

$$f(x) = 2x^3 - 7x^2 + 16x - 15$$

$1, 3, 5, 15$
2 2 2 2

3 or 1 pos

$$f(-x) = -2x^3 - 7x^2 - 16x - 15$$

no neg roots

$2x-15$

(b) $x-1, x-3, x-5, x-15, 2x-1, 2x-3, 2x-5,$

(a) $(x_1 + x_2 + x_3)^2 = (x_1^2 + x_2^2 + x_3^2) + 2(x_1x_2 + x_1x_3 + x_2x_3)$

$(\frac{7}{2})^2 = (x_1^2 + x_2^2 + x_3^2) + 2(8 + x_2x_3)$

$$2x^3 - 7x^2 + 16x - 15$$

x^3 $-\frac{7}{2}x^2$ $+8x$ $-\frac{15}{2}$

opp *same* *opp*

$\frac{49}{4} = x_1^2 + x_2^2 + x_3^2 + \frac{64}{4}$

$$\frac{-15}{4} = x_1^2 + x_2^2 + x_3^2$$

$$(c) \quad 2x^3 - 7x^2 + 16x - 15$$

$$\begin{array}{r} 1 \mid 2 \quad -7 \quad 16 \quad -15 \\ \quad \quad 2 \quad -5 \quad 11 \\ \hline 2 \quad -5 \quad 11 \quad \boxed{-4} \end{array}$$

$$\begin{array}{r} 3 \mid 2 \quad -7 \quad 16 \quad -15 \\ \quad \quad 6 \quad -3 \quad 39 \\ \hline 2 \quad -1 \quad 13 \quad \boxed{} \end{array}$$

$$\begin{array}{r} 5 \mid 2 \quad -7 \quad 16 \quad -15 \\ \quad \quad 10 \quad 15 \quad 155 \\ \hline 2 \quad 3 \quad 31 \quad \boxed{140} \end{array} \quad \text{all positive}$$

~~no larger~~

$$\begin{array}{r} \frac{1}{2} \mid 2 \quad -7 \quad 16 \quad -15 \\ \quad \quad 1 \quad -3 \\ \hline 2 \quad -6 \quad 13 \end{array}$$

$$\begin{array}{r} \frac{3}{2} \mid 2 \quad -7 \quad 16 \quad -15 \\ \quad \quad 3 \quad -6 \quad 15 \\ \hline 2 \quad -4 \quad 10 \quad \boxed{0} = f\left(\frac{3}{2}\right) \end{array}$$

$$\begin{array}{r|rrrr} \frac{3}{2} & 2 & -7 & 16 & -15 \\ & & 3 & -6 & 15 \\ \hline & 2 & -4 & 10 & 0 = f\left(\frac{3}{2}\right) \end{array}$$

$$\left(x - \frac{3}{2}\right) (2x^2 - 4x + 10) = 0$$

$$\boxed{(2x - 3)(x^2 - 2x + 5) = 0}$$

$$\boxed{x = \frac{3}{2}}$$

$$x = \frac{2 \pm \sqrt{4 - 20}}{2}$$

$$x = \frac{2 \pm 4i}{2}$$

$$\boxed{x = 1 \pm 2i}$$

$$3x^4 - 8x^3 + 33x^2 - 18x - 10$$

1 neg
3 or 1 pos

+ + + + -

1, 3 1, 2, 5, 10

$$x \pm 1, x \pm 2, x \pm 5, x \pm 10, 3x \pm 1, 3x \pm 2, 3x \pm 5, 3x \pm 10$$

④

3	-8	33	-18	-10
	3	-5	28	10
3	-5	28	10	0

~~1~~

3	-5	28	10
	3	-2	26
3	-2	26	

2

3	-5	28	10
	6	2	60
3	1	30	70

all positive

no larger

$\frac{1}{3}$

3	-5	28	10
	1		
3	-4		

$$\begin{array}{r} \left(-\frac{1}{3}\right) \quad 3 \quad -5 \quad 28 \quad 10 \\ \quad \quad \quad -1 \quad \quad 2 \quad -10 \\ \hline 3 \quad -6 \quad 30 \quad \boxed{0 = f(-1/3)} \end{array}$$

$$\boxed{(x-1)(3x+1)(x^2-2x+10)} = 0$$

$$\begin{array}{c} \downarrow \quad \downarrow \\ \boxed{x=1} \quad \boxed{x=-1/3} \\ \downarrow \quad \downarrow \\ \boxed{x=1 \pm 3i} \end{array}$$

$$\begin{array}{c} \downarrow \\ x = \frac{2 \pm \sqrt{4-40}}{2} \\ \quad \quad \quad \sqrt{-36} \\ x = \frac{2 \pm 6i}{2} \end{array}$$

