

Last Name: SOLUTIONS

First Name: _____

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Quiz 10B

Question 1. (5 marks) Use the second derivative test to find the relative extrema if any of

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

$$f'(x) = 6x^2 + 6x - 12$$

$$f'(x) = 0$$

$$6x^2 + 6x - 12 = 0$$

$$6(x^2 + x - 2) = 0$$

$$6(x+2)(x-1) = 0$$

$$x = -2, x = 1$$

$$f''(x) = 12x + 6$$

$$\bullet f''(-2) = 12(-2) + 6 = -18 < 0$$

$$\therefore f(-2) = 2(-2)^3 + 3(-2)^2 - 12(-2) - 4 = 16 \text{ IS A RELATIVE MAXIMUM.}$$

$$\bullet f''(1) = 12(1) + 6 = 18 > 0$$

$$\therefore f(1) = 2(1)^3 + 3(1)^2 - 12(1) - 4 = -11 \text{ IS A RELATIVE MINIMUM}$$

Question 2. (5 marks) Find the inflection points if any of $f(x) = x^4 - 2x^3 + 6$.

$$f'(x) = 4x^3 - 6x^2$$

$$f''(x) = 12x^2 - 12x$$

$$f''(x) = 0$$

$$12x^2 - 12x = 0$$

$$12x(x-1) = 0$$

$$x = 0, x = 1$$

~~$f''(x)$ D.N.E.
POLYNOMIAL~~

TEST POINTS

$$x = -1 : f''(-1) = 12(-1)^2 - 12(-1) = 24 > 0$$

$$x = \frac{1}{2} : f''(\frac{1}{2}) = 12(\frac{1}{2})^2 - 12(\frac{1}{2}) = -3 < 0$$

$$x = 2 : f''(2) = 12(2)^2 - 12(2) = 36 > 0$$

$$\therefore f(0) = 6 \Rightarrow (0, 6) \text{ IS AN I.P.}$$

$$f(1) = 5 \Rightarrow (1, 5) \text{ IS AN I.P.}$$

