

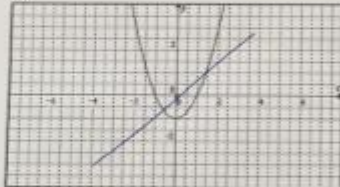


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Name: Brenda Díaz Sánchez Group: 401 Date: 13/11/17

1. Use the graph to find the intervals in which the graph of $f(x)$ is increasing or decreasing and sketch the derivative

1)



$f(x)$ is increasing: $(0, \infty)$

$f(x)$ is decreasing: $(-\infty, 0)$

2)



$f(x)$ is increasing: $(-\infty, 0.75)$

$f(x)$ is decreasing: $(0.75, \infty)$

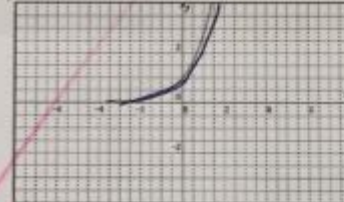
3)



$f(x)$ is increasing: $(-\infty, -2)$, $(-1, 1)$, $(2, \infty)$

$f(x)$ is decreasing: $(-2, 1)$, $(1, 2)$

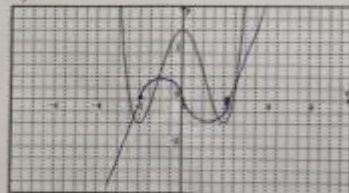
4)



$f(x)$ is increasing: $(-\infty, \infty)$

$f(x)$ is decreasing: does not apply

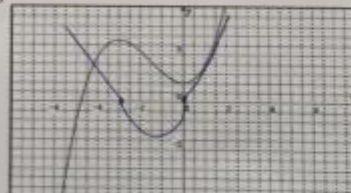
5)



$f(x)$ is increasing: $(-2, 0)$, $(2, \infty)$

$f(x)$ is decreasing: $(-\infty, -2)$, $(0, 2)$

6)



$f(x)$ is increasing: $(-\infty, -3)$ and $(0, \infty)$

$f(x)$ is decreasing: $(-3, 0)$

II. For each of the following functions find:

1) $f(x) = x^2 - 6x^2 + 9x + 1$

a) Domain $(-\infty, \infty)$ or \mathbb{R}

b) Derivative of $f(x) = 2x^2 - 12x + 9$

c) Critical Values when $f'(x) = 0$ $x = 3$ $x = 1$

d) Maximum and minimum coordinates

e) Intervals where the function is increasing $(-\infty, 1) \cup (3, \infty)$

f) Intervals where the function is decreasing $(1, 3)$

min (3, 1)
max (1, 5)

2) $y = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$

a) Domain \mathbb{R}

b) Derivative of $f(x) = x^2 + x - 6$

c) Critical Values when $f'(x) = 0$ $x = -3$ $x = 2$

d) Maximum and minimum coordinates

e) Intervals where the function is increasing $(-\infty, -3) \cup (2, \infty)$

f) Intervals where the function is decreasing $(-3, 2)$

$-9 + \frac{9}{2} + 18 + 8$
 $\frac{9}{2} + 2 - 12 + 8$

max (-3, 21.5)
min (2, 0.66)

$(-\infty, -3)$ $(-3, 2)$ $(2, \infty)$
T.V. -4 0 3
+ - +
inc dec inc

3) $f(x) = x^3 + x^2 - 5x - 5$

a) Domain \mathbb{R}

b) Derivative of $f(x) = 3x^2 + 2x - 5$

c) Critical Values $x = 1$ $x = -1.66$

d) Maximum and minimum coordinates

e) Intervals where the function is increasing $(-\infty, -1.66) \cup (1, \infty)$

f) Intervals where the function is decreasing $(-1.66, 1)$

$-9.57 + 2.7556 + 3.3 - 5$
 $-4.64 + 2.7556 - 8.3 - 5$

max (-1.66, 1.47)
min (1, -8)

$(-\infty, -1.66)$ $(-1.66, 1)$ $(1, \infty)$
-2 -1 2
+ - +
 $x = -1.66$ $x = 1$

4) $f(x) = x^4 - 8x^2 + 1$

a) Domain \mathbb{R}

b) Derivative of $f(x) = 4x^3 - 16x$

c) Critical Values $x = 0$ $x = -2$ $x = 2$

d) Maximum and minimum coordinates

e) Intervals where the function is increasing $(-2, 0) \cup (2, \infty)$

f) Intervals where the function is decreasing $(-\infty, -2) \cup (0, 2)$

max (-2, 7)
min (2, -15)

$(-\infty, -2)$ $(-2, 0)$ $(0, 2)$ $(2, \infty)$
- + -

5) $g(x) = \frac{x^4}{4} - \frac{x^3}{3} - 3x^2 + 1$

a) Domain \mathbb{R}

b) Derivative of $f(x) = x^3 - x^2 - 6x$

c) Critical Values $x = 0$ $x = 3$ $x = -2$

d) Maximum and minimum coordinates

e) Intervals where the function is increasing $(-2, 0) \cup (3, \infty)$

f) Intervals where the function is decreasing $(-\infty, -2) \cup (0, 3)$

MIN (-2, -13.3)
MAX (0, 1)

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