

#36. $x = 1 + i\sqrt{2}$
 $(x-1)^2 = (i\sqrt{2})^2$

$x = 1 - i\sqrt{2}$

$x^2 - 2x + 1 = -2$

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

#60 $4x^4 + 2x^3 - 2x^2 - 3x - 1$ ± 1
 $\pm \frac{1}{2}$
 $\pm \frac{1}{4}$

\Downarrow
$$\begin{array}{r|rrrrr} 4 & 2 & -2 & -3 & -1 \\ & 4 & 6 & 4 & 1 \\ \hline 4 & 6 & 4 & 1 & 0 \end{array}$$

$x = -\frac{1}{2}$
 $2x = -1$
 $2x + 1 = 0$

~~\Downarrow
$$\begin{array}{r|rrrr} 4 & 6 & 4 & 1 \\ & 4 & 10 & 14 \\ \hline 4 & 10 & 14 & \end{array}$$~~

$(x-1)(2x+1)(2x^2+2x+1)$

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

$x = \frac{-2 \pm \sqrt{4 - 2i}}{2(2)}$

$x = \frac{-1 \pm i}{2}$

\Rightarrow
$$\begin{array}{r|rrrr} 4 & 6 & 4 & 1 \\ & -4 & -2 & \\ \hline 4 & 2 & 2 & \end{array}$$

$\frac{1}{2} \Big|$
$$\begin{array}{r|rrrr} 4 & 6 & 4 & 1 \\ & 2 & 4 & \\ \hline 4 & 8 & & \end{array}$$

$\left(\frac{-1}{2}\right) \Big|$
$$\begin{array}{r|rrrr} 4 & 6 & 4 & 1 \\ & -2 & -2 & -1 \\ \hline 4 & 4 & 2 & 0 \end{array}$$

$(x + \frac{1}{2})(4x^2 + 4x + 2)$

#55 (1)

x^5	-1	7	-7	12	-12
	1	0	7	0	12
x^4	0	7	0	12	0

$$(x-1)(x^4 + 7x^2 + 12)$$

$$(x-1)(x^2 + 3)(x^2 + 4)$$

↓

$$x=1$$

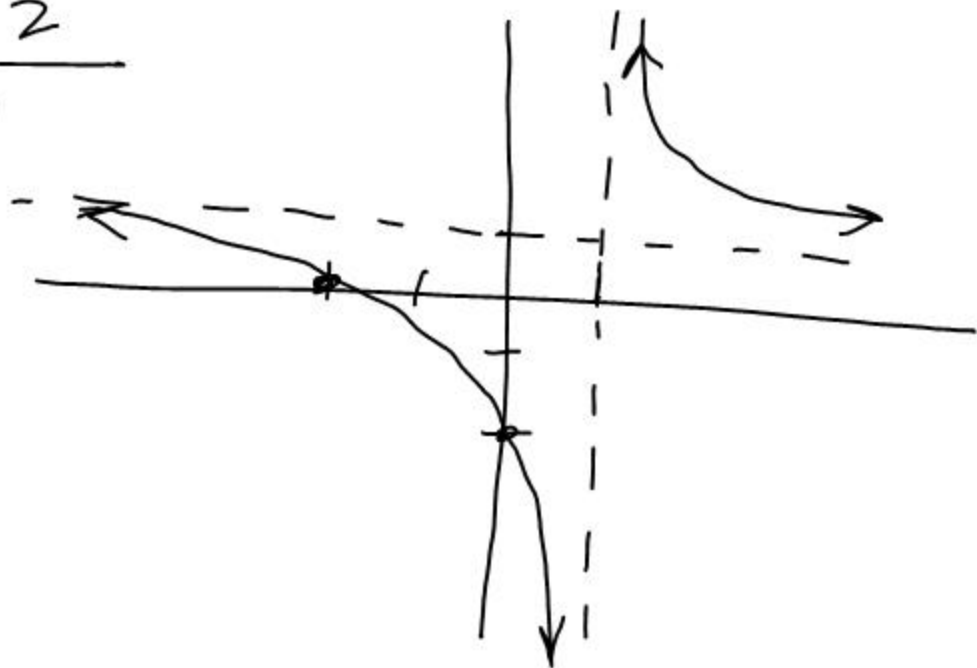
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$$x = \pm i\sqrt{3}$$

