Bonus 8: H16.a

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$$a_0 = \frac{1}{3}\sum_{i=-3}^{2} y_i = \frac{1}{3}\cdot(0.54 + 0.37 + 0.69 + 1.87 + 2.69 + 1.44) =$$

$$\underline{a_0 = 2.533}$$

$$a_1 = \frac{1}{3}\sum_{i=-3}^{2} y_i \cdot \cos(x_i) = \frac{1}{3}(-0.54 - 0.185 + 0.345 + 1.87 + 1.345 - 0.72)$$

$$\underline{a_1 = 0.705}$$

$$a_2 = \frac{1}{3}\sum_{i=-3}^{2} y_i \cos(2x_i) = \frac{1}{3}\cdot(0.54 - 0.185 - 0.345 + 1.87 - 1.345 - 0.72)$$

$$\underline{a_2 = -0.062}$$

$$b_1 = \frac{1}{3}\sum_{i=-3}^{2} y_i \cdot \sin(x_i) = \frac{1}{3}\cdot(0 - 0.320 - 0.598 + 0 + 2.330 + 1.247)$$

$$\underline{b_1 = 0.886}$$

$$b_2 = \frac{1}{3}\sum_{i=-3}^{2} y_i \cdot \sin(2x_i) = \frac{1}{3}\cdot(0 + 0.320 - 0.598 + 0 + 2.330 - 1.247)$$

$$\underline{b_2 = 0.268}$$

approximate at $x = \pi/2$:

$$f(\pi/2) = \frac{a_0}{2} + a_1\cos(\pi/2) + b_1\sin(\pi/2) + a_2\cos(\pi) + b_2\sin(\pi)$$

$\cos(\pi/2) = 0$, $\sin(\pi/2) = 1$, $\cos(\pi) = -1$, $\sin(\pi) = 0$

$$f(\pi/2) = \frac{2.533}{2} + 0.705\cdot 0 + 0.866 + 0.062 + 0.268\cdot 0$$

$$\boxed{f(\pi/2) = 2.1945}$$