## 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 $c\left(x\right)$, in dollars, when using an online store to print $x$ copies of a self-published paperback book. Here is a graph of $c\left(x\right)=\frac{120+4x}{x}.$



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 $c\left(x\right)$ 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



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1. Match each function with its graphical representation.
	1. $a\left(x\right)=\frac{4}{x}−1$
	2. $b\left(x\right)=\frac{1}{x}−4$
	3. $c\left(x\right)=\frac{1+4x}{x}$
	4. $d\left(x\right)=\frac{x+4}{x}$
	5. $e\left(x\right)=\frac{1−4x}{x}$
	6. $f\left(x\right)=\frac{4−x}{x}$
	7. $g\left(x\right)=1+\frac{4}{x}$
	8. $h\left(x\right)=\frac{1}{x}+4$
2. Where do you see the **horizontal asymptote** of the graph in the expressions for the functions?



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