

The number of x -intercepts on the graph of

$$y = \sin\left(\frac{1}{x}\right)$$

in the interval $(0.0001, 0.001)$ is ?

$$\sin\left(\frac{1}{x}\right) = 0 \iff \frac{1}{x} = n\pi \quad (n \in \mathbb{Z})$$

So we want
$$\iff x = \frac{1}{n\pi}$$

$$0.0001 < \frac{1}{n\pi} < 0.001$$

$$\Rightarrow 1 \times 10^{-4} < \frac{1}{n\pi} < 1 \times 10^{-3}$$

$$\Rightarrow 10^3 < n\pi < 10^4$$

$$\Rightarrow \frac{10^3}{\pi} < n < \frac{10^4}{\pi}$$

$$\Rightarrow 318.3... < n < 3183.1...$$

$$\Rightarrow 319 \leq n \leq 3183$$

$$\Rightarrow 1 \leq n - 318 \leq 2865$$

So there are **2865** solutions.