C12 - 9.7 - HT/VT Graph -> Equation Notes

(3,1)

HA: $y = 0$

VA: $x = 2$

$$y = \frac{a}{x-h} + k \qquad y = \underline{\qquad}$$

$$y = \frac{a}{x-2} + k$$

$$x = 2$$
$$x - 2 = 0 \qquad VA: \ x = 2$$

$$y = \frac{a}{x-2} + 0$$

$$k = 0 \qquad HA: \ y = 0$$

$$\boxed{HA: \ y = k}$$

$$y = \frac{a}{x-2}$$

$$1 = \frac{a}{3-2} \qquad (3,1)$$
$$(x, y)$$

$$a = 1$$

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

(1,0)

HA: $y = -1$

VA: $x = 0$

$$\boxed{y = \frac{a}{x-h} + k} \qquad \boxed{y = \frac{a(x - int)}{VA's} + HA}$$

$$y = \frac{a}{x-0} + k \qquad x = 0 \ VA: \ x = 0$$

$$y = \frac{a}{x} + k$$

$$y = \frac{a}{x} - 1 \qquad k = -1 \qquad HA: \ y - 1$$

$$\boxed{HA: \ y = k}$$

$$0 = \frac{a}{1} - 1 \qquad (1,0)$$
$$(x, y)$$

$$a = 1$$

$$\boxed{y = \frac{1}{x} - 1}$$

$$y = \frac{a(x-r)}{x-h} \qquad \boxed{y = \frac{HA(x - int)}{VA's}}$$

$$y = \frac{a(x-r)}{x} \qquad VA: \ x = 0$$

$$x = 1 \qquad x: int: (1,0)$$
$$y = \frac{a(x-1)}{x} \qquad x - 1 = 0$$

$$y = \frac{-(x-1)}{x} \qquad HA: \ y = -1 \qquad \text{Case 3:} \ \frac{-1x}{1x}$$

$$\frac{\dfrac{1}{x} - 1}{}$$
$$\dfrac{1}{x} - 1 \times \dfrac{x}{x} \qquad \text{Add Fractions: LCD}$$
$$\dfrac{\dfrac{1}{x} - \dfrac{x}{x}}{}$$
$$\dfrac{1 - x}{x}$$
$$y = -\dfrac{x-1}{x}$$

(1,3)