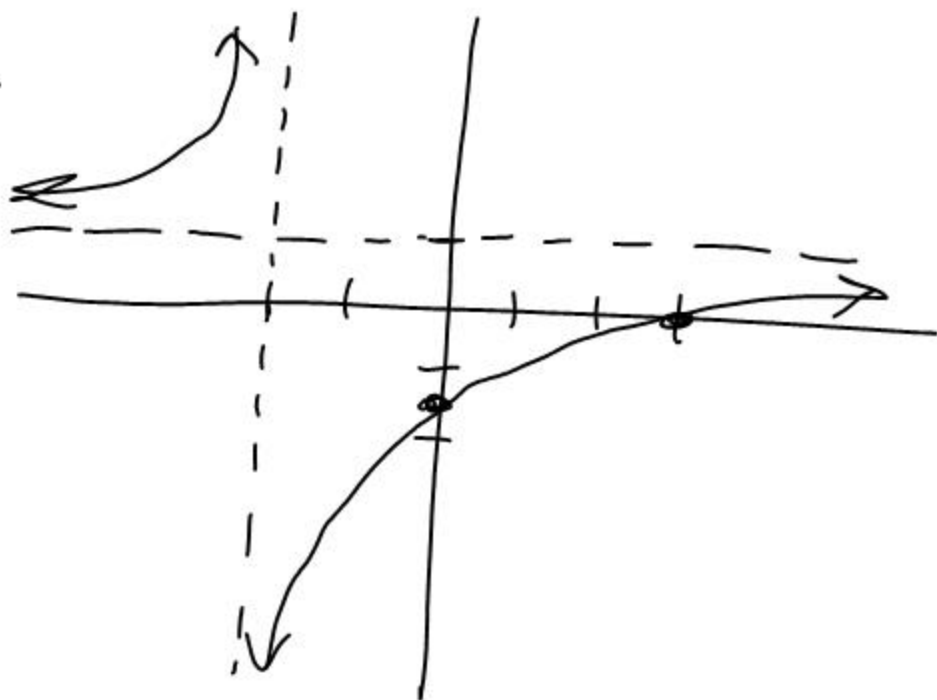
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$$x = \pm 2i$$

