## Unit 5 Lesson 10: Combining Functions

### 1 Notice and Wonder: Are Book Sales Improving? (Warm up)

#### Student Task Statement

What do you notice? What do you wonder?

| $t$ (years since 2010) | number of books soldin the US (millions) | population ofthe US (millions) |
| --- | --- | --- |
| 0 | 2,530 | 309.35 |
| 1 | 2,400 | 311.64 |
| 2 | 2,730 | 313.99 |
| 3 | 2,720 | 316.23 |
| 4 | 2,700 | 318.62 |
| 5 | 2,710 | 321.04 |
| 6 | 2,700 | 323.41 |

### 2 How Many Books Can One Person Have?

#### Student Task Statement

The table shows the values of two functions, $P$ and $B$, where $P\left(t\right)$ is the population of the US, in millions, $t$ years after 2010, and $B\left(t\right)$ is the number of books sold per year, in millions, $t$ years after 2010.

| $t$ (years since 2010) | $B\left(t\right)$ (millions) | $P\left(t\right)$ (millions) | $R\left(t\right)$ |
| --- | --- | --- | --- |
| 0 | 2,530 | 309.35 |                   |
| 1 | 2,400 | 311.64 |   |
| 2 | 2,730 | 313.99 |   |
| 3 | 2,720 | 316.23 |   |
| 4 | 2,700 | 318.62 |   |
| 5 | 2,710 | 321.04 |   |
| 6 | 2,700 | 323.41 |   |

1. Plot the values of $B$ as a function of $t$. What does the plot tell you about book sales?
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1. How many books were sold per person in 2010 and 2016? What do these values tell you about book sales?
2. Define a new function $R$ by $R\left(t\right)=\frac{B\left(t\right)}{P\left(t\right)}$. Complete the table and then graph the values of $R\left(t\right)$. What do the values of $R$ tell you?

### 3 Adding Functions

#### Student Task Statement

1. Here are the graphs of two functions, $E$ and $L$. Define a new function $S$ by adding $E$ and $L$, so $S\left(x\right)=E\left(x\right)+L\left(x\right)$. On the same axes, sketch what you think the graph of $S$ looks like.
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1. Sketch the graph of the sum of $E$ and each of the following functions.
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