HA:
$y = 0$
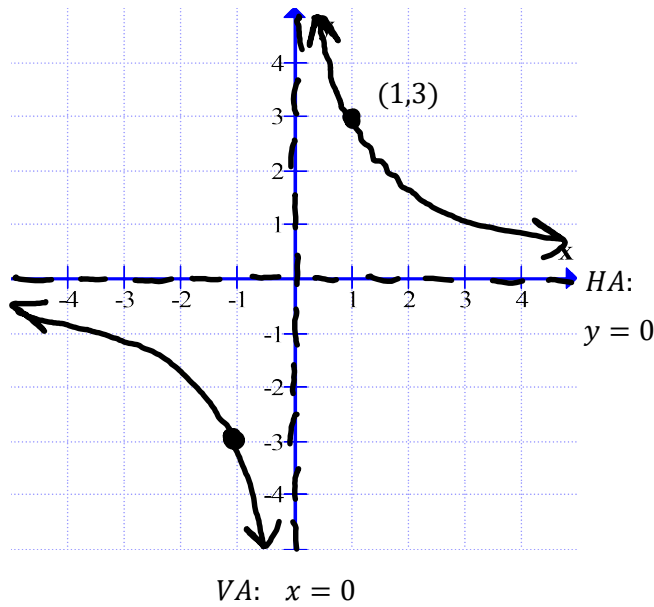
VA: $x = 0$

$$y = \frac{a}{x - h} + k$$

$$y = \frac{a}{x} + k \qquad x = 0 \qquad VA: \quad x = 0$$

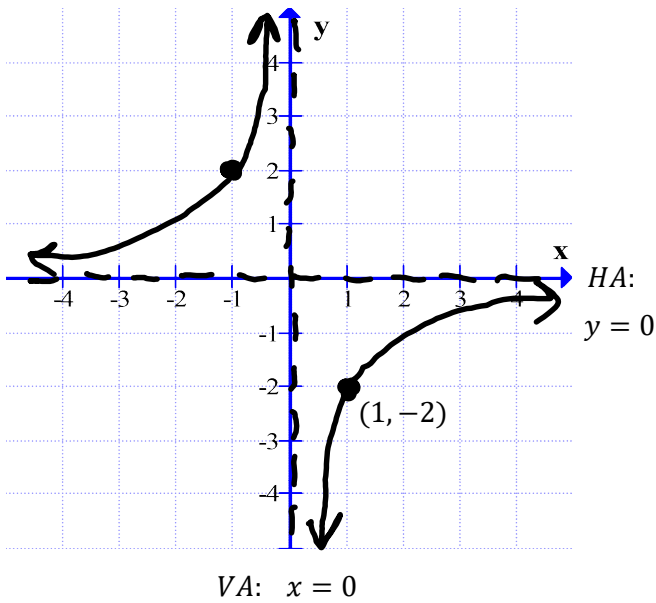$$y = \frac{a}{x} + 0 \qquad k = 0 \qquad HA: \quad y = 0$$

$$\boxed{HA: \quad y = k}$$

$$y = \frac{a}{x}$$

$$3 = \frac{a}{1} \qquad (1,3)$$

$$(x, y)$$

$$a = 3$$

$$y = \frac{3}{x}$$

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y

(1,−2)

HA:
$y = 0$

VA: $x = 0$

$$y = \frac{a}{x - h} + k$$

$$y = \frac{a}{x - 0} + k \qquad x = 0 \qquad VA: \quad x = 0$$

$$y = \frac{a}{x} + k$$

$$y = \frac{a}{x} + 0 \qquad k = 0 \qquad HA: \quad y = 0$$
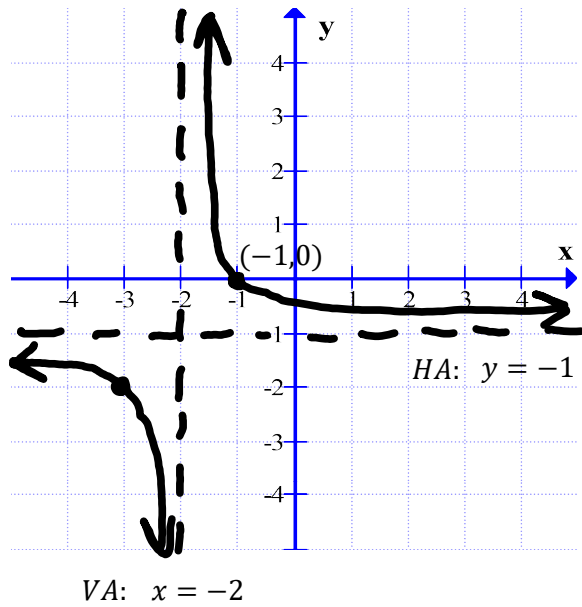
$$\boxed{HA: \quad y = k}$$

$$-2 = \frac{a}{1} \qquad (1, -2)$$

$$(x, y)$$

$$a = -2$$

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

C12 - 9.7 - HT/VT Combo Graph -> Equation Notes

$$\boxed{y = \frac{a}{x - h} + k}$$

$$y = \frac{a}{x + 2} + k \qquad \begin{array}{l} x = -2 \\ x + 2 = 0 \end{array} \qquad VA: \ x = -2$$

$$y = \frac{a}{x + 2} - 1 \qquad k = -1 \quad HA: \ y = -1$$

$$y = \frac{a}{x + 2} - 1 \qquad \boxed{HA: \ y = k}$$

$$0 = \frac{a}{-1 + 2} - 1 \qquad (-1, 0)$$
$$(x, y)$$

$$a = 1$$

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

$(-1,0)$

$HA: \ y = -1$

$VA: \ x = -2$

$$y = \frac{a(x - r)}{x - h} \qquad \boxed{y = \frac{HA(x - int)}{VA's}}$$

$$y = \frac{a(x - r)}{x + 2}$$

$$y = \frac{a(x + 1)}{x + 2} \qquad VA: x = -2$$

$$x = -1 \quad x - int: (-1, 0)$$
$$x + 1 = 0$$

$$y = \frac{-(x + 1)}{x + 2} \qquad HA: y = -1 \qquad Case \ 3: \ \frac{-1x}{1x}$$

$$\frac{1}{x + 2} - 1$$
$$\frac{1}{x + 2} - 1 \times \frac{x + 2}{x + 2}$$
$$\frac{1}{x + 2} - \frac{x + 2}{x + 2}$$
$$\frac{-x - 1}{x + 2}$$

