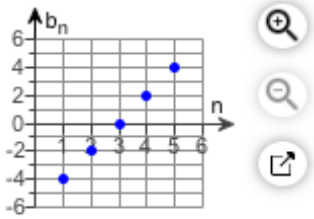
Period 4, May 8, 2025

Use the graphs of $\{b_n\}$ and $\{c_n\}$ to find the indicated sum.

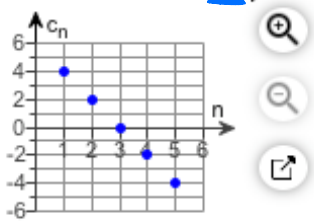
$$\sum_{i=1}^{5} 2b_i^2 + \sum_{i=1}^{5} 5c_i^2$$

80 + 200 = 280

The graph of $\{b_n\}$



The graph of $\{c_n\}$



$$\sum_{i=1}^{5} 2b_i^2 + \sum_{i=1}^{5} 5c_i^2 = \square$$

$\sum_{i=1}^{5} 2 \cdot b_i^2 = 2(-4)^2 + 2(-2)^2 + 2(0)^2 + 2(2)^2 + 2(4)^2$

$2 \cdot 16 + 2 \cdot 4 + 2 \cdot 00 + 2 \cdot 4 + 2 \cdot 16$

$32 + 8$

40

$+$

$8 + 32$

40

$\sum_{i=1}^{5} 5c_i^2 = 5(4)^2 + 5(2)^2 + 5(0)^2 + 5(-2)^2 + 5(-4)^2$

$= 80 + 20 + 0 + 80 + 20$

100 $+$ 100

$\sin\theta - 1 = 0$

$\sin\theta = 1$

$\theta = \frac{\pi}{2}$

$\sin\theta - 1 = 0$

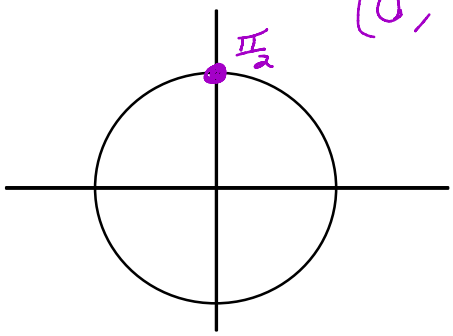
$+1 \quad +1$

$\sin\theta = 1$

$\theta = \frac{\pi}{2}$

$(\cos\theta, \sin\theta)$

$(0, 1)$



$\cos 2\theta - \sin\theta = 0$

$1 - 2\sin^2\theta - \sin\theta = 0$

$-1(-2\sin^2\theta - \sin\theta + 1) = 0 \cdot -1$

$2\sin^2\theta + \sin\theta - 1 = 0 \Rightarrow 2\sin^2\theta + 2\sin\theta - 1\sin\theta - 1 = 0$

$2 \cdot -1 = -2$

$2 \quad -1 = +1$

$2\sin\theta(\sin\theta + 1) \quad -1(\sin\theta + 1) = 0$

$(\sin\theta + 1)(2\sin\theta - 1) = 0$

$\sin\theta + 1 = 0$ or $2\sin\theta - 1 = 0$

$-1 \quad -1 \qquad +1 \quad +1$

$\sin\theta = -1$ $\qquad \frac{2\sin\theta}{2} = \frac{1}{2}$

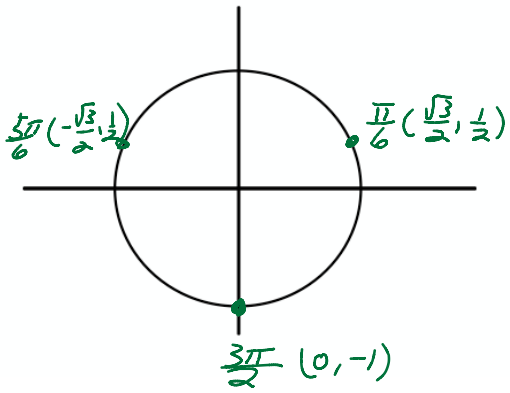
$\theta = \frac{3\pi}{2}$ $\qquad \sin\theta = \frac{1}{2}$

