

$$\textcircled{1} d, \quad x^4 - 10x^2 + 9 \leq 0$$

$$y = x^4 - 10x^2 + 9$$

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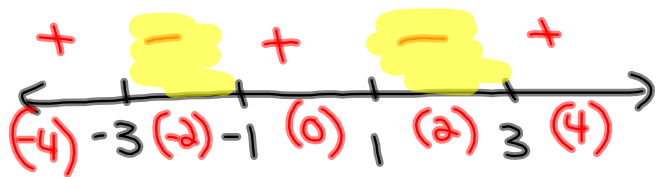
$$y = (x^2 - 1)(x^2 - 9)$$

$$y = (x+1)(x-1)(x+3)(x-3)$$

① Roots: (y=0)

$$x = -3, -1, 1, 3$$

②/③



$$\textcircled{4} \quad x \in [-3, -1] \cup [1, 3]$$

$$\textcircled{1} \text{ c) } x^3 - 8 \geq x^2 + 10x$$

$$x^3 - x^2 - 10x - 8 \leq 0$$

$$y = x^3 - x^2 - 10x - 8$$

$$y = (-1)^3 - (-1)^2 - 10(-1) - 8$$

$$y = -1 - 1 + 10 - 8$$

$$y = 0$$

$$\begin{array}{r} -1 \overline{) 1 \quad -1 \quad -10 \quad -8} \\ \underline{\phantom{-1} -1 \quad \phantom{-10} \phantom{-8}} \\ 1 \quad -2 \quad -8 \end{array}$$

$$y = (x+1)(x^2 - 2x - 8)$$

$$y = (x+1)(x+2)(x-4)$$

① Roots:

$$x = -2, -1, 4$$

② Number Line / Test Values



③ State Intervals

$$x \in [-2, -1] \cup [4, \infty)$$

## Review #1

$$\textcircled{1} \text{ g) } 9x^4 + \underline{26x^2} + 25 \quad * \sqrt{9 \cdot 25} \\ \sqrt{225} = 15 \cdot 2 = \underline{30}$$

$$(9x^4 + 30x^2 + 25) - 4x^2$$

$$(3x^2 + 5)(3x^2 + 5) - 4x^2$$

$$\boxed{(3x^2 + 5)^2} - \boxed{4x^2}$$

$$(\underline{3x^2 + 5} - \underline{2x})(\underline{3x^2 + 5} + \underline{2x})$$

$$(3x^2 - 2x + 5)(3x^2 + 2x + 5)$$

$$\textcircled{4} \quad f(x) = 2x^2 + 5 \quad g(x) = x - 3$$

$$\text{a) } f(g(x))$$

$$\begin{aligned} f(\underline{x-3}) &= 2(\underline{x-3})^2 + 5 \\ &= 2(x^2 - 6x + 9) + 5 \\ &= 2x^2 - 12x + 18 + 5 \\ &= 2x^2 - 12x + 23 \end{aligned}$$

$$\textcircled{4} \quad f(x) = 2x^2 + 5 \quad g(x) = x - 3$$

$$\text{b) } g(f(-3))$$

$$\begin{aligned} f(-3) &= 2(-3)^2 + 5 \\ &= 18 + 5 \\ &= 23 \end{aligned}$$

$$\begin{aligned} g(23) &= 23 - 3 \\ &= \boxed{20} \end{aligned}$$

$$\textcircled{3} \quad y = x^3 - 4x^2 + x + 6$$

a)  $(x-2)$  is a factor

$$\begin{array}{r} x-2 \overline{) x^3 - 4x^2 + x + 6} \\ \underline{-(x^3 - 2x^2)} \phantom{+ 6} \\ -2x^2 + x + 6 \\ \underline{-(-2x^2 + 4x)} \phantom{+ 6} \\ -3x + 6 \\ \underline{-(-3x + 6)} \\ 0 \end{array}$$

$$y = (x-2)(x^2 - 2x - 3)$$

$$y = (x-2)(x-3)(x+1)$$

b) Roots

$$x = -1, 2, 3$$

c) y int

$$y = 6$$

d) local max ( $x=0.5$ )

$$y = (x-2)(x-3)(x+1)$$

$$y = (-1.5)(-2.5)(1.5)$$

$$y = 5.625$$

approx.  $(0.5, 5.625)$

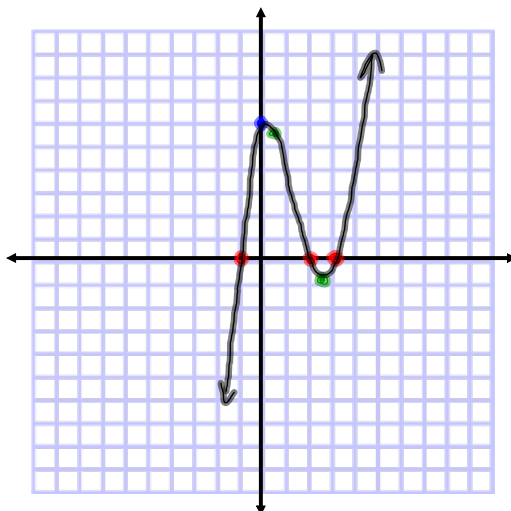
e) local min ( $x=2.5$ )

$$y = (x-2)(x-3)(x+1)$$

$$y = (0.5)(-0.5)(3.5)$$

$$y = -0.875$$

$(2.5, -0.875)$



3<sup>rd</sup> Degree Polynomial  
with a positive  
stretch factor