$$y = \frac{-(x + 1)}{x + 2}$$
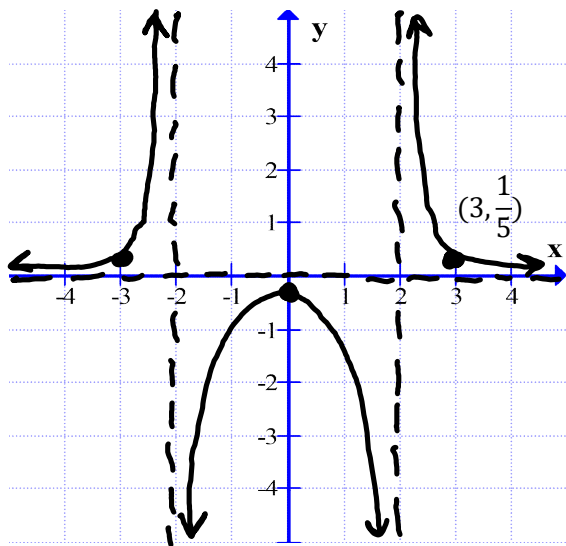
$$y = \frac{a}{x-h} + k$$

$$y = \frac{a}{(x+2)(x-2)} + k$$

$$y = \frac{a}{(x+2)(x-2)} + 0$$

HA:

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

$y = 0$

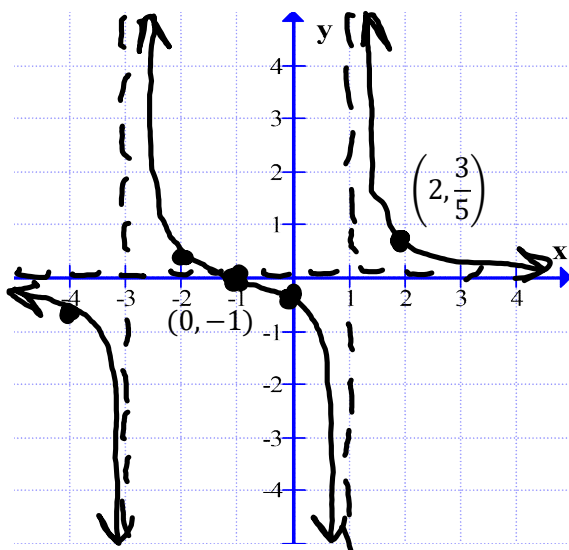$$\frac{1}{5} = \frac{a}{(3+2)(3-2)}$$

$\left(3, \frac{1}{5}\right)$

(x, y)

$a = 1$

VA: $x = -2$ VA: $x = 2$

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

$$\boxed{y = \frac{1}{x^2 - 4}}$$

$$y = \frac{a}{x-h} + k \qquad y = \frac{a(x - int)}{VA's} + HA$$

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

$$y = \frac{a(x+1)}{(x+3)(x-1)} + 0$$

HA:

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

$y = 0$

$$\frac{3}{5} = \frac{a(2+1)}{(2+3)(2-1)} \qquad \left(2, \frac{3}{5}\right)$$
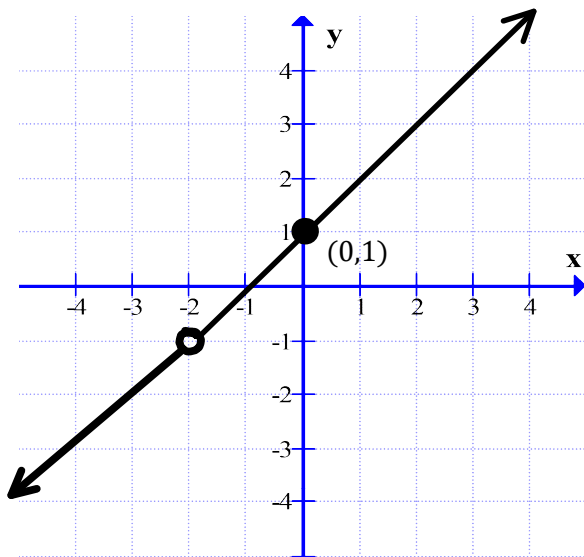
(x, y)

$$\frac{3}{5} = \frac{3a}{5}$$

$a = 1$

VA: $x = -3$ VA: $x = 1$

$$y = \frac{a(x - r)}{x - h} \qquad y = \frac{HA(x - int)}{VA's}$$

$$y = \frac{(x+1)}{(x+3)(x-1)} \qquad HA:\ y = 0 \qquad \text{Case 2:} \quad \frac{x}{x^2}$$

