Asymptotes

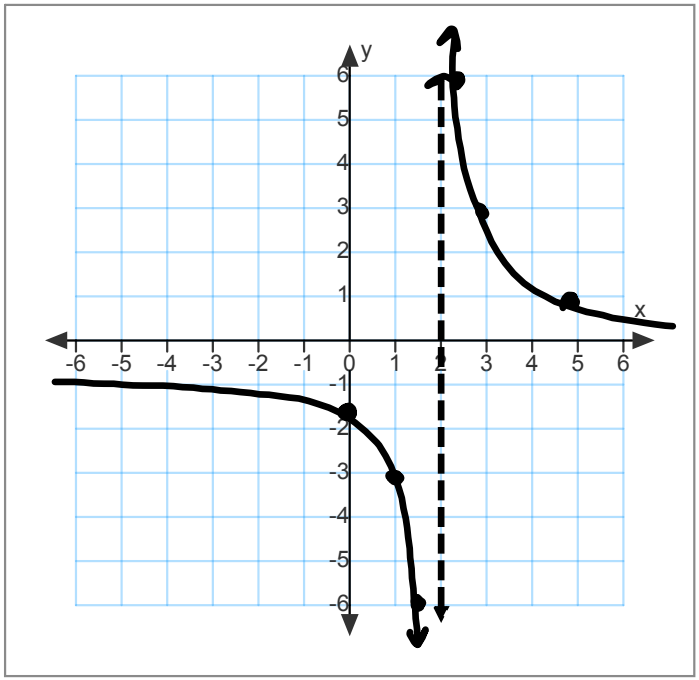
$$f(x) = \frac{3}{x-2}$$

| x | 0 | 1 | 1.5 | 1.99 |
|---|---|---|---|---|
| y | -1.5 | -3 | -6 | -300 |

as $x \to 2^-$, $f(x) \to -\infty$

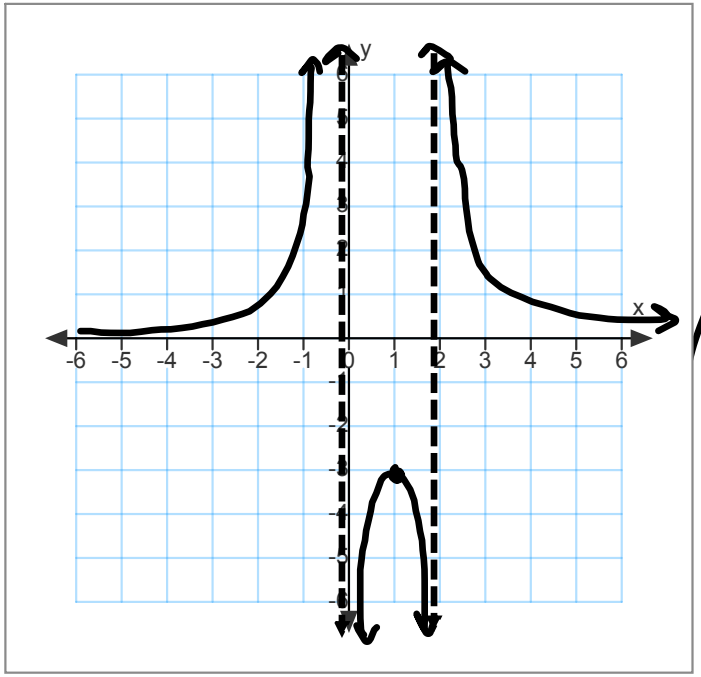
| x | 5 | 3 | 2.5 | 2.01 |
|---|---|---|---|---|
| y | 1 | 3 | 6 | 300 |

as $x \to 2^+$, $f(x) \to +\infty$



$$f(x) = \frac{x+2}{x^2-2x} \qquad x^2-2x \rightarrow x(x-2)$$

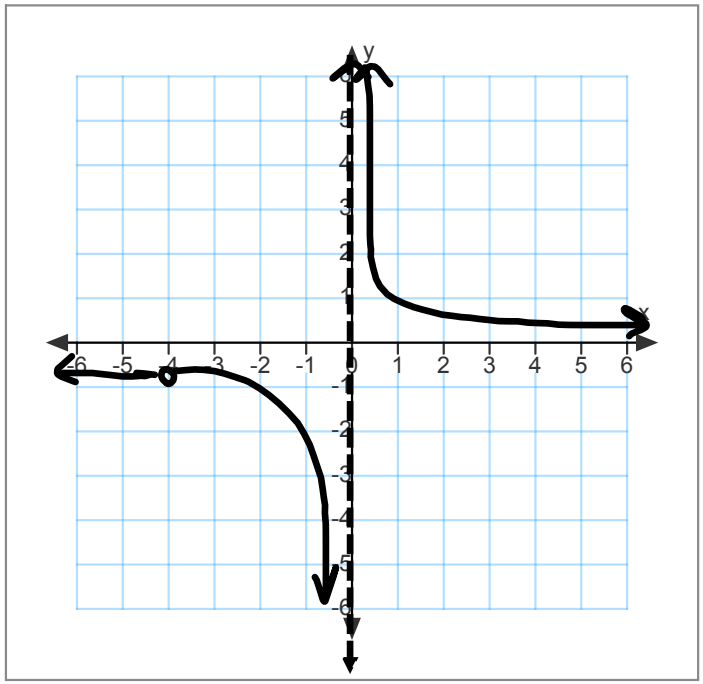
VA @ : 0, 2




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

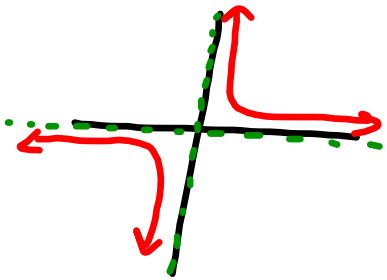
VA : 0

Hole : -4



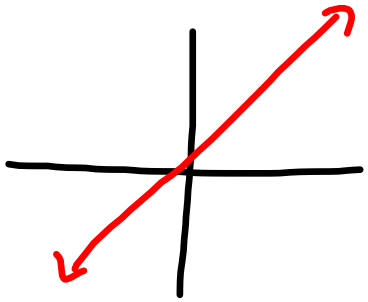
## Horizontal Asympotes

1) If the degree of the denominator is greater than the numerator then a HA exists at y=0



