$$= -\frac{1}{n\pi}(\cos n\pi + \cos n\pi) + 0 - 0$$

$$= -\frac{2}{n\pi}\cos n\pi = \begin{cases} \frac{2}{n\pi} & n \text{ odd} \\ -\frac{2}{n\pi} & n \text{ even} \end{cases}$$

We can also write $\cos n\pi = (-1)^n$

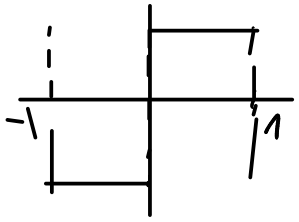
so $b_n = \frac{-2}{n\pi}(-1)^n = \frac{2}{n\pi}(-1)^{n+1}$

So the Fourier series for the sawtooth is

$$f(t) = \sum_{n=1}^{\infty} \frac{2}{n\pi}(-1)^{n+1} \sin n\pi t$$

Compare with square wave of same period

$$\sum_{n \text{ odd}} \frac{4}{n\pi} \sin n\pi t$$



In the square wave, only odd multiples of the fundamental occur
In the sawtooth, all multiples of the fundamental occur.
In both, the amplitude of the nth multiple is proportional to $1/n$.

For triangle wave 

Odd multiples of fundamental are present, but the nth has amplitude proportional to $1/n^2$.