

1. State where is the function $f(x)$ increasing and decreasing:

a. $f(x) = x^2 - 12x$

b. $f(x) = \sqrt{x^2 - 9}$

2. State any local extrema and all increasing and decreasing intervals for $f(x) = -2\cos(2x + \pi)$ on the interval $[0, \pi]$

3. Find the value of "c" that is guaranteed by MVT for $y = x^3 - 5x^2 + 2x - 3$ on $[1, 3]$.

4. Find all possible functions with the given derivative.

a. $f'(x) = 2\sec x \tan x$

b. $f'(x) = -3e^x + \csc^2 x + \cos x$

c. $f'(x) = 4x^3 + x^2 - 12x + 3$

5. Find the function with the given derivative that passes through the point P.

$$f'(x) = 6x^2 - 4x + \frac{1}{x} + 1 \quad P(1, -4)$$

6. Find the local and absolute extrema of the function on the given interval. $f(x) = 2x^3 - 4x^2$ on $[-2, 2]$