## Unit 5 Lesson 7: Expressing Transformations of Functions Algebraically

### 1 Describing Translations (Warm up)

#### Student Task Statement

Let . Complete the table. Be prepared to explain your reasoning.

|  |  |  |
| --- | --- | --- |
| words (the graph of is...) | function notation | expression |
| translated left 5 units |  |  |
| translated left 5 units and down 3 units |  |  |
|  |  |  |
| translated left 5 units, then down 3 units, then reflected across the -axis |  |  |

### 2 Translating Vertex Form

#### Student Task Statement

