

1. Simplify. State restrictions on the variable.

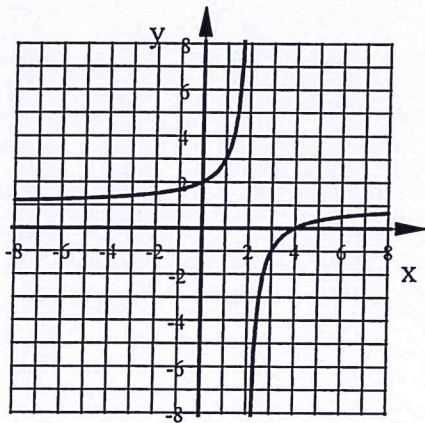
$$\frac{4x^2 + 8x - 60}{x^3 + 6x^2 + 5x} \div \frac{12x^2 - 108}{2x^3 + 10x^2 + 8x}$$

2. Find all points of discontinuity:

$$\frac{7x^2 + 3x - 11}{20x^2 - 7x - 3}$$

3. Write the equation of the graph below which is a transformation of $y = \frac{2}{x}$

$y =$

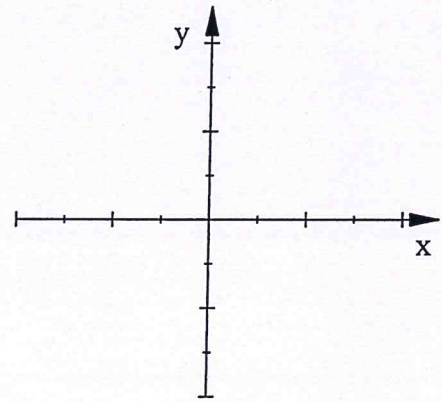


4. Graph this function, showing asymptotes as dashed lines. State the equations of the asymptotes.

$$y = \frac{0.1}{x + 4} - 3$$

HA:

VA:



5. For the given rational functions state the equations of the HA and VA, if any. State the Holes, x-intercepts and y-intercepts, if any.

a) $y = \frac{8x^2 - 128}{3x^2 + 12x - 96}$

Eq HA:

Eq VA:

Holes:

x-int:

y-int:

b) $y = \frac{x^3 + 6x^2 - 9x - 54}{8x^2 + 6x}$

Eq HA:

Eq VA:

Holes:

x-int:

y-int

1. Simplify. State restrictions on the variable.

$$\frac{4x^2 + 8x - 60}{x^3 + 6x^2 + 5x} \div \frac{12x^2 - 108}{2x^3 + 10x^2 + 8x}$$

$$4x^2 + 8x - 60 \Rightarrow 4(x^2 + 2x - 15) = 4(x+5)(x-3)$$

$$x^3 + 6x^2 + 5x \Rightarrow x(x^2 + 6x + 5) = x(x+5)(x+1)$$

$$12x^2 - 108 \Rightarrow 12(x^2 - 9) = 12(x+3)(x-3)$$

$$2x^3 + 10x^2 + 8x \Rightarrow 2x(x^2 + 5x + 4) = 2x(x+4)(x+1)$$

$$\frac{4(x+5)(x-3)}{x(x+5)(x+1)} \div \frac{12(x+3)(x-3)}{2x(x+4)(x+1)}$$

$$= \frac{4(x+5)(x-3)}{x(x+5)(x+1)} \cdot \frac{2x(x+4)(x+1)}{12(x+3)(x-3)}$$

2. Find all points of discontinuity:

$$\frac{7x^2 + 3x - 11}{20x^2 - 7x - 3}$$

$$\begin{array}{c} -60 \\ -12 \times +5 \\ -7 \end{array} \quad \begin{array}{c} 4x+1 \\ 5x \\ +3 \end{array} \quad \begin{array}{c} 20x^2 + 15x \\ 12x - 3 \end{array}$$

$$(4x+1)(5x+3)$$

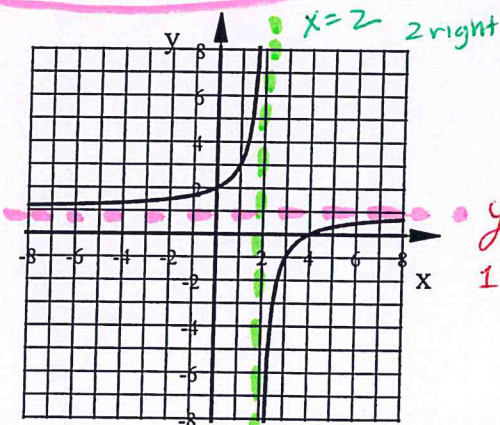
PTS of Discontinuity
are $x = -\frac{1}{4}, \frac{3}{5}$

$$= \frac{2(x+4)}{3(x+3)}$$

$$x \neq 0, -5, -1, -4, \pm 3$$

3. Write the equation of the graph below which is a transformation of $y = \frac{2}{x}$

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



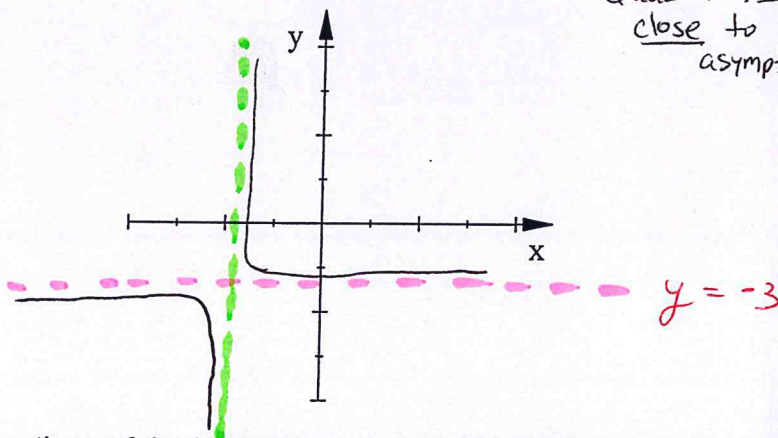
4. Graph this function, showing asymptotes as dashed lines. State the equations of the asymptotes.

$$y = \frac{0.1}{x+4} - 3$$

$$\text{HA: } y = -3 \quad \text{VA: } x = -4$$

4 left
3 down

Branches in
Quad I & III
close to
asymptotes



5. For the given rational functions state the equations of the HA and VA, if any. State the Holes, x-intercepts and y-intercepts, if any.

a) $y = \frac{8x^2 - 128}{3x^2 + 12x - 96} = \frac{8(x+4)(x-4)}{3(x+8)(x-4)}$

Eq HA: $y = \frac{8}{3}$ Eq VA: $x = -8$

Holes: $x = 4$ x-int: $x = -4$

y-int: $\frac{-128}{-96} \rightarrow y = \frac{4}{3}$

b) $y = \frac{x^3 + 6x^2 - 9x - 54}{8x^2 + 6x} = \frac{(x+6)(x+3)(x-3)}{2x(4x+3)}$

Eq HA: No HA Eq VA: $x = 0, -\frac{3}{4}$

Holes: NONE x-int: $x = -6, \pm 3$

y-int: No y-int