ex. 1

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

$$f'(x) = 6x^2 + 18x - 24$$

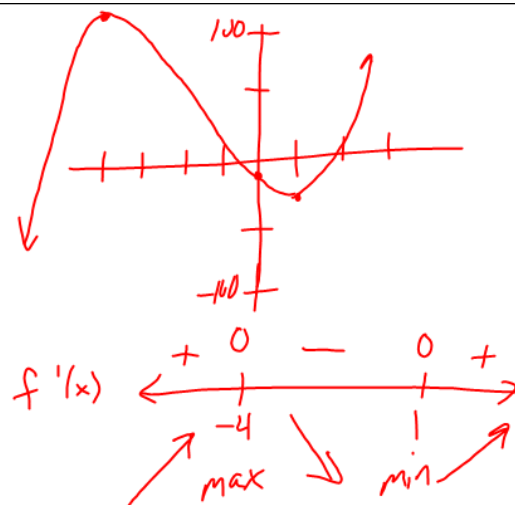$$0 = 6(x^2 + 3x - 4)$$

$$0 = 6(x + 4)(x - 1)$$

crit. #'s: $x = -4, 1$

$$f(-4) = 102$$
$$f(1) = -23$$

$f'(x)$ sign chart: $+ \quad 0 \quad - \quad 0 \quad +$, at -4 (max), at 1 (min)

$$f'(x) \begin{cases} > 0 & (-\infty, -4), (1, \infty) \text{ incr.} \\ < 0 & (-4, 1) \text{ decr.} \end{cases}$$

ex. 2

$$f(x) = 3x^4 + 40x^3 - .06x^2 - 1.2x$$

$$f'(x) = (12x^3 + 120x^2)(-.12x - 1.2)$$

$$= 12x^2(x + 10) - .12(x + 10)$$

$$= (x + 10)(12x^2 - .12)$$

$$f'(x) = 12(x^2 - .01)(x + 10)$$
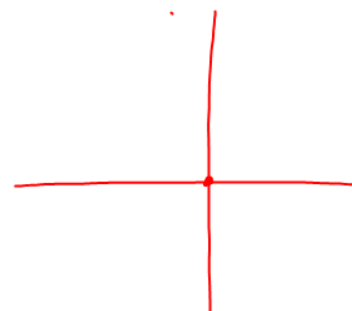
$$0 = 12(x^2 - .01)(x + 10)$$

$$x^2 - .01 = 0 \qquad x + 10 = 0$$
$$x^2 = .01 \qquad\qquad x = -10$$
$$x = \pm\sqrt{.01}$$
$$x = \pm .1$$

$f'(x)$ sign chart: $- \quad 0 \quad + \quad 0 \quad - \quad 0 \quad +$, at -10 (min), $-.1$ (max), $.1$ (min)

$$f(-10) = -10,048$$
$$f(-.1) = .0797$$
$$f(.1) = -.0803$$