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

larger power is in the numerator

To find the non-vertical asymptote:

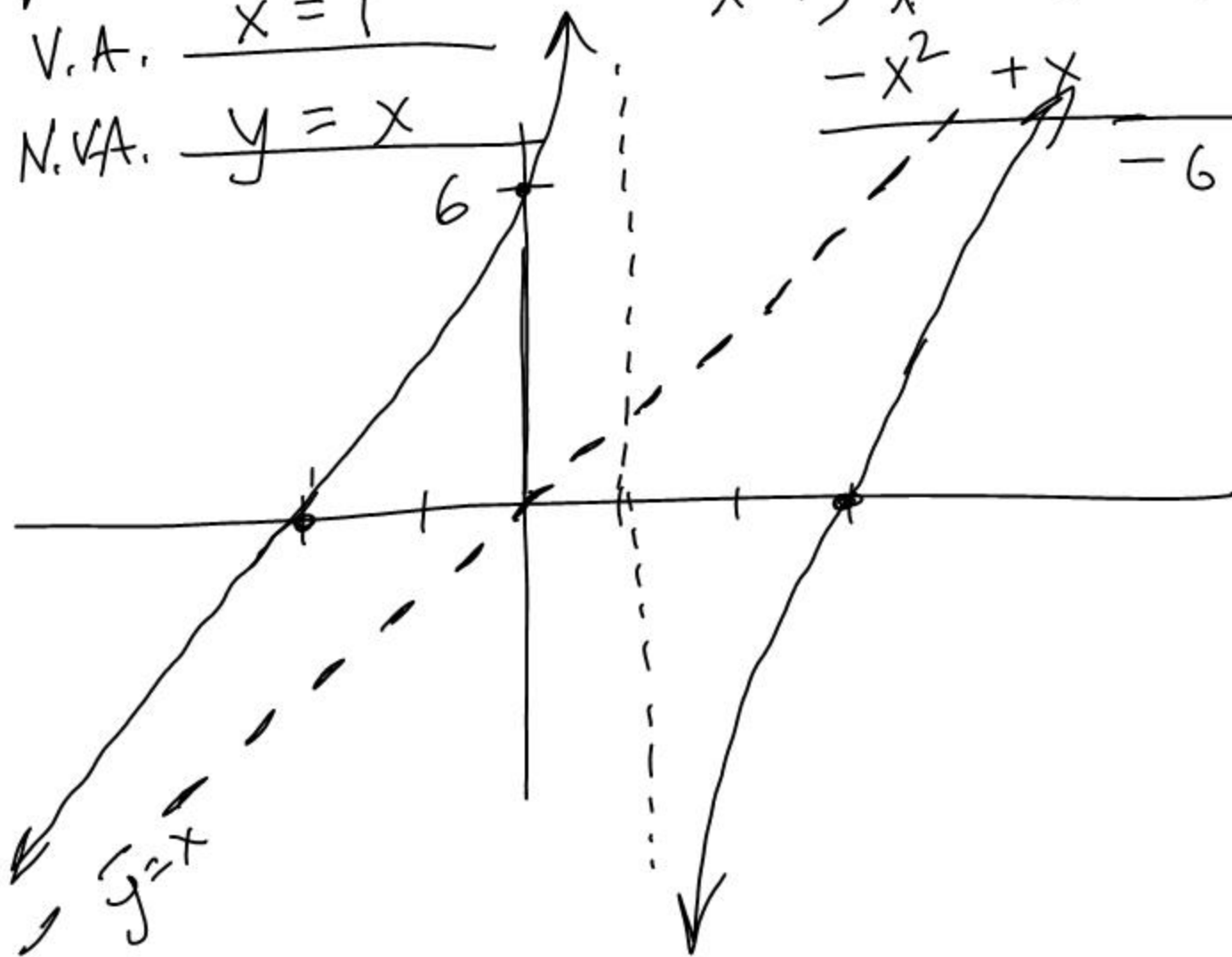
$$\begin{array}{r}
 x \overline{) x^2 - x - 6} \\
 \underline{-x^2 + x} \\
 -x - 6 \\
 \underline{+x} \\
 -6
 \end{array}$$

