7) To extend the fourier series we extend over $f(x) = -f(-x)$

$$\text{so}: \begin{cases} f(x), & 0 \le x \le \pi \\ -f(-x), & -\pi \le x \le 0 \end{cases}$$

$$\rightarrow f(x) = \sum_{n=1}^{\infty} b_n \cdot \sin(nx)$$

$$\text{with } b_n = \frac{2}{\pi} \int_0^{\pi} f(x) \cdot \sin(nx)\, dx$$

$$\rightarrow \text{fill in } f(x) = x^3$$

$$b_n = \frac{2}{\pi} \int_0^{\pi} x^3 \cdot \sin(nx)\, dx$$