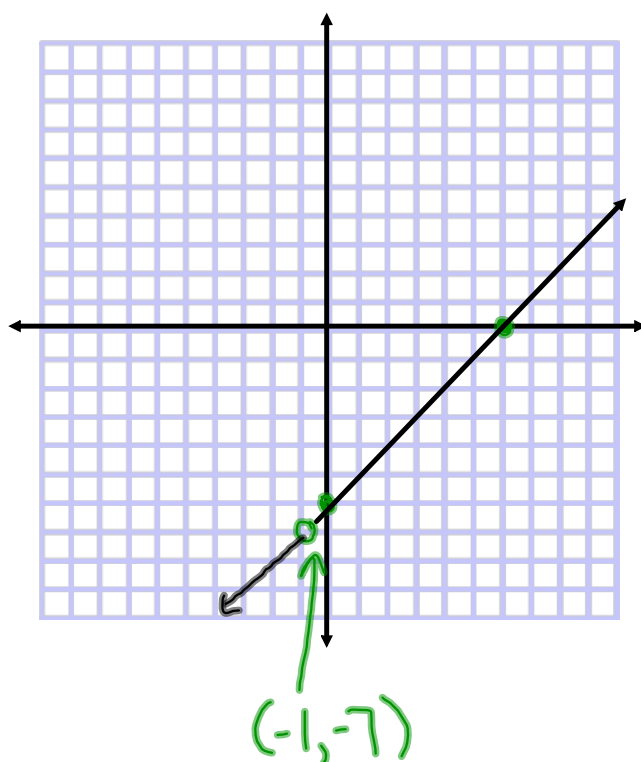


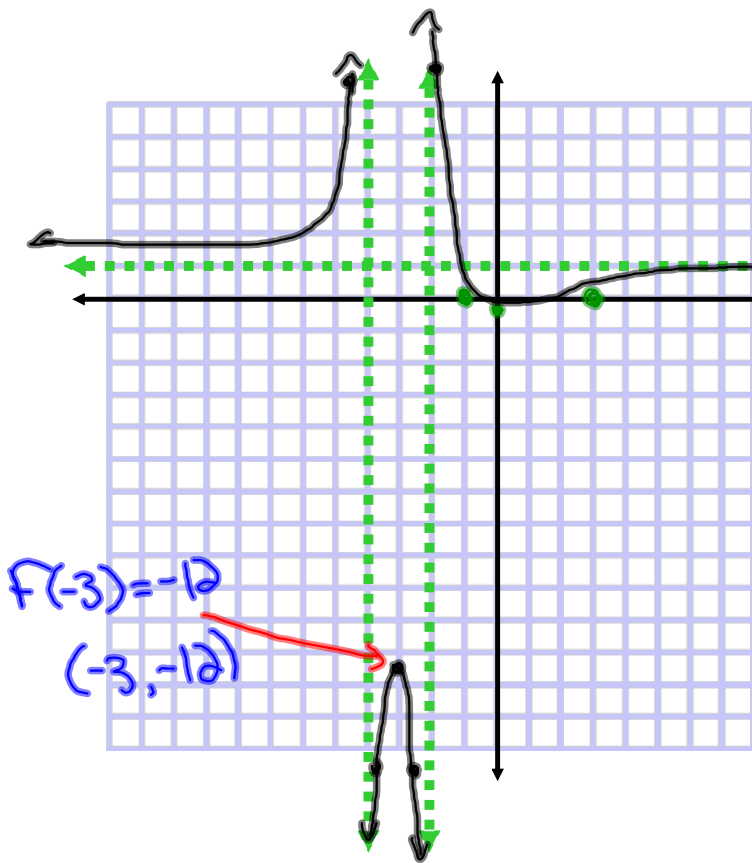
$$\textcircled{4} \text{ a) } f(x) = \frac{x^2 - 5x - 6}{x+1} = \frac{(x-6)\cancel{(x+1)}}{\cancel{(x+1)}} = x-6$$

① Roots: $x=6$ ② V.A.: None ③ O.A.: $y=x-6$ ④ Holes: $x=-1$ ⑤ y int: $y=-6$



$$\textcircled{4} \text{ b) } f(x) = \frac{x^2 - 2x - 3}{x^2 + 6x + 8} = \frac{(x-3)(x+1)}{(x+2)(x+4)}$$

- ① roots $x = -1, 3$ ② V.A. $x = -4, -2$ ③ H.A. $y = 1$ ④ Holes: None ⑤ y.int $y = -3/8$



Check Behaviour near V.A.

