

For: $f(x) = 3x^5 - 5x^4 + 1$ Find:

Critical Numbers:

Increasing:

Decreasing:

Maximums:

Minimums:

Point of Inflections:

Concave Up:

Concave Down:

For $f(x) = 3x^5 - 5x^4 + 1$ Find:

Critical Numbers: $x = 0 \ \& \ 4/3$

Increasing: $(-\infty, 0) \cup (4/3, \infty)$

Decreasing: $(0, 4/3)$

Maximums: $x = 0$

Minimums: $x = 4/3$

Point of Inflections: $x = 1$ (only)

Concave Up: $(1, \infty)$

Concave Down: $(-\infty, 1)$

$$-\infty \quad + \quad 0 \quad - \quad 4/3 \quad + \quad \infty$$

$$- \quad 1 \quad - \quad 1 \quad + \quad f'(x)$$

$$- \quad 0 \quad - \quad 1 \quad + \quad f''(x)$$

$$f'(x) = 15x^4 - 20x^3$$

$$0 = 5x^3(3x - 4)$$

$$5x^3 = 0 \quad 3x - 4 = 0$$

$$x = 0 \quad x = 4/3$$

$$f'(-1) = (-)(-) = +$$

$$f'(1) = (+)(-) = -$$

$$f'(2) = (+)(+) = +$$

$$f''(x) = 60x^3 - 60x^2$$

$$0 = 60x^2(x - 1)$$

$$60x^2 = 0 \quad x - 1 = 0$$

$$x = 0 \quad x = 1$$

$$f''(-1) = (+)(-) = - \quad f''(1/2) = (+)(-) = -$$

$$f''(2) = (+)(+) = +$$

Given: $f(x)$ Find:

Critical Numbers:

Increasing:

Decreasing:

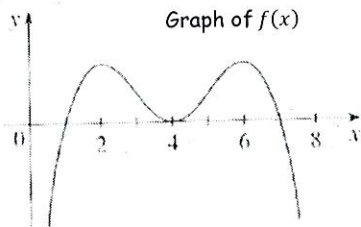
Maximums:

Minimums:

Point of Inflections:

Concave Up:

Concave Down:



Given: $f(x)$ Find:

Critical Numbers: $x = 2, 4, 6$

Increasing: $(-\infty, 2) \cup (4, 6)$

Decreasing: $(2, 4) \cup (6, \infty)$

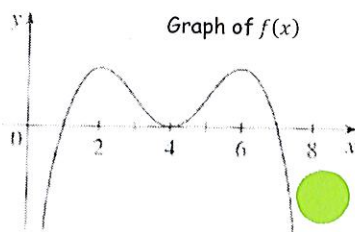
Maximums: $x = 2 \ \& \ x = 6$

Minimums: $x = 4$

Point of Inflections:

Concave Up: $(3, 5)$

Concave Down: $(-\infty, 3) \cup (5, \infty)$



Given: $f'(x)$ Find:

Critical Numbers:

Increasing:

Decreasing:

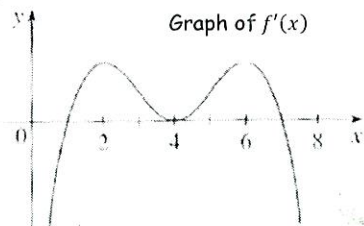
Maximums:

Minimums:

Point of Inflections:

Concave Up:

Concave Down:



Given: $f'(x)$ Find:

Critical Numbers: $x = 1, 4, \ \& \ 7$

Increasing: $(1, 4) \cup (4, 7)$ OR $(1, 7)$

Decreasing: $(-\infty, 1) \cup (7, \infty)$

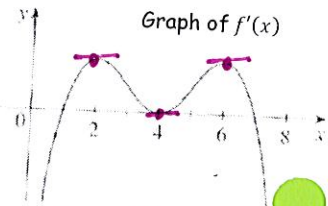
Maximums: $x = 7$

Minimums: $x = 1$

Point of Inflections: $x = 2, 4, 6$

Concave Up: $(-\infty, 2) \cup (4, 6)$

Concave Down: $(2, 4) \cup (6, \infty)$



$$- \quad 1 \quad + \quad 4 \quad + \quad 7 \quad -$$

$$+ \quad 2 \quad - \quad 4 \quad + \quad 6 \quad -$$

$$- \quad f'(x)$$

$$+ \quad f''(x)$$

☒ $x = 4$ is a critical number

it is not max/min b.c. no sign change

☒ P.O.I - have to have sign change in between.