(1) $f(x) = \frac{x+2}{x-1}$



$$(2) \quad f(x) = \frac{x-3}{x+2}$$

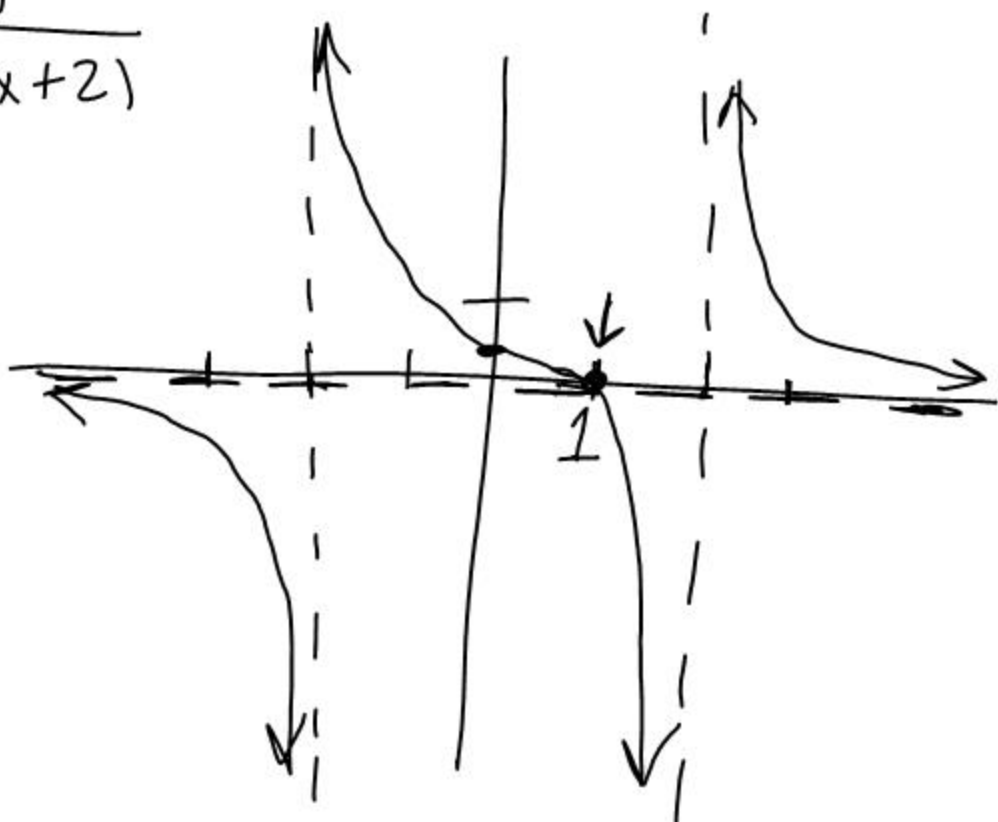


$$(3) \quad f(x) = \frac{x-1}{(x-2)(x+2)}$$

N.V.A. $y=0$

$$f(-3) = \frac{-}{- -}$$

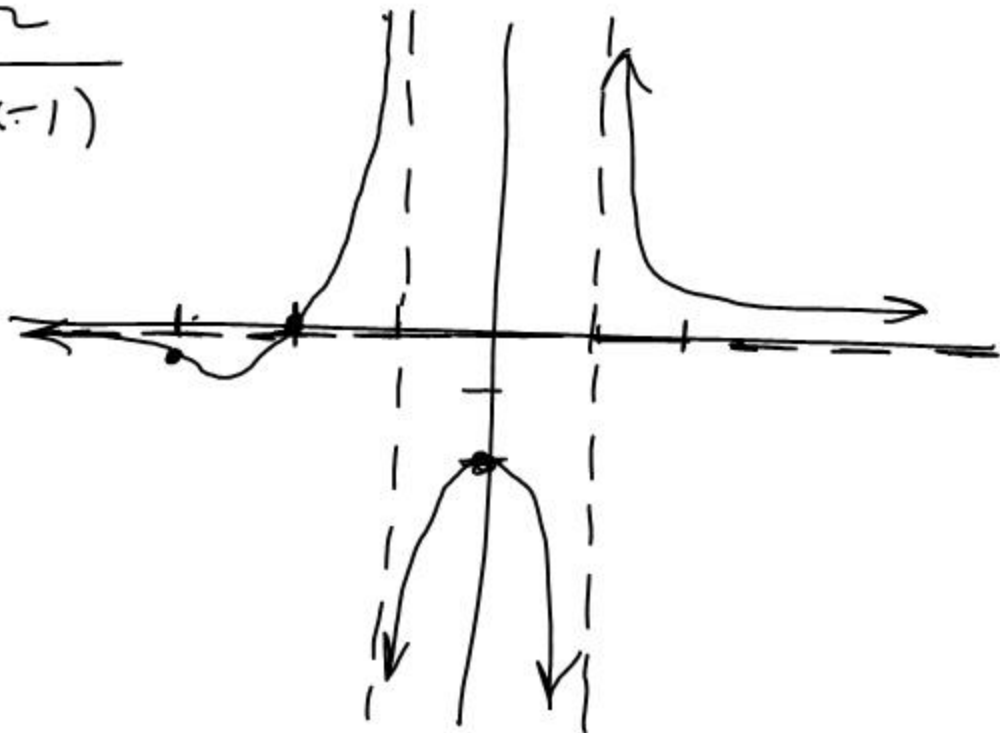
$$f(3) = \frac{+}{+ +}$$



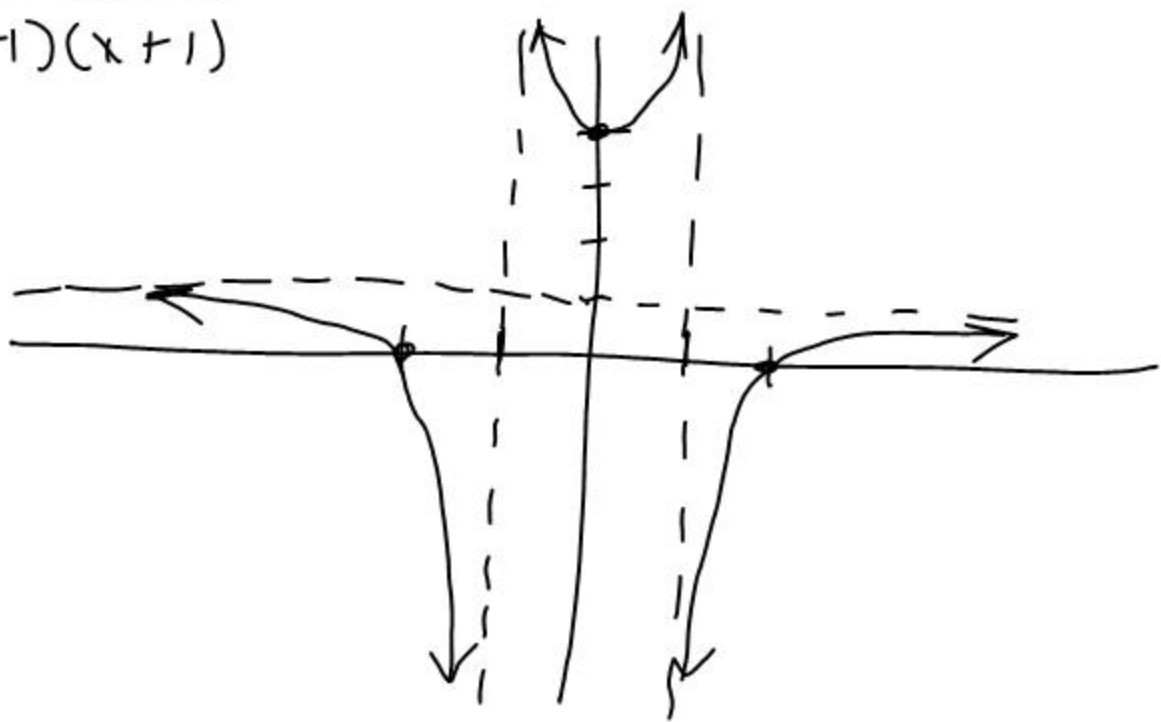
$$\#4 \quad y = \frac{x+2}{(x+1)(x-1)}$$

