

$$1. f(x) = 2x^3 + 3x^2 - 36x + 12$$

DOMAIN: $(-\infty, \infty)$

X-INTERCEPT(S)

$$0 = 2x^3 + 3x^2 - 36x + 12$$

$$X = -5.2, 0.3, 3.3$$

Y-INTERCEPTS

$$y = 2(0)^3 + 3(0)^2 - 36(0) + 12$$

$$y = 12$$

ASYMPTOTES

VA
HA
SA) NONE

CONCAVITY

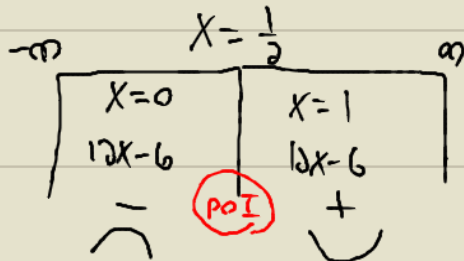
$$f''(x) = 12x - 6$$

$$12x - 6 = 0$$

$$12x = 6$$

$$x = \frac{6}{12}$$

$$x = \frac{1}{2}$$



CONC DOWN $(-\infty, \frac{1}{2})$

CONC UP $(\frac{1}{2}, \infty)$

POINTS OF INFLECTIONS

$$y = 2x^3 + 3x^2 - 36x + 12$$

$$y = 2\left(\frac{1}{2}\right)^3 + 3\left(\frac{1}{2}\right)^2 - 36\left(\frac{1}{2}\right) + 12$$

$$= \frac{1}{4} + \frac{3}{4} - 18 + 12$$

$$= -5$$

$$\text{POI: } \left(\frac{1}{2}, -5\right)$$

LEADING COEFFICIENT TEST

	DEGREE IS EVEN	DEGREE IS ODD
COEFF IS POS.	UP TO LEFT UP TO RIGHT	DOWN TO LEFT UP TO RIGHT
COEFF IS NEG.	DOWN TO LEFT DOWN TO RIGHT	UP TO LEFT DOWN TO RIGHT

L.C.T. $\left(\begin{array}{l} \text{DOWN TO LEFT} \\ \text{UP TO RIGHT} \end{array}\right)$

INC/DEC

$$f'(x) = 6x^2 - 6x - 36$$

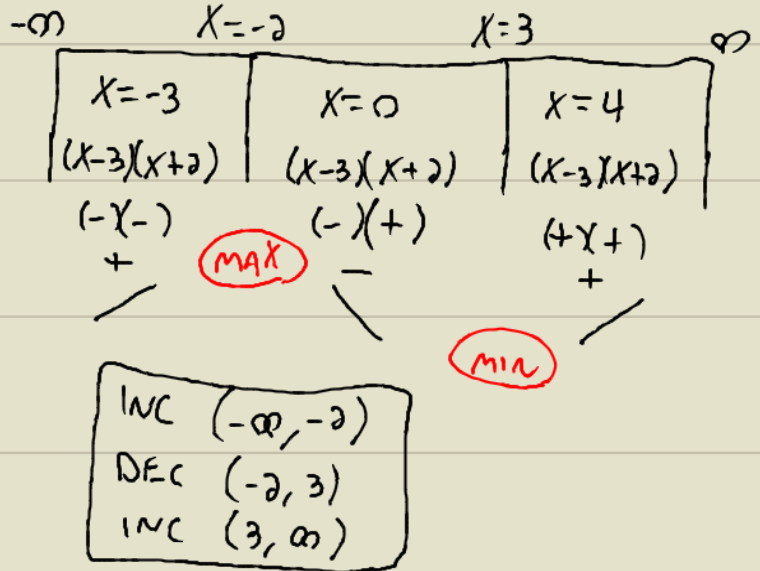
$$6x^2 - 6x - 36 = 0$$

$$\text{GCF } 6(x^2 - x - 6) = 0$$

$$\text{PSD } 6(x-3)(x+2) = 0 \leftarrow$$

$$x-3=0 \quad x+2=0$$

$$x=3 \quad x=-2$$



$$x = -2$$

$$y = 2x^3 + 3x^2 - 36x + 12$$

$$y = 2(-2)^3 + 3(-2)^2 - 36(-2) + 12$$

$$y = 80$$

$$\text{REL MAX: } (-2, 80)$$

$$x = 3$$

$$y = 2x^3 + 3x^2 - 36x + 12$$

$$y = 2(3)^3 + 3(3)^2 - 36(3) + 12$$

$$y = -15$$

$$\text{REL MIN: } (3, -15)$$