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

C12 - 9.7 - Holes Graph -> Equation Notes

$$y = \frac{a}{x - h}$$

$$y = \frac{a(x - int)(holes)}{(VA's)(holes)}$$

$$y = \frac{a(x + 2)}{(x + 2)} + k$$

$x = -2$ hole:

$x + 2 = 0$ $(-2, -1)$

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

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

$x = -1$

$x + 1 = 0$ $x - int: (0, -1)$

$$y = a(x + 1)$$
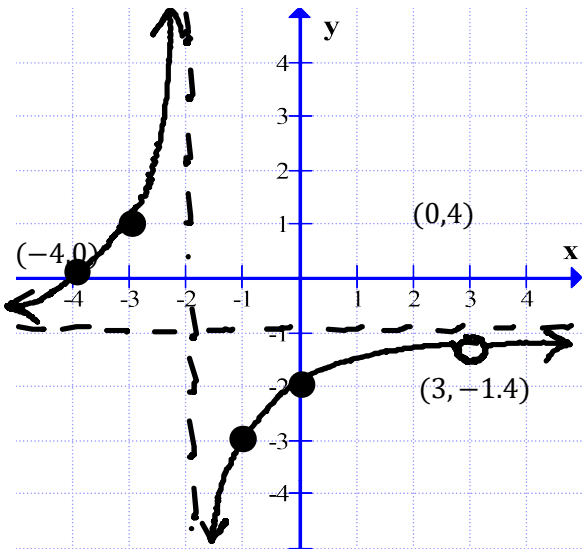
$(0, 1)$

(x, y)

$$1 = a(0 + 1)$$

$$a = 1$$

$$y = \frac{(x + 2)(x + 1)}{(x + 2)}$$ $HA:$ $none$

$$y = \frac{a}{x - h}$$

$$y = \frac{a(x - int)(holes)}{(VA's)(holes)}$$

$$y = \frac{a(x - 3)}{(x - 3)}$$

$x = 3$ hole: $(3, -1.4)$

$x - 3 = 0$

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

$x = -2$ $VA:$ $x = -2$

$x + 2 = 0$

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

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

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

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

$$-2 = \frac{a(0 + 4)}{(0 + 2)}$$

$(0, -2)$

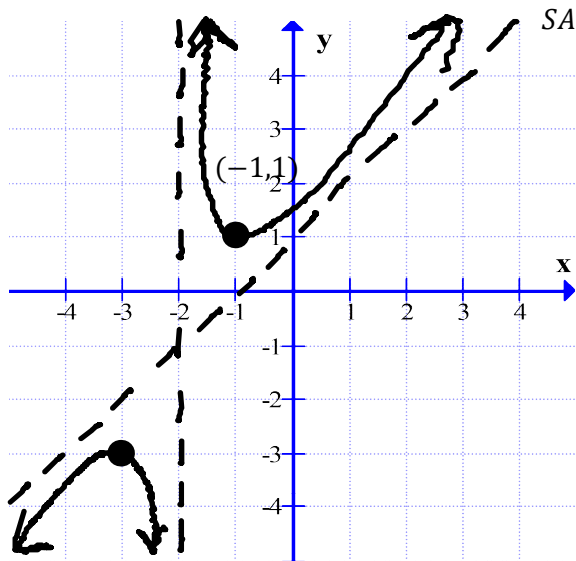(x, y)

$$-2 = \frac{4a}{2}$$

$$a = -1$$

$$y = \frac{-1(x + 4)(x - 3)}{(x + 2)(x - 3)}$$ $HA:$ Case 3: $\frac{-1x^2}{1x^2}$

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

C12 - 9.7 - Slant Graph -> Equation Notes

SA: $\quad y = x + 1$

$$y = \frac{a}{x - h} + Slant$$

SA: $\quad y = x + 1$

$$y = \frac{a}{x + 2} + x + 1 \qquad y = Slant + \frac{R}{Divisor}$$

$$1 = \frac{a}{-1 + 2} - 1 + 1 \qquad (-1, 1)$$

$$\qquad\qquad\qquad\qquad (x, y)$$

$$a = a$$

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

$$\frac{1}{x + 2} + x + 1$$

$$\frac{1}{x + 2} + x + 1 \times \frac{x + 2}{x + 2}$$

$$\frac{1}{x + 2} + x + 1 \times \frac{x + 2}{x + 2}$$

$$\frac{1}{x + 2} + \frac{x^2 + 3x + 2}{x + 2}$$

$$\frac{x^2 + 3x + 3}{x + 2} \qquad y = \frac{x^2 + 3x + 3}{x + 2}$$