

$$x < -1 \text{ or } x \geq 3$$

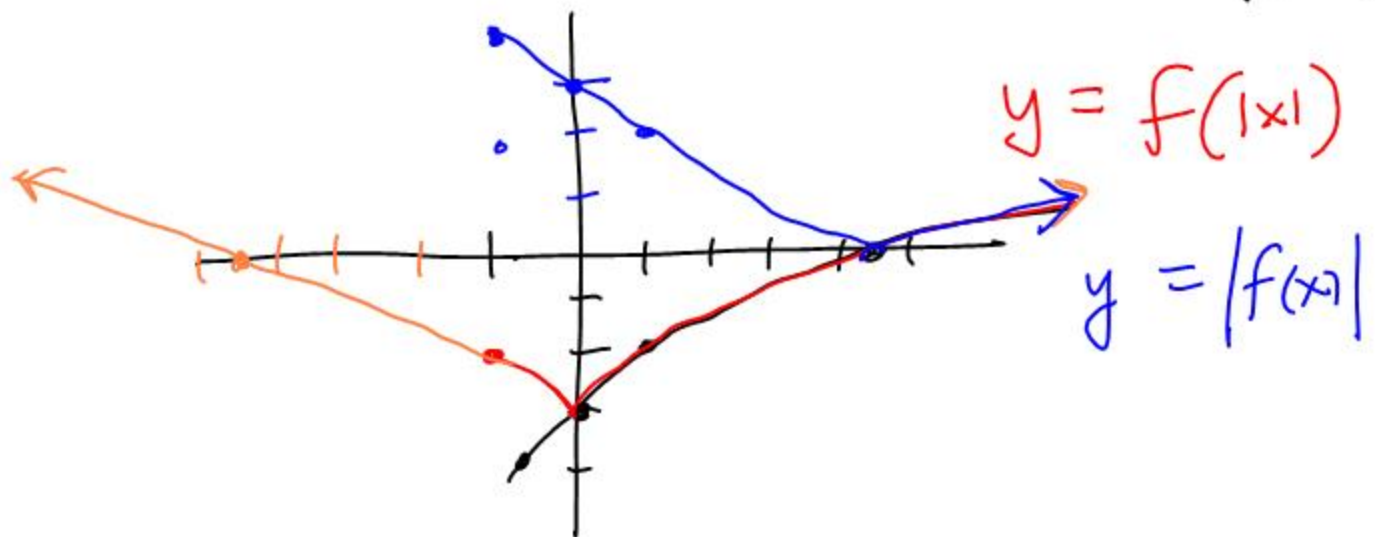
$$\{x : x < -1 \text{ or } x \geq 3\}$$

$$(-\infty, -1) \cup [3, \infty)$$

25 # 5.  $y = \sqrt{3x+1} - 4$

$$3x+1 = 0$$

$$x = -\frac{1}{3}$$



Writing polynomials given their roots.

Ex.  $x_1 = 4$  and  $x_2 = 5 + 2i$ .

Write a polynomial with these roots.

$$x_1 = 4, \quad x_2 = 5 + 2i, \quad x_3 = 5 - 2i$$

Method I Viète's Thm.

$$x^3 + \overset{\text{opp}}{b}x^2 + \overset{\text{same}}{c}x + \overset{\text{opp}}{d} = 0$$

$$b = -(x_1 + x_2 + x_3) = -14$$

$$\begin{aligned} c &= 4(5+2i) + 4(5-2i) + (5+2i)(5-2i) \\ &= 20 + \cancel{8i} + 20 - \cancel{8i} + \underline{25 - \cancel{10i} + \cancel{10i} - 4i^2} \\ &= 69 \end{aligned}$$

$$d = -4(5+2i)(5-2i) = -4(29) = -116$$

$$x^3 - 14x^2 + 69x - 116 = 0$$

Method II generate the factors

$$x = 4$$

$$x = 5 + 2i$$

$$\underline{x-4} = 0$$

factor

$$(x-5)^2 = (2i)^2$$

$$x^2 - 10x + 25 = -4$$

$$\underline{x^2 - 10x + 29} = 0$$

factor

$$(x-4)(x^2 - 10x + 29) = 0$$

$$x^3 - \underline{10x^2} + \underline{29x} - \underline{4x^2} + \underline{40x} - 116 = 0$$

$$\underline{x^3 - 14x^2 + 69x - 116 = 0}$$

---

$$x_1 = 4 - 3\sqrt{5}$$

$$(x-4)^2 = (-3\sqrt{5})^2$$

$$x^2 - 8x + 16 = 45$$

$$\underline{x^2 - 8x - 29} = 0$$

automatically:  $4 + 3\sqrt{5}$

3H #1

$\lambda$  lambda Capital  $\Lambda$   
 $\mu$  mu Capital  $M$

$$\lambda \cdot f(x) + \mu \cdot g(x) = 13x + 13$$

$$\lambda \cdot 2x^2 + \lambda 3x + \lambda + \mu \cdot 3x^2 - \mu \cdot 2x - 5\mu$$

$$\underline{(2\lambda + 3\mu)x^2} + \underline{(3\lambda - 2\mu)x} + \underline{(\lambda - 5\mu)} = \underline{13x + 13}$$

$$\begin{cases} \lambda - 5\mu = 13 \rightarrow \lambda = 13 + 5\mu \\ 3\lambda - 2\mu = 13 \\ 2\lambda + 3\mu = 0 \end{cases}$$
$$3(13 + 5\mu) - 2\mu = 13$$
$$39 + 15\mu - 2\mu = 13$$
$$13\mu = -26$$
$$\mu = -2$$
$$\lambda = 13 + 5(-2)$$

$$\lambda = 3$$

$$2(3) + 3(-2) = 0 \checkmark$$

HW  
 $\boxed{3H}$  #2b, 3-8;  $\boxed{3I}$  #1a

---

$$x+2 \overline{) x^4 + 5x^3 + 8x^2 + 3x - 2}$$

$$y = 5 \underline{|3x+2|} - 9$$

$$3x+2 = 0$$

$$x = -2/3$$

vertex here

$$= 5 \cancel{|3(-2/3)+2|} - 9 = -9$$

ye  $-9, \infty)$