

# Math 131 - Quiz 8

November 11, 2020

Name key

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary. This quiz is worth 10 points, and it is due on November 16.

Let  $f(x) = x - 2\sin x$  on  $[-2, 3]$ . Find open intervals on which  $f$  is increasing/decreasing. Identify all relative and absolute extreme values.

$$f'(x) = 1 - 2\cos x = 0$$

$$\cos x = \frac{1}{2}$$

$$x = \frac{\pi}{3} + 2k\pi$$

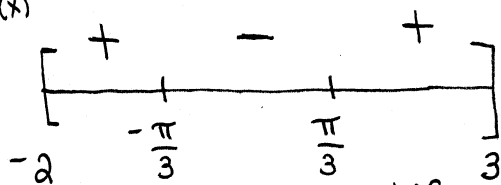
or

$$x = -\frac{\pi}{3} + 2k\pi$$

THE ONLY SOLUTIONS IN  $[-2, 3]$

ARE  $-\frac{\pi}{3}, \frac{\pi}{3}$ . THESE ARE CRIT. #s.

SIGNS OF  $f'(x)$



$f$  IS INC. DEC. INC

$f'(x)$  DNE NEVER.

$$f(-2) \approx -0.181$$

$$f(-\frac{\pi}{3}) \approx 0.685$$

$$f(\frac{\pi}{3}) \approx -0.685 \leftarrow \text{ABS MIN.}$$

$$f(3) \approx 2.718 \leftarrow \text{ABS MAX.}$$

$f$  IS INCREASING ON  $(-2, -\frac{\pi}{3}) \cup (\frac{\pi}{3}, 3)$

$f$  IS DECREASING ON  $(-\frac{\pi}{3}, \frac{\pi}{3})$

$$f(-\frac{\pi}{3}) = -\frac{\pi}{3} + \sqrt{3} \approx 0.685$$

IS A REL. MAX.

$$f(\frac{\pi}{3}) = \frac{\pi}{3} - \sqrt{3} \approx -0.685$$

IS A REL. MIN.