$$x = -4$$

$$\lim_{x \rightarrow -4^-} f(x) = +\infty$$

$$\lim_{x \rightarrow -4^+} f(x) = -\infty$$

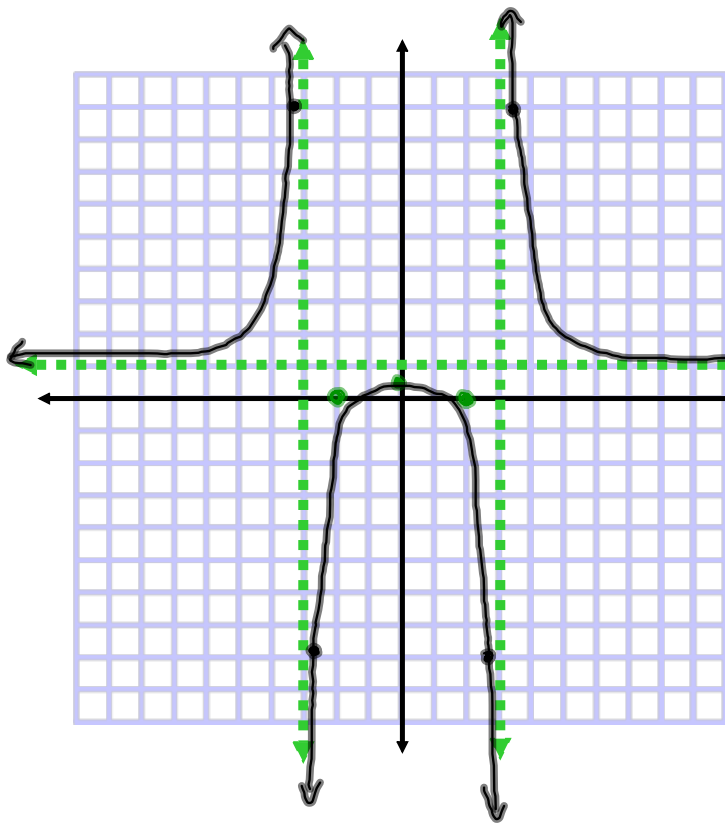
$$x = -2$$

$$\lim_{x \rightarrow -2^-} f(x) = -\infty$$

$$\lim_{x \rightarrow -2^+} f(x) = +\infty$$

$$\textcircled{4} \text{ c) } f(x) = \frac{x^2 - 4}{x^2 - 9} = \frac{(x+2)(x-2)}{(x+3)(x-3)}$$

- ① Roots: $x = \pm 2$ ② V.A. $x = \pm 3$ ③ H.A. $y = 1$ ④ Holes: None ⑤ y int $y = 4/9$



Check the behaviour near the V.A.

$$x = -3$$

$$\lim_{x \rightarrow -3^-} f(x) = +\infty$$

$$\lim_{x \rightarrow -3^+} f(x) = -\infty$$

$$x = 3$$

$$\lim_{x \rightarrow 3^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^+} f(x) = +\infty$$

$$\textcircled{1} d) \quad \frac{\frac{2}{x} + \frac{3}{xy}}{\frac{2}{xy} + \frac{3}{y}} \rightarrow \frac{\frac{2y+3}{xy}}{\frac{2+3x}{xy}} \rightarrow \frac{2y+3}{\cancel{xy}} \cdot \frac{\cancel{xy}}{2+3x} \rightarrow$$

$$\frac{2y+3}{2+3x} \quad \begin{array}{l} x \neq 0, -\frac{2}{3} \\ y \neq 0 \end{array}$$

$$\textcircled{2} c) \quad (\sqrt{3x+15})^2 = (1 + \sqrt{18+x})^2$$

$$3x+15 = 19+x + 2\sqrt{18+x}$$

$$2x-4 = 2\sqrt{18+x}$$

$$\frac{\cancel{2}(x-2)}{\cancel{2}} = \frac{\cancel{2}\sqrt{18+x}}{\cancel{2}}$$

$$(x-2)^2 = (\sqrt{18+x})^2$$

$$x^2 - 4x + 4 = 18 + x$$

$$x^2 - 5x - 14 = 0$$

$$(x-7)(x+2) = 0$$

$$\begin{array}{l|l} x-7=0 & x+2=0 \\ x=7 & x=-2 \end{array}$$

$$\textcircled{a} \text{ e) } |2x-7| \geq 15$$

$$2x-7 \geq 15$$

$$2x \geq 22$$

$$\boxed{x \geq 11}$$

$$2x-7 \leq -15$$

$$2x \leq -8$$

$$\boxed{x \leq -4}$$

$$\textcircled{4} \text{ b) } f(x) = \frac{x^2 - 2x - 3}{x^2 + 6x + 8} = \frac{(x-3)(x+1)}{(x+4)(x+2)}$$