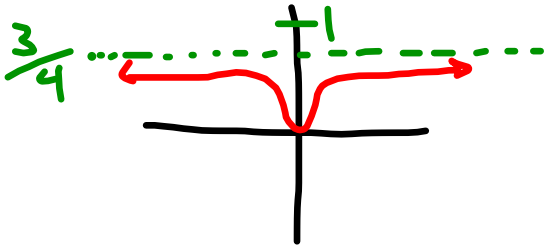
$f(x) = \frac{1}{x}$

2) If the degree of the numerator is greater than the denominator, then there is no HA.



$f(x) = x$

3) If the degree of the numerator and denominator are equal, then a HA exists at
y= Leading coefficient(N)/
Leading coefficient(D)




$f(x) = \frac{3x^2}{4x^2+1}$

f(x) = 5x^6/(7X^6 - 4x^2)

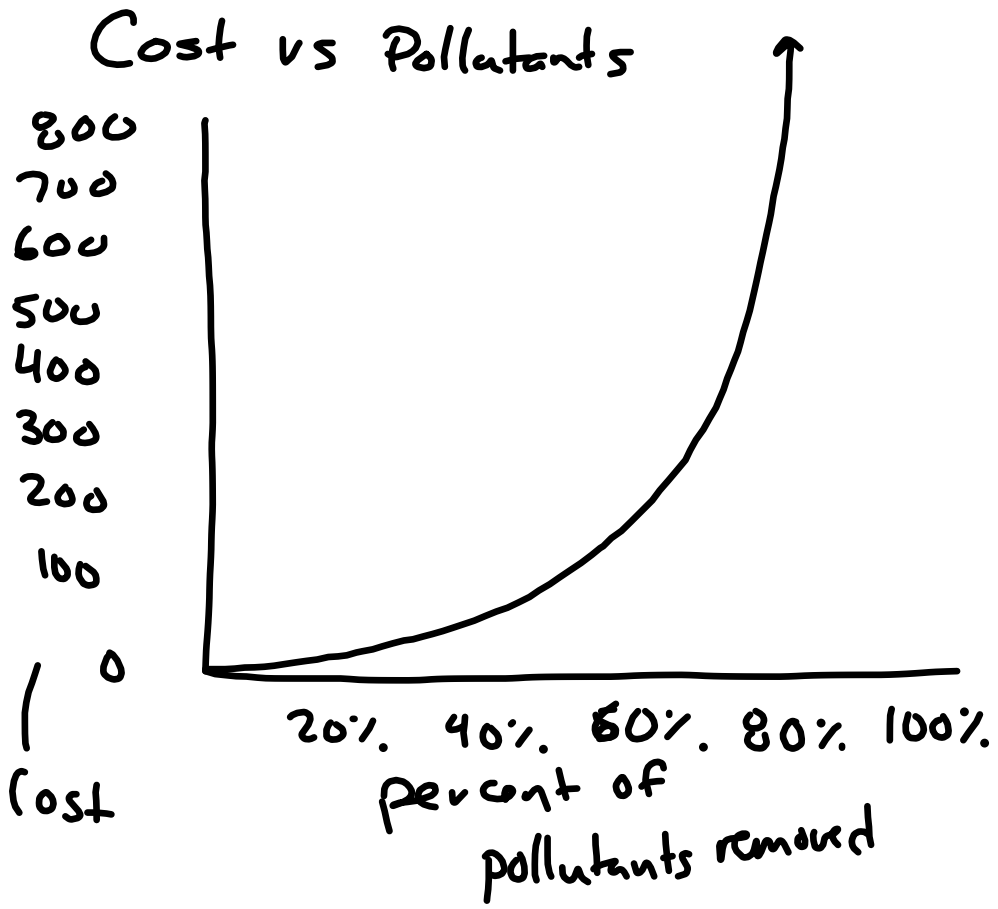
A small business spends $5000 in start up costs on a new products. In addition, every new product costs $0.50 to make. Find the average cost of producing 10 units, 100 units, 1000 units, and infinity units. What happens to the average price as I produce more units?

$$\text{Cost} = 0.50x + 5000$$

$$\text{Average Cost} = \frac{0.5x+5000}{x} = 0.5 + \frac{5000}{x}$$

$$\lim_{x\to\infty} \frac{0.5x+5000}{x} = 0.5 + \frac{5000}{x}$$

| X | Y |
|---|---|
| 10 | $500.50 |
| 100 | $50.50 |
| 1000 | $5.50 |
| 10,000 | $1.00 |
| 100,000 | $0.55 |
| 1,000,000 | $0.505 |
| $\infty$ | $0.50 |


Cost vs Pollutants
800
700
600
500
400
300
200
100
0
Cost
20%. 40%. 60%. 80%. 100%.
percent of
pollutants removed