$$f(-3) = \frac{-}{--}$$

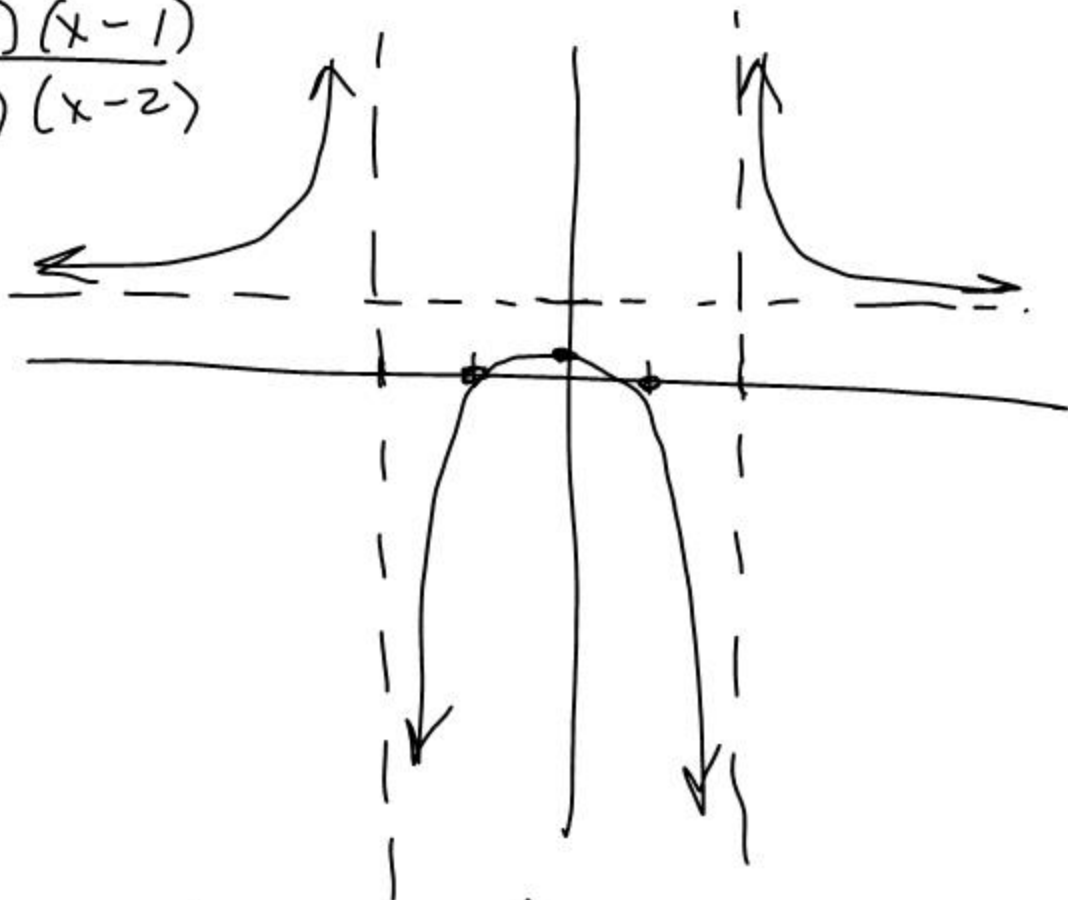
$$f(2) = \frac{+}{++}$$



$$\#5. \quad y = \frac{(x-2)(x+2)}{(x-1)(x+1)}$$



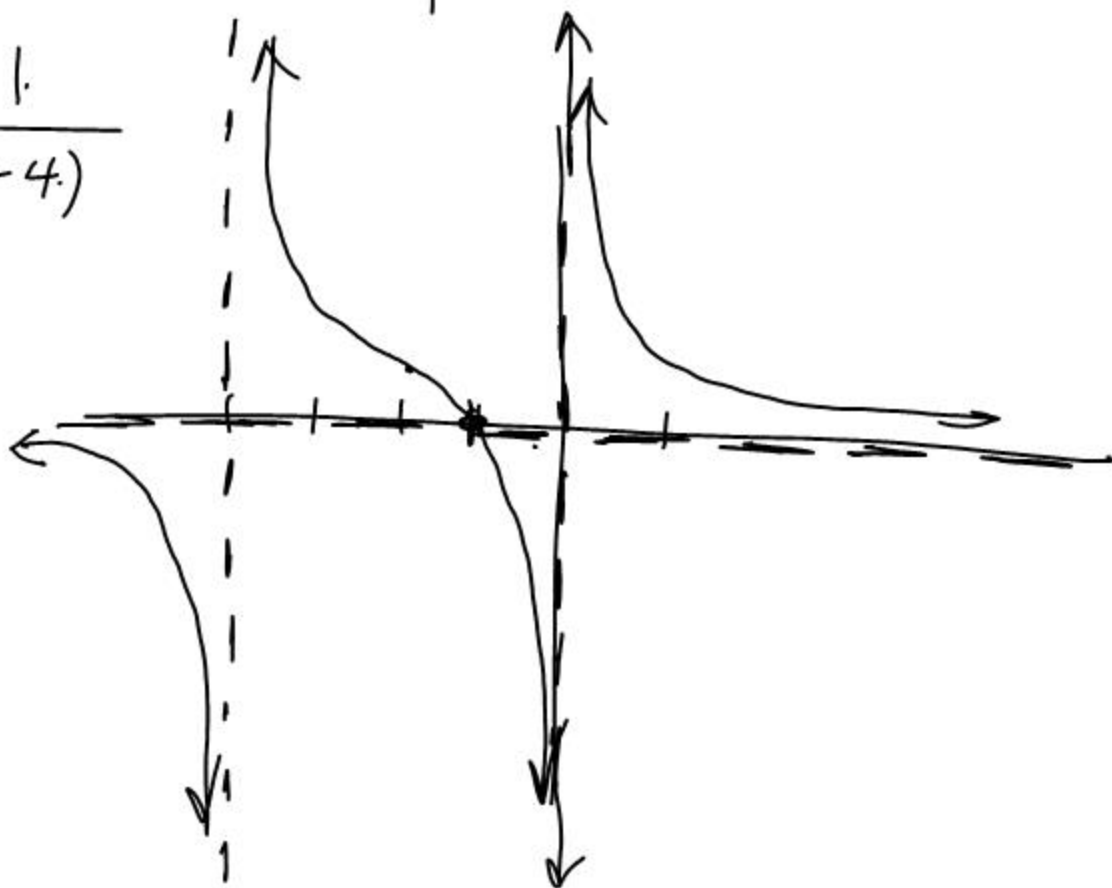
#6. $y = \frac{(x+1)(x-1)}{(x+2)(x-2)}$



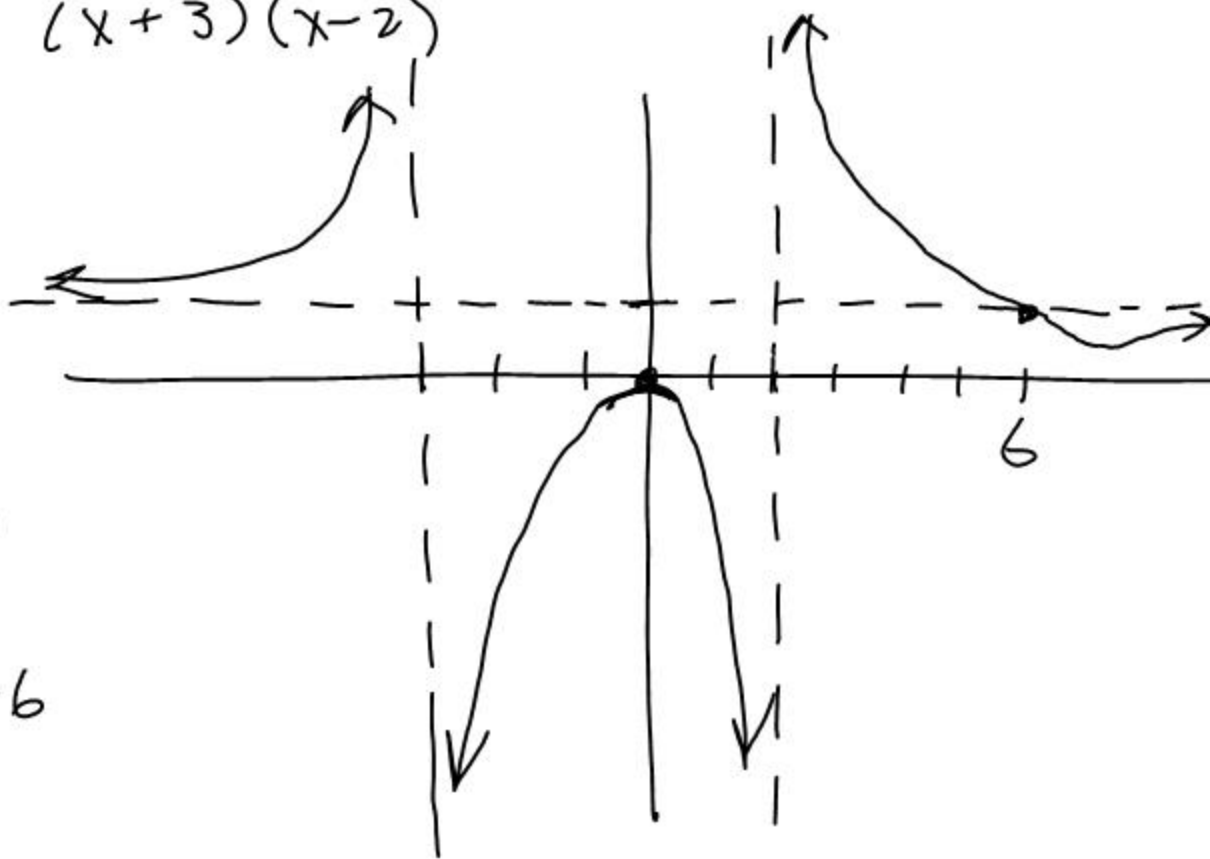
#1 $\frac{x+1}{x(x+4)}$

