)  $\sin 2\beta$       (b)  $\sin(\theta + \beta)$       (c)  $\cos(\theta - \beta)$

**Solution:**

$$1. \sin 2\beta = 2 \sin \beta \cos \beta = 2 \left(\frac{3}{5}\right) \left(\frac{4}{5}\right) = \frac{24}{25}$$

$$2. \sin(\theta + \beta) = \sin \theta \cos \beta + \cos \theta \sin \beta = \left(-\frac{1}{3}\right) \left(\frac{4}{5}\right) + \left(-\frac{2\sqrt{2}}{3}\right) \left(\frac{3}{5}\right) = \frac{-4 - 6\sqrt{2}}{15}$$

$$3. \cos(\theta - \beta) = \cos \theta \cos \beta + \sin \theta \sin \beta = \left(-\frac{2\sqrt{2}}{3}\right) \left(\frac{4}{5}\right) + \left(-\frac{1}{3}\right) \left(\frac{3}{5}\right) = \frac{-8\sqrt{2} - 3}{15}$$