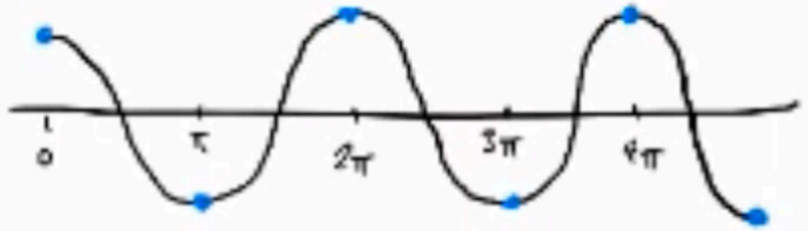
$$0, \quad x<0$$

$$a_0 = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\,dx = \frac{1}{\pi}\int_0^{\pi} dx = 1$$

$$a_n = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\cos nx\,dx = \frac{1}{\pi}\int_0^{\pi}\cos nx\,dx = \frac{1}{n\pi}\Big[\sin nx\Big]_0^{\pi} = 0$$

$$b_n = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\sin nx\,dx = \frac{1}{\pi}\int_0^{\pi}\sin nx\,dx = \frac{1}{n\pi}\Big[-\cos nx\Big]_0^{\pi} = \frac{1-(-1)^n}{n\pi}$$

$$(-1)^n = \cos nx$$



$$f \sim \frac{1}{2} + \sum_{n=1}^{\infty}\frac{1-(-1)^n}{n\pi}\sin nx = \frac{1}{2} + \frac{2}{\pi}\left(\sin x + \frac{1}{3}\sin 3x + \frac{1}{5}\sin 5x + \dots\right)$$

$$= \frac{1}{2} + \frac{2}{\pi}\sum_{\substack{n=1\\ n \text{ odd}}}^{\infty}\frac{\sin nx}{n}$$

$$= \frac{1}{2} + \frac{2}{\pi}\sum_{k=0}^{\infty}\frac{\sin(2k+1)x}{2k+1}$$