$f(-5) = \frac{-}{-}$

$f(-2) = \frac{-}{+}$



$$\#3. f(x) = \frac{x^2}{(x+3)(x-2)}$$



$$\frac{x^2}{x^2 + x - 6} = 1$$

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

$$6 = x$$

Bigger Power on top

$$y = \frac{3x+2}{x^2-1} \quad \text{N.V.A. } \underline{y=0}$$

$$y = \frac{4x^3 - x + 2}{2x^3 - x^2 + 5} \quad \text{N.V.A. } \underline{y=2}$$

$$y = \frac{x^2 - 9}{x + 1} = x - 1 - \frac{8}{x + 1}$$

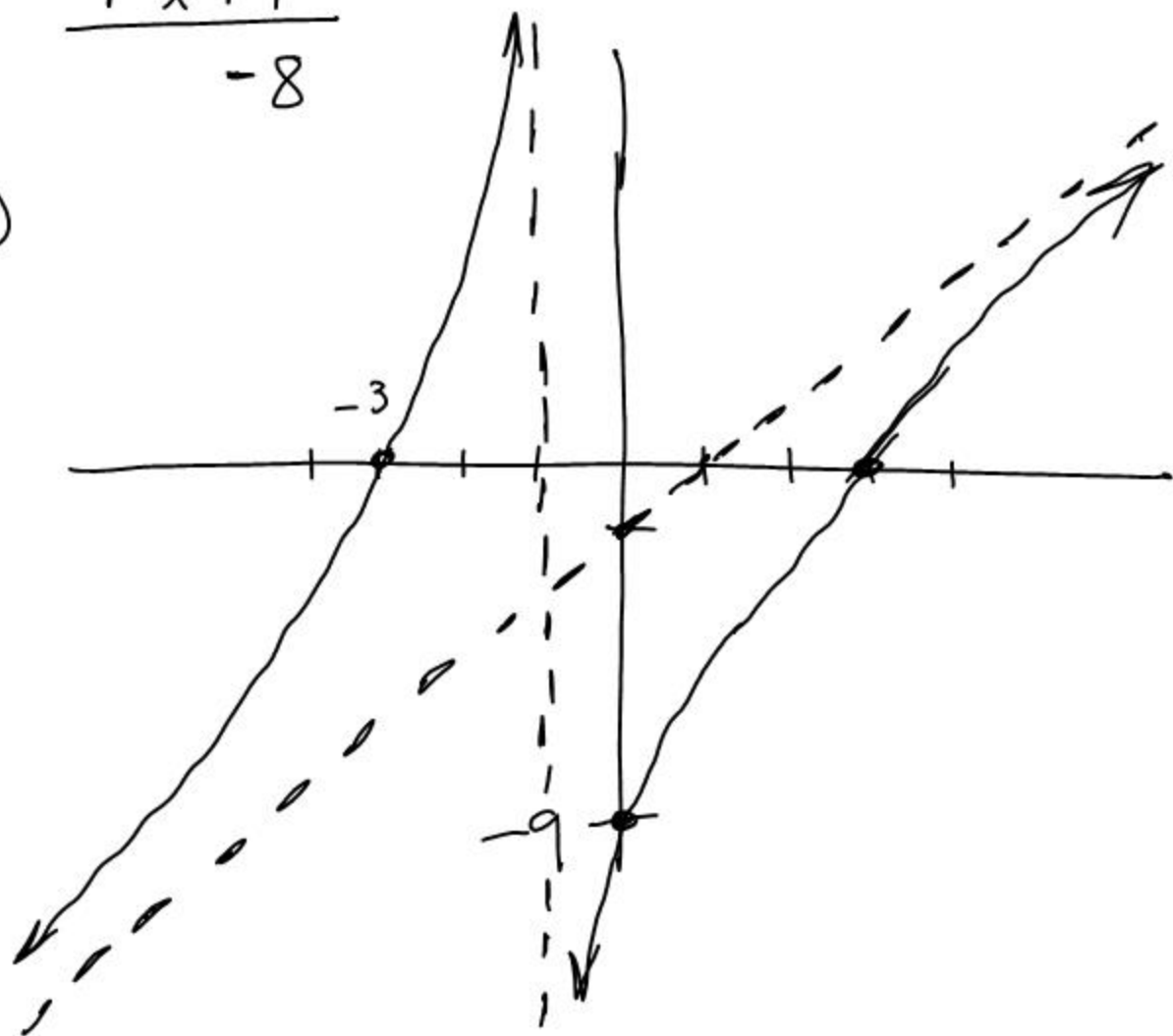
$$\begin{array}{r} x+1 \overline{) x^2 - 9} \\ \underline{-x^2 + x} \\ x - 9 \\ \underline{+x + 1} \\ - 8 \end{array}$$

