Unit 2 Lesson 18: Graphs of Rational Functions (Part 2)

1 Rewritten Equations (Warm up)

Student Task Statement

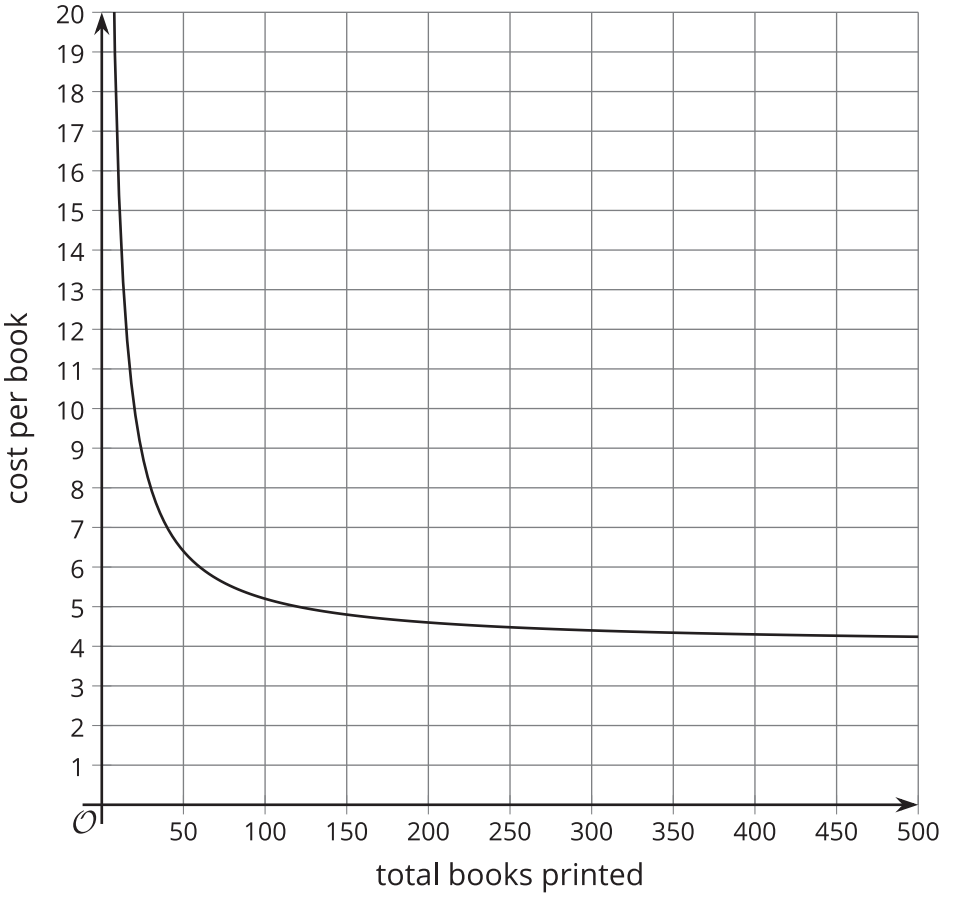
Decide if each of these equations is true or false for x values that do not result in a denominator of 0. Be prepared to explain your reasoning.

1. $\frac{x+7}{x} = 1 + \frac{7}{x}$
2. $\frac{x}{x+7} = 1 + \frac{x}{7}$

2 Publishing a Paperback

Student Task Statement

Let c be the function that gives the average cost per book $c(x)$, in dollars, when using an online store to print x copies of a self-published paperback book. Here is a graph of $c(x) = \frac{120+4x}{x}$.



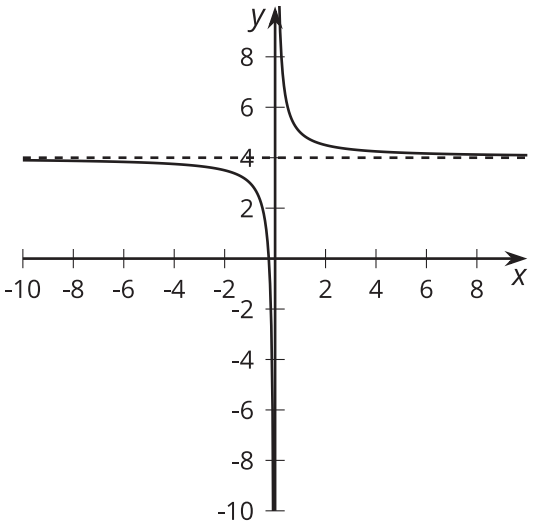
1. What is the approximate cost per book when 50 books are printed? 100 books?
2. The author plans to charge $8 per book. About how many should be printed to make a profit?
3. What is the value of $c(x)$ when $x = \frac{1}{2}$? How does this relate to the context?
4. What does the end behavior of the function say about the context?

