

Problem 19

How many zeros does $f(x)$ have on $[0, 1)$?

$$f(x) = \frac{\cos^3(3\pi x)}{\cot(\pi x)}$$

Answer

3

Explanation

Rewrite the function as $(\cos(3\pi x))^3 \cdot \tan(\pi x)$, so setting each factor equal to zero we obtain $x = \frac{1}{6}, \frac{1}{2}, \frac{5}{6}$ and 0, but $\tan(\frac{\pi}{2})$ is undefined, so reject $\frac{1}{2}$, which means $f(x)$ has 3 zeros.