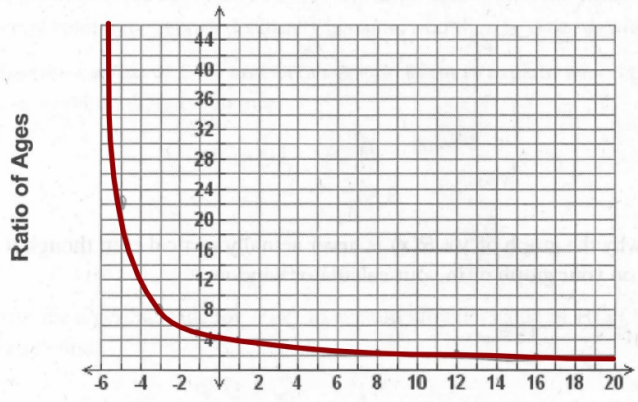
December 11

SWBAT:

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

Happy Hanukkah

Let $R(x)$ represent the ratio of Cera's age in years to Cory's age in years, and let x represent the number of years from now, either past or future. Thus, R is a function of x, and $R(x)=\frac{27+x}{6+x}$. Recall that positive x will represent years in the future and negative x will represent years in the past. On the grid below, sketch a graph of the function R for $-6 < x < 19$.



12) As R(x) is evaluated for values of x closer and closer to -6, the ratio found by R(x) gets larger and larger. Explain why this occurs.

13) What is the equation of the vertical line, called a vertical asymptote, that your graph appears to be merging with as x values are selected closer and closer to -6?

$x = -6$

15) As x increases without bound, to what numerical value does R(x) appear to converge?

16) What is the equation of the horizontal line, called a horizontal asymptote, that best models the graph for very large values of x?

$y = 1$

17a) Use the context of Cory and Cera's age problem to explain why the value of R(x) can never actually reach one.

17b) Use the algebraic rule for R(x) to explain why the value of R(x) can never actually reach one.

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

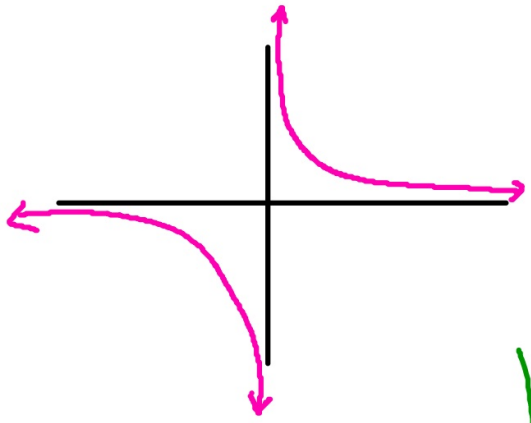
$$(6+x)\frac{27+x}{6+x} = 1\cdot(6+x)$$

$$27+x = 6+x$$

$$-x \quad -x$$

$$27 \neq 6$$

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



vertical asymptote: $x = 0$

horizontal asymptote: $y = 0$