3 Horizontal Asymptotes

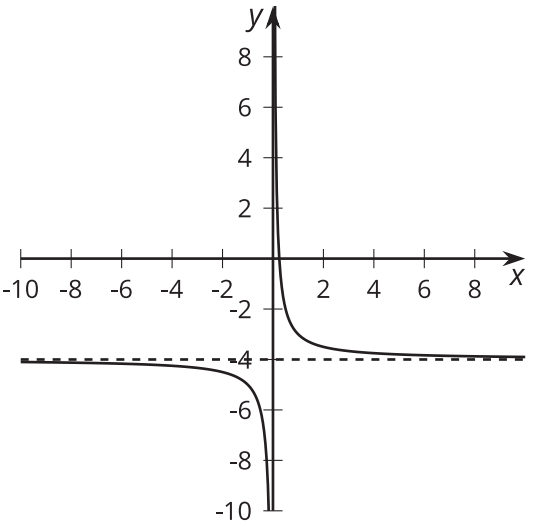
Student Task Statement

Here are four graphs of rational functions.

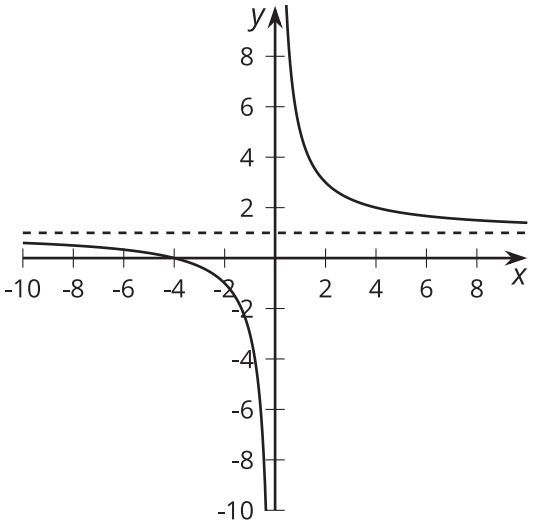
A



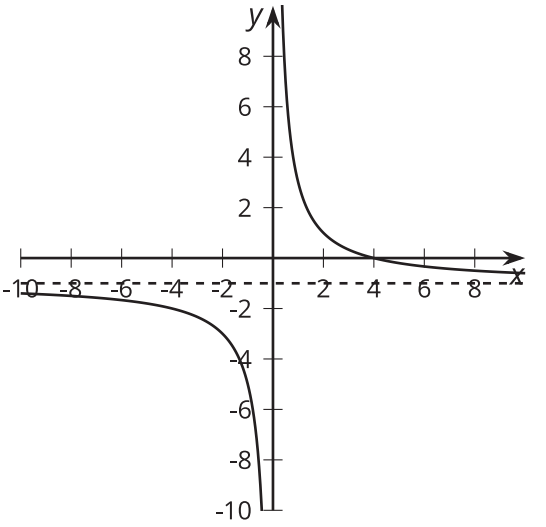
B



C



D



1. Match each function with its graphical representation.
   a. $a(x) = \frac{4}{x} - 1$
   b. $b(x) = \frac{1}{x} - 4$
   c. $c(x) = \frac{1+4x}{x}$

d. $d(x) = \frac{x+4}{x}$

e. $e(x) = \frac{1-4x}{x}$

f. $f(x) = \frac{4-x}{x}$

g. $g(x) = 1 + \frac{4}{x}$

h. $h(x) = \frac{1}{x} + 4$

2. Where do you see the **horizontal asymptote** of the graph in the expressions for the functions?