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Quiz 10A

Question 1. (5 marks) Find the inflection points if any of $f(x) = 3x^4 - 4x^3 + 1$.

$$f'(x) = 12x^3 - 12x^2$$

$$f''(x) = 36x^2 - 24x$$

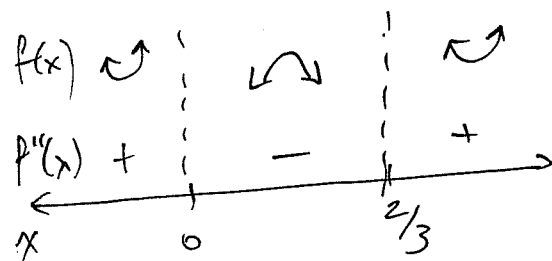
$$f''(x) = 0$$

$$36x^2 - 24x = 0$$

$$2x(3x - 2) = 0$$

$$x = 0, x = \frac{2}{3}$$

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



TEST POINTS

$$x = -1 : f''(-1) = 60 > 0$$

$$x = \frac{1}{3} : f''(\frac{1}{3}) = -4 < 0$$

$$x = 2 : f''(2) = 96 > 0$$

$$\therefore f(0) = 1 \Rightarrow (0, 1) \text{ IS AN I.P.}$$

$$f(\frac{2}{3}) = \frac{11}{27} \Rightarrow (\frac{2}{3}, \frac{11}{27}) \text{ IS AN I.P.}$$

Question 2. (5 marks) Use the second derivative test to find the relative extrema if any of

$$f(x) = \frac{1}{3}x^3 - 2x^2 - 5x - 10$$

$$f'(x) = x^2 - 4x - 5 = 0$$

$$(x - 5)(x + 1) = 0$$

$$\therefore x = -1, 5$$

$$f''(x) = 2x - 4$$

$$f''(-1) = 2(-1) - 4 = -6 < 0$$

$$\therefore f(-1) = -\frac{22}{3} \text{ IS A RELATIVE MAX}$$

$$f''(5) = 2(5) - 4 = 6 > 0$$

$$\therefore f(5) = -\frac{130}{3} \text{ IS A RELATIVE MINIMUM}$$