$\theta = \frac{\pi}{6}$ or $\theta = \frac{5\pi}{6}$

$\cos 2\theta = \cos^2\theta - \sin^2\theta$

$= 2\cos^2\theta - 1$

$= 1 - 2\sin^2\theta$



$2\sin\theta\cos\theta = -\sin\theta$

$+\sin\theta \quad +\sin\theta$

$2\sin\theta\cos\theta + \sin\theta = 0$

$\sin\theta(2\cos\theta + 1) = 0$

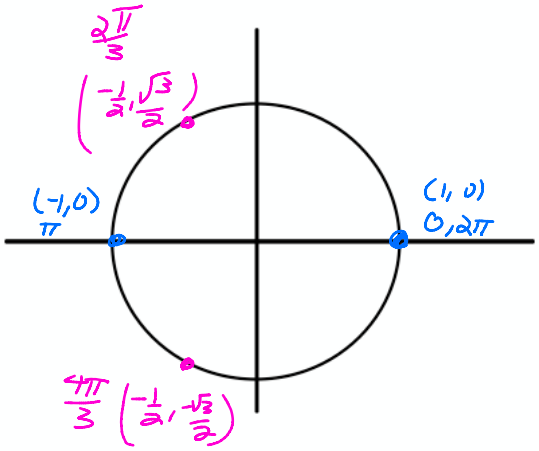
$\sin\theta = 0$ or $2\cos\theta + 1 = 0$

$\theta = 0, \pi, 2\pi$ $\quad -1 \quad -1$

$\frac{2\cos\theta}{2} = \frac{-1}{2}$

$\cos\theta = -\frac{1}{2}$

$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$



$2\sin^4\theta - 5\sin^2\theta = -2$

$+2 \quad +2$

$2\sin^4\theta - 5\sin^2\theta + 2 = 0 \Rightarrow 2\sin^4\theta - 4\sin^2\theta - 1\sin^2\theta + 2$

$2 \cdot 2 = 4$

$-4 \quad -1 = -5$

$2\sin^2\theta(\sin^2\theta - 2) - 1(\sin^2\theta - 2)$

$(\sin^2\theta - 2)(2\sin^2\theta - 1) = 0$

$\sin^2\theta - 2 = 0$ or $2\sin^2\theta - 1 = 0$

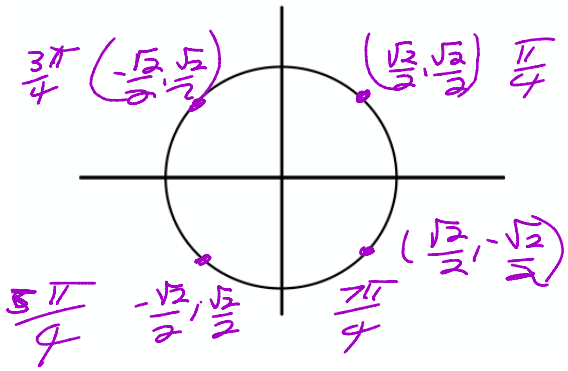
$+2 \quad +2 \qquad +1 \quad +1$

$\sin^2\theta = 2$ or $\frac{2\sin^2\theta}{2} = \frac{1}{2}$

$\sqrt{\sin^2\theta} = \sqrt{2}$ or $\sqrt{\sin^2\theta} = \sqrt{\frac{1}{2}}$

$\sin\theta = \pm\sqrt{2} = \pm 1.414$ or $\sin\theta = \pm\frac{1}{\sqrt{2}}\frac{\sqrt{2}}{\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$

$-1 \le \sin\theta \le 1$



$$\frac{1-\sin\theta}{\cos\theta} = \cos\theta$$

$\cos\frac{\pi}{2} = 0$

$\cos\theta$

$$\frac{1-\sin\theta}{\cos\theta} = \cos\theta \cdot \cos\theta$$

$$1-\sin\theta = \cos^2\theta$$

$$1-\sin\theta = 1-\sin^2\theta$$

$-1 \quad -1$

$$-\sin\theta = -\sin^2\theta$$

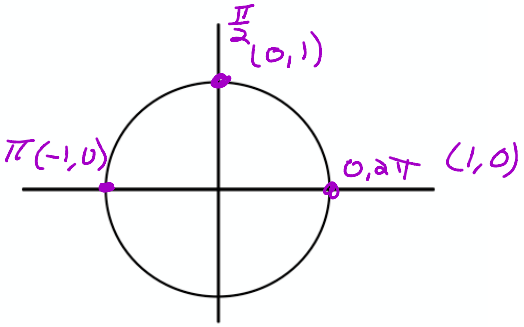
$+\sin^2\theta \quad +\sin^2\theta$

$$\sin^2\theta - \sin\theta = 0$$

$$\sin\theta(\sin\theta - 1) = 0$$

$\sin\theta = 0$ or $\sin\theta - 1 = 0$

$\sin\theta = 1$



$\theta = \frac{\pi}{2}, \pi, 0, 2\pi$