

$$1. \cos A = \frac{2}{7} \quad 0 < \theta < \frac{\pi}{2}$$

$$\text{AND } \cos A = \frac{x}{r}$$

$$\text{so } x=2, r=7$$

$$x^2 + y^2 = r^2$$

$$2^2 + y^2 = 7^2$$

$$4 + y^2 = 49$$

$$y^2 = 49 - 4$$

$$y^2 = 45$$

$$y = \pm \sqrt{45}$$

$$y = \pm \sqrt{3 \cdot 3 \cdot 5}$$

$$y = 3\sqrt{5}$$

$$\text{AND } \sin A = \frac{y}{r}$$

$$\sin A = \frac{3\sqrt{5}}{7}$$

$$\cos A = \frac{2}{7} \quad \sin A = \frac{3\sqrt{5}}{7}$$

$$\cos A = \frac{2}{7} \quad \sin A = \frac{3\sqrt{5}}{7}$$

$$\begin{aligned} a) \sin(2\theta) &= 2 \sin A \cos A \\ &= 2 \left(\frac{3\sqrt{5}}{7} \right) \left(\frac{2}{7} \right) \\ &= \frac{12\sqrt{5}}{49} \end{aligned}$$

$$\begin{aligned} b) \cos(2\theta) &= \cos^2 A - \sin^2 A \\ &= \left(\frac{2}{7} \right)^2 - \left(\frac{3\sqrt{5}}{7} \right)^2 \\ &= \frac{4}{49} - \frac{9(5)}{49} \\ &= \frac{4}{49} - \frac{45}{49} \\ &= \frac{-41}{49} \end{aligned}$$

$$c) \sin \frac{A}{2}$$

$$= \sqrt{\frac{1 - \cos A}{2}}$$

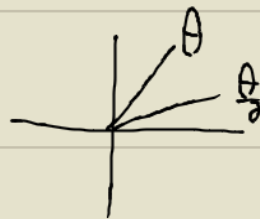
$$= \sqrt{\frac{1 - \frac{2}{7}}{2}}$$

$$= \sqrt{\frac{7-2}{14}}$$

$$= \sqrt{\frac{5}{14}}$$

$$= \frac{\sqrt{5}}{\sqrt{14}}$$

$$= \frac{\sqrt{70}}{14}$$



$$\begin{aligned} d) \cos \frac{A}{2} &= \sqrt{\frac{1 + \cos A}{2}} \\ &= \sqrt{\frac{1 + \frac{2}{7}}{2}} \\ &= \sqrt{\frac{7+2}{14}} \\ &= \sqrt{\frac{9}{14}} \end{aligned}$$

$$\begin{aligned} &= \frac{\sqrt{9}}{\sqrt{14}} \\ &= \frac{3}{\sqrt{14}} \\ &= \frac{3\sqrt{14}}{14} \end{aligned}$$