as $x \rightarrow \infty$
the remainder
is shrinking
to zero

$$5 \overline{) 72} \begin{array}{r} 14 \frac{2}{5} \\ \underline{-5} \\ 22 \\ \underline{-20} \\ 2 \end{array}$$

NVA

$y = x - 1$



Ex. $y = \frac{x^2 + x - 2}{x - 2} = \frac{(x + 2)(x - 1)}{x - 2}$

$y = x + 3 + \frac{4}{x - 2}$

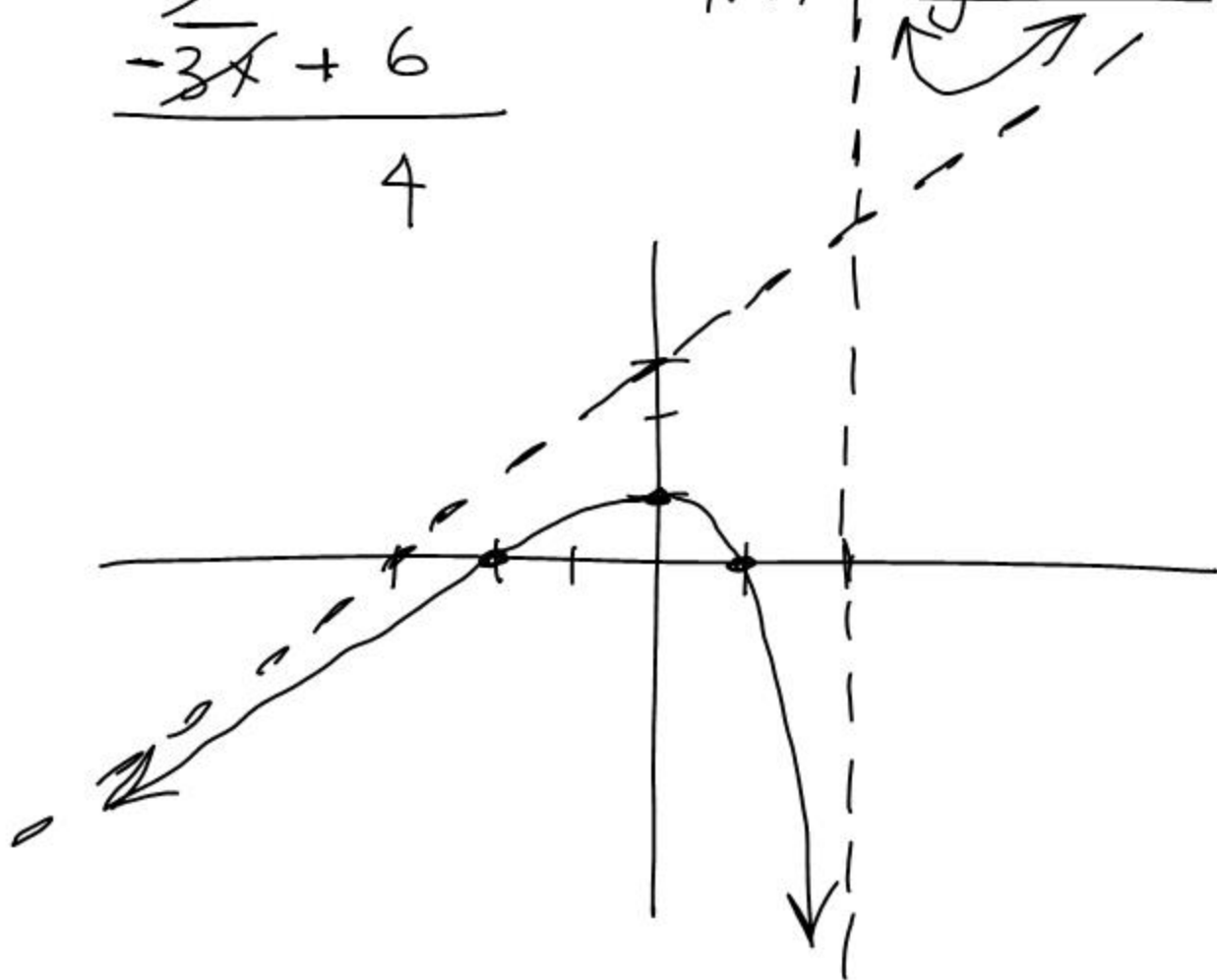
$$\begin{array}{r} x + 3 + \frac{4}{x - 2} \\ \hline x - 2 \overline{) x^2 + x - 2} \\ \underline{-x^2 + 2x} \quad \downarrow \\ 3x - 2 \\ \underline{-3x + 6} \\ 4 \end{array}$$