① Roots:

$$x = -1, 3$$

$$(-1, 0) + (3, 0)$$

② y int:

$$y = -\frac{3}{8}$$

$$(0, -\frac{3}{8})$$

③ VA:

$$x = -4, -2$$

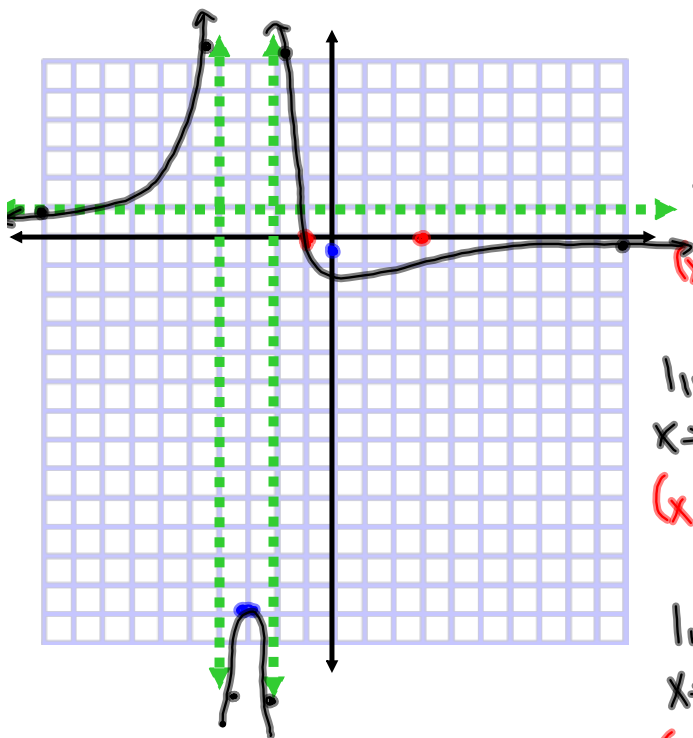
④ HA:

$$y = 1$$

⑤ Holes:

None

Check behaviour near the VA:



$$\lim_{x \rightarrow -4^-} \frac{(-)(-)}{(-)(-)} = +\infty$$

$$(x = -4.01)$$

$$\lim_{x \rightarrow -4^+} \frac{(-)(-)}{(+)(-)} = -\infty$$

$$(x = -3.99)$$

$$\lim_{x \rightarrow -2^-} \frac{(-)(-)}{(+)(-)} = -\infty$$

$$(x = -2.01)$$

$$\lim_{x \rightarrow -2^+} \frac{(-)(-)}{(+)(+)} = +\infty$$

$$(x = -1.99)$$

$$f(-3) = \frac{(-6)(-2)}{(+)(-1)} = -12$$

$$\textcircled{2} \text{ 5) } 12 > |x-5| > -8$$

$$12 > x-5 > -8$$

$$17 > x > -3$$

$$-3 < x < 17$$

$$12 > -(x-5) > -8$$

$$12 > -x+5 > -8$$

$$7 > -x > -13$$

$$\boxed{-7 < x < 13}$$

$$-12 < x-5 < 8$$

$$\boxed{-7 < x < 13}$$

$$\textcircled{a} \text{ c) } (\sqrt{3x+15})^2 = (1 + \sqrt{18+x})^2$$

$$3x+15 = 1 + 2\sqrt{18+x} + 18+x$$

$$2x-4 = 2\sqrt{18+x}$$

$$2(x-2) = 2\sqrt{18+x}$$

$$(x-2) = \sqrt{18+x}$$

$$x^2 - 4x + 4 = 18 + x$$

$$x^2 - 5x - 14 = 0$$

$$(x-7)(x+2) = 0$$

$$x = -2, 7$$

Test your answers.

$$\textcircled{25} \text{ c) } f(x) = \frac{x^2 + 8x + 16}{x+8} = \frac{(x+4)(x+4)}{(x+8)}$$

① Roots:

$$(x+4)(x+4) = 0$$

$$x = -4$$

$$(-4, 0)$$

② y int

$$y = \frac{16}{8} = 2$$

$$(0, 2)$$

③ VA:

$$x+8=0$$

$$x = -8$$

④ SA

$$y = x \quad m = \frac{1}{1} \quad b =$$

$$\begin{array}{r} x+8 \overline{) x^2 + 8x + 16} \\ \underline{-(x^2 + 8x)} \\ 16 \end{array}$$

⑤ Holes:

None

⑥ Check Behaviour near VA: ($x = -8$)

$$\lim_{x \rightarrow -8^-} \frac{(x+4)(x+4)}{(x+8)} = \frac{(-)(-)}{(-)} = -\infty$$

$$(-8.01)$$

$$\lim_{x \rightarrow -8^+} \frac{(-)(-)}{(+)} = +\infty$$

$$(-7.99)$$

