

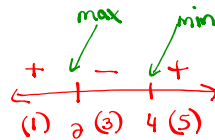
$$f(x) = x^3 - 9x^2 + 24x - 10$$

⊙ y-intercept (x=0) ⊙ Asymptotes: None
 (Polynomial function)

$$f(0) = (0)^3 - 9(0)^2 + 24(0) - 10 = -10$$

$$(0, -10)$$

$$⊙ f(x) = x^3 - 9x^2 + 24x - 10$$



$$f'(x) = 3x^2 - 18x + 24$$

$$f'(x) = 3(x^2 - 6x + 8)$$

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

Increasing on $(-\infty, 2) \cup (4, \infty)$

Decreasing on $(2, 4)$

$$CV: x=2, 4$$

Max/min

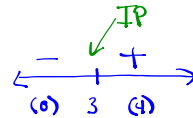
$$f(x) = x^3 - 9x^2 + 24x - 10$$

$$f(2) = (2)^3 - 9(2)^2 + 24(2) - 10 = 10 \quad (2, 10) \text{ max}$$

$$f(4) = (4)^3 - 9(4)^2 + 24(4) - 10 = 6 \quad (4, 6) \text{ min}$$

Concavity:

$$f(x) = x^3 - 9x^2 + 24x - 10$$



$$f'(x) = 3x^2 - 18x + 24$$

$$f''(x) = 6x - 18$$

$$f''(x) = 6(x-3)$$

⊙ on $(-\infty, 3)$

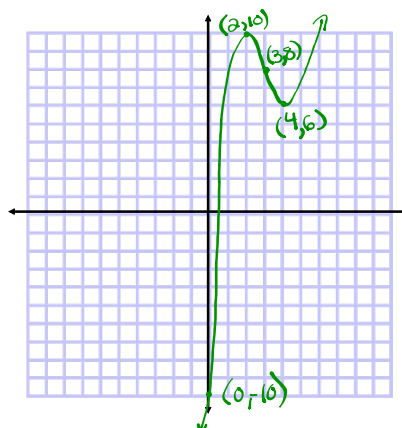
⊙ on $(3, \infty)$

$$CI: x=3$$

IP:

$$f(x) = x^3 - 9x^2 + 24x - 10$$

$$f(3) = (3)^3 - 9(3)^2 + 24(3) - 10 = 8 \quad (3, 8) \text{ IP}$$



Sketch the following function $f(x) = \frac{(x+2)^2}{(x^2+4)}$ if

$$f'(x) = \frac{16-4x^2}{(x^2+4)^2} \quad \text{and} \quad f''(x) = \frac{8x(x^2-12)}{(x^2+4)^3}$$

- Intercepts
- Asymptotes
- Intervals of Increase or Decrease
- Local Maximum and Minimum values
- Intervals of Concavity
- Points of Inflection

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

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

$$x^3 = 0 \quad | \quad 3x^2 - 5 = 0$$

$$x = 0 \quad | \quad 3x^2 = 5$$

$$x^2 = \frac{5}{3}$$

$$(0, 0)$$

$$x = \pm \sqrt{\frac{5}{3}}$$

$$\left(\sqrt{\frac{5}{3}}, 0\right) + \left(-\sqrt{\frac{5}{3}}, 0\right)$$