

December 13

SWBAT:

Describe how to find
the equations for
vertical and horizontal
asymptotes.



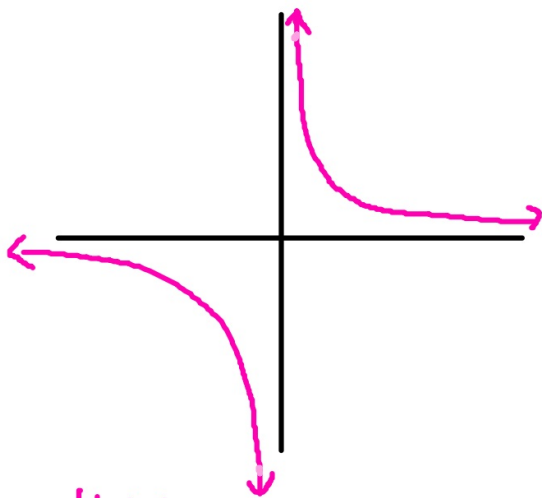
$$R(x) = \frac{27+x}{6+x}$$

$$\text{H.A.: } y=1$$

$$\text{V.A.: } x=-6$$

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



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

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$$g(x) = \frac{3x+1}{4x-5}$$

Horizontal Asymptote:

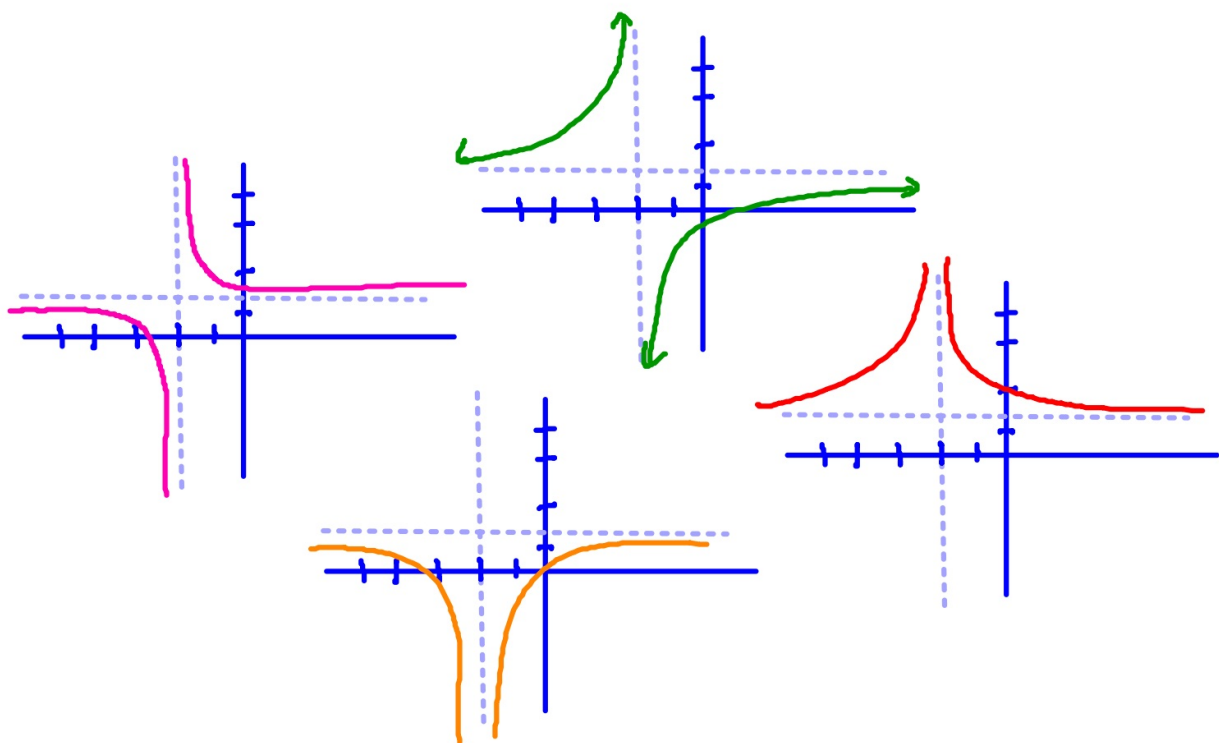
$$y = \frac{3}{4} = .75$$

Vertical Asymptote:

$$4x-5=0$$

$$4x=5$$

$$x = \frac{5}{4}$$



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

Horizontal Asymptote:

$$\frac{3x^2}{x^2} \rightarrow 3$$

Vertical Asymptote:

$$x^2 + 4 = 0$$

$$x^2 = -4$$

$$x = \sqrt{-4}$$

none

Horizontal
Asymptote

the y-value a function approaches
as x gets really big

The ratio of the coefficients of
the term with the highest
exponent

$$\frac{7x^3 - 6x + 12}{17 + 4x^2 + 9x^3} \rightarrow \frac{7x^3}{9x^3} = \frac{7}{9}$$

H.A. at $y = \frac{7}{9}$

$$\frac{8x^2 - 4x + 0x^7}{12x^2 + 5x^7} \rightarrow \frac{0x^7}{5x^7} = 0$$

H.A. at $y = 0$

$$\frac{7x - 10x^0 + 15x^4}{9x^3 + 16x + 0x^4} \rightarrow \frac{15x^4}{0x^4} \text{ undefined}$$

no H.A.

Vertical Asymptote

Where the function is undefined
because you are dividing by zero

Set the denominator = 0

(factor & simplify first)

$$\frac{x(x-5)}{(x-5)(x+9)} = \frac{x}{x+9}$$
$$x+9=0$$
$$\text{V.A. at } x=-9$$

$$\frac{x^2-36}{x(x^2+8x+12)} = \frac{(x+6)(x-6)}{x(x+6)(x+2)} = \frac{x-6}{x(x+2)}$$
$$x(x+2)=0$$
$$x=0 \quad x+2=0$$
$$\text{V.A. at } x=0 \text{ \& } x=-2$$