

① ~~$f(x) = x^3 - 3x$~~

$$f'(x) = 3x^2 - 6x = 0$$

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

$$x = 0, 2$$

$$f(0) = 0 \quad (0,0) \text{ Rel. Max}$$

$$f(2) = -4 \quad (2,-4) \text{ Rel Min}$$

$$f''(x) = 6x - 6 = 0$$

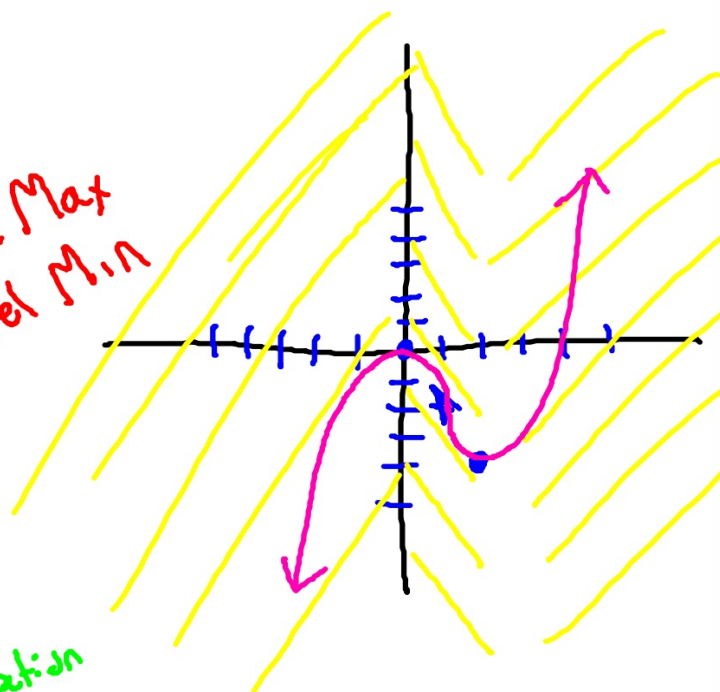
$$x = 1$$

$$f(1) = -2 \quad (1,-2)$$

Point of
Inflection

$$\frac{3(-1)^2 - 6(-1)}{3 + 6} = 9$$

$$\frac{6(-1) - 6}{-6 - 6} = -12$$



$$\textcircled{2} f(x) = x^4 - 4x^3$$

$$f'(x) = 4x^3 - 12x^2 = 0$$

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

$$x = 0 \text{ (DR)}, 3$$

$$f(0) = 0 \quad (0,0) \text{ POT}$$

$$f(3) = -27 \quad (3, -27) \text{ Abs Min}$$

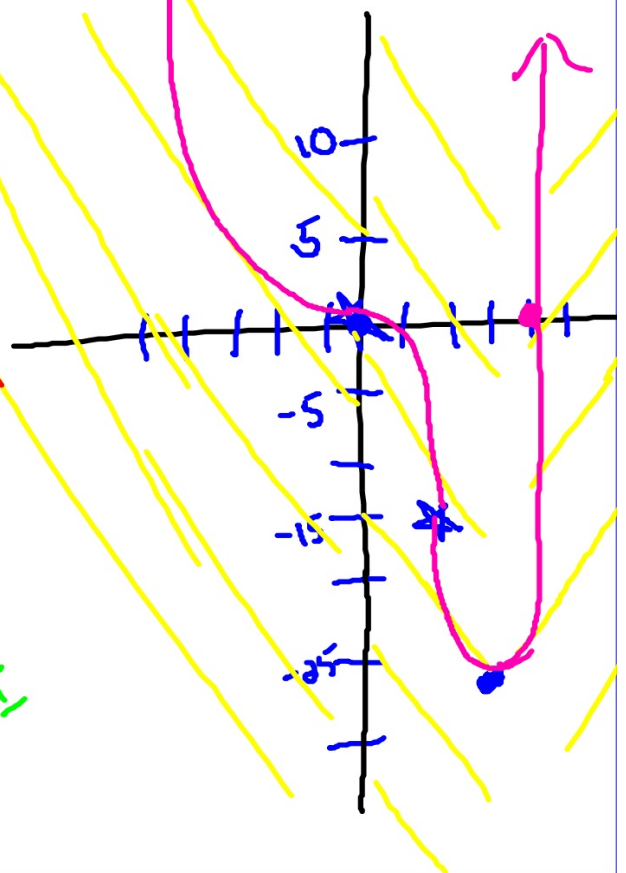
$$f''(x) = 12x^2 - 24x = 0$$

$$12x(x-2) = 0$$

$$x = 0, 2$$

$$f(0) = 0 \quad (0,0) \text{ POT}$$

$$f(2) = -16 \quad (2, -16)$$



$$(3) f(x) = -x^3 + 6x^2 - 9x - 5$$

$$f'(x) = -3x^2 + 12x - 9 = 0$$

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

$$-3(x - 3)(x - 1) = 0$$

$$x = 1, 3$$

$$f(1) = -9 \quad (1, -9) \text{ Rel. Min}$$

$$f(3) = -5 \quad (3, -5) \text{ Rel. Max}$$

$$f''(x) = -6x + 12 = 0$$

$$x = 2$$

$$f(2) = -7 \quad (2, -7) \text{ POI}$$