x-int $\frac{-2, 1}{1}$

y-int $\frac{1}{1}$

V.A. $\frac{x = 2}{1}$

NVA $\frac{y = x + 3}{1}$



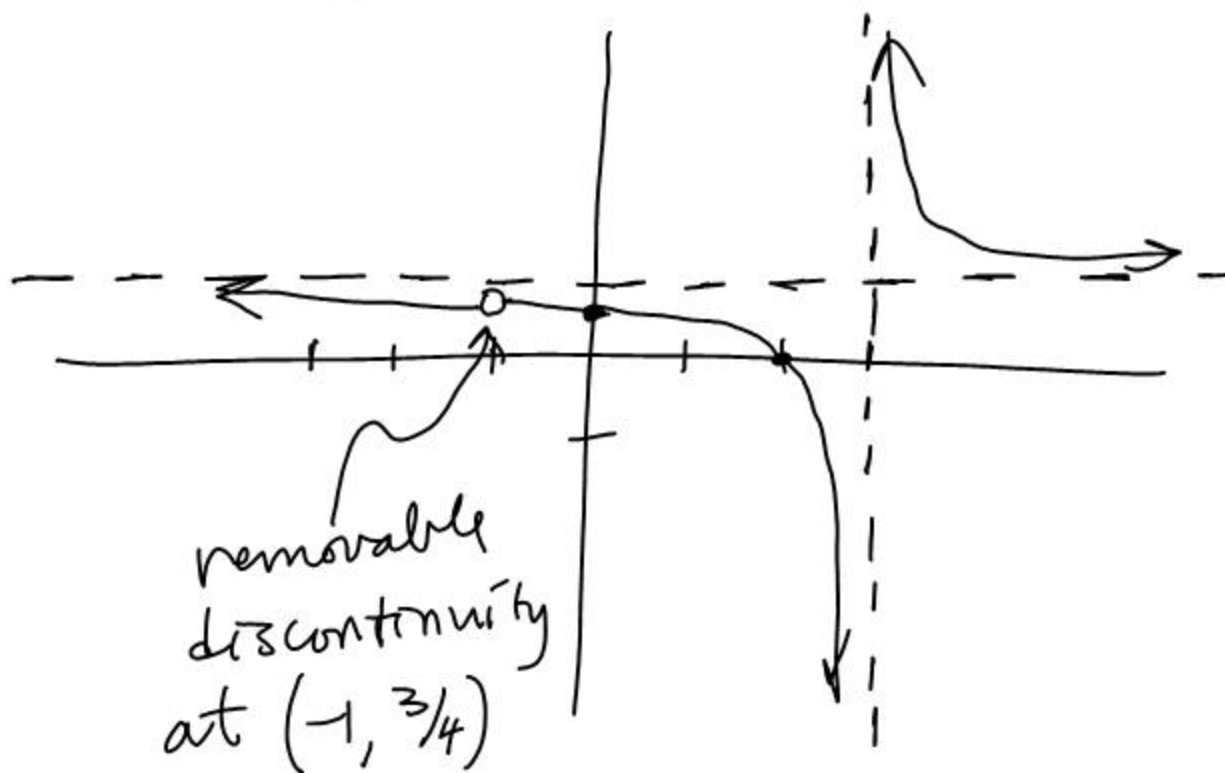
Removable Discontinuity ("hole")

Domain: $\mathbb{R} - \{3, -1\}$

Ex. $y = \frac{x^2 - x - 2}{x^2 - 2x - 3} = \frac{(x-2)(\cancel{x+1})}{(x-3)(\cancel{x+1})}$

$$y = \frac{x-2}{x-3}, x \neq -1$$

$$\left(-1, \frac{-3}{-4}\right) = \left(-1, \frac{3}{4}\right)$$



HW Slant asy. + RD #1, 2, 4, 5
Advanced #2, 4*