2.6 Rational Functions and Asymptotes Day 2

Find the zeros of the function. (the zeros of the numerator)

Ex1) $g(x) = \dfrac{x^2 - 9}{x + 2} = \dfrac{(x+3)(x-3)}{x+2}$

graphing calculator: $y = (x^2 - 9)/(x + 2)$

zeros: $x + 3 = 0$ $x - 3 = 0$

$x = \pm 3$

Ex2) $h(x) = 5 + \dfrac{3}{x + 1}$

no real zeros

Ex3) A utility company burns coal to generate electricity. The cost C (in dollars) of removing p% of the smokestack pollutants is given by:

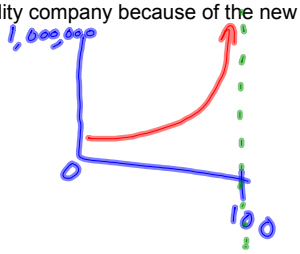
$$C = \frac{80{,}000}{100 - p}, \text{ for } 0 \le p \le 100$$

Using a graphing utility to graph this function. you are a member of a state legislature that is considering a law that would require utility companies to remove 90% of the pollutants from their smokestack emissions. The current law requires 85% removal. How much additional cost would there be to the utility company because of the new law?

$C = \dfrac{80000(85)}{100 - 85} = \$453{,}333.33$

$C = \dfrac{80000(90)}{100 - 90} = \$720{,}000$

$\$720{,}000 - 453{,}333.33 = \$266{,}667$ more



Ex 4) For a person with sensitive skin, the amount of time T (in hours) the person can be exposed to the sun with a minimal burning can be modeled by:

$$T = \frac{0.37s + 23.8}{s}, \quad 0 \le s \le 120$$

where s is the Sunsor Scale reading. The Sunsor Scale is based on the level of intensity of UVB rays.

a. Find the amount of time a person with sensitive skin can be exposed to the sun with minimal burning when s=10, s=25, and s=100.

$s=10 \Rightarrow T = \frac{0.37(10)+23.8}{10} = 2.75 \text{ hrs.}$

$s=25 \Rightarrow T = \frac{0.37(25)+23.8}{25} = 1.32 \text{ hrs.}$

$s=100 \Rightarrow T = \frac{0.37(100)+23.8}{100} = 0.61 \text{ hrs.}$

b. If the model were valid for all s>0, what would be the horizontal asymptote of this fuction, and what would it represent?

$n=m \therefore y=0.37$

Shortest possible expose time with minimal burning