x-int -2, 3

y-int 6

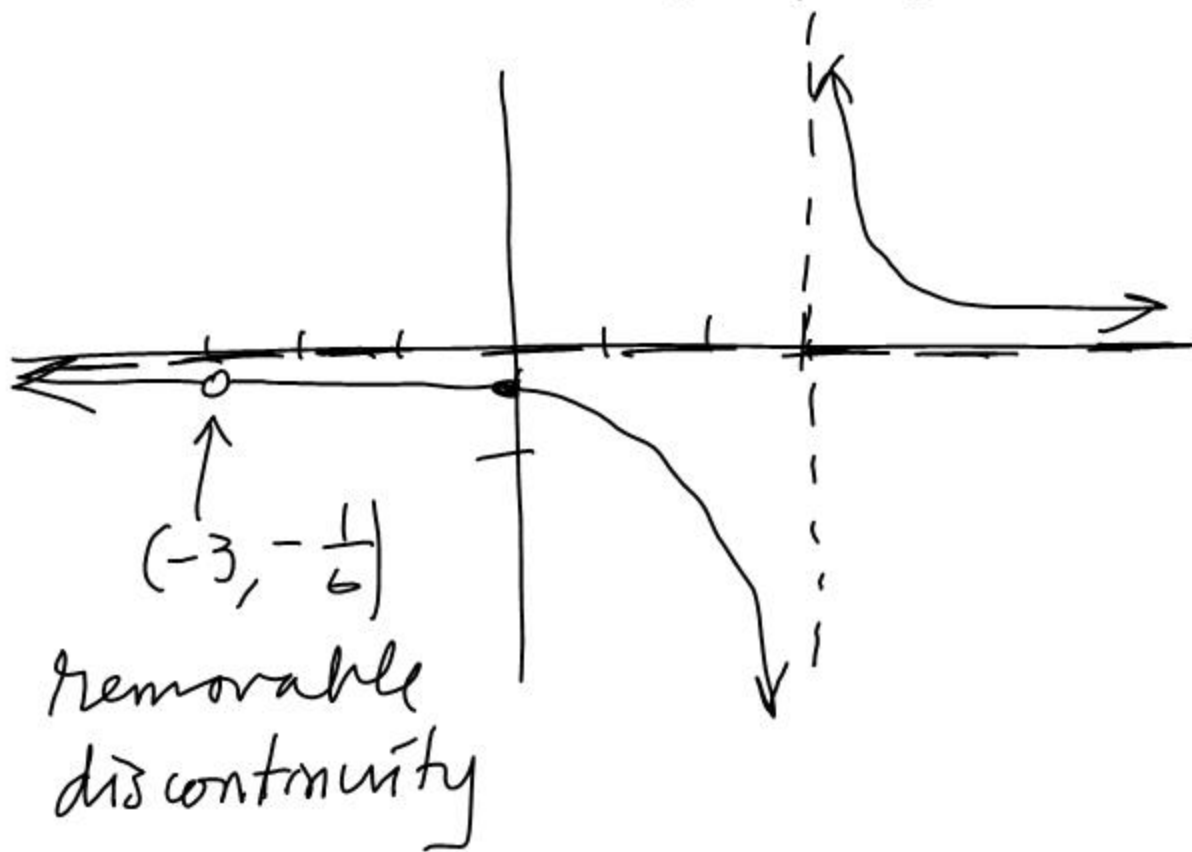
V.A. $x=1$

N.V.A. $y=x$



$$y = \frac{x+3}{x^2-9} = \frac{x+3}{(x+3)(x-3)} = \frac{1}{x-3}, \quad x \neq 3$$

$\mathbb{R} - \{\pm 3\}$



⑦ $y = \frac{x^2 + x - 12}{x^2 - 4}$

⑧ $y = \frac{x^2}{x^2 + x - 6}$

Be
careful