

$$\textcircled{5} \quad x^2 + x \geq 30$$

$$x^2 + x - 30 \geq 0$$

$$y = x^2 + x - 30 \xrightarrow{\text{2}^{\text{nd}} \text{ Degree (+ stretch)}}$$

(i) Roots:

$$y = x^2 + x - 30$$

$$y = (x+6)(x-5)$$

$$0 = (x+6)(x-5)$$

$$x = -6, 5$$

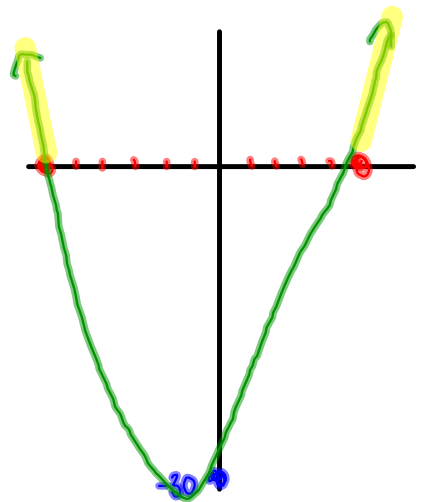
(ii) y int:

$$y = x^2 + x - 30$$

$$y = 0 + 0 - 30$$

$$y = -30$$

(iii) Graph



(iv) Intervals:

$$x \in (-\infty, -6] \cup [5, \infty)$$

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

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

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

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

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. $(0.5, 5.625)$

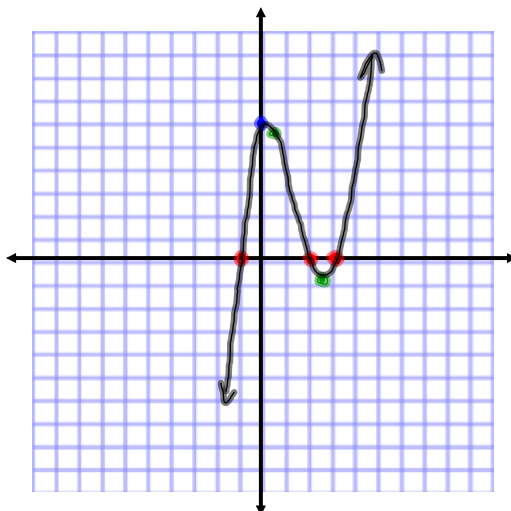
e) local min ($x=2.5$)

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

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

$$y = -0.875$$

$(2.5, -0.875)$



3rd Degree Polynomial
with a positive
stretch factor

Review # 1

$$\textcircled{1} \text{ i) } 4x^2 - c^2 - 12x + 9$$

$$(4x^2 - 12x + 9) - c^2$$

$$\boxed{(2x-3)^2} - \boxed{c^2}$$

$$(2x-3+c)(2x-3-c)$$

Review # 2

⑥ $x^3 - x^2 < 12x$ "y" values are less than 0
 $x^3 - x^2 - 12x < 0$ y is negative

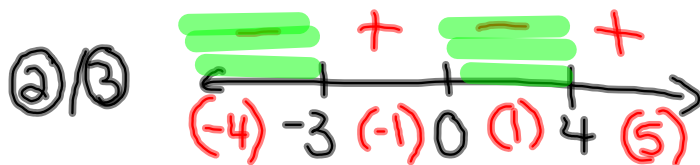
$$y = x^3 - x^2 - 12x$$

$$y = x(x^2 - x - 12)$$

$$y = x(x+3)(x-4)$$

① Roots:

$$x = -3, 0, 4$$



④ $x \in (-\infty, -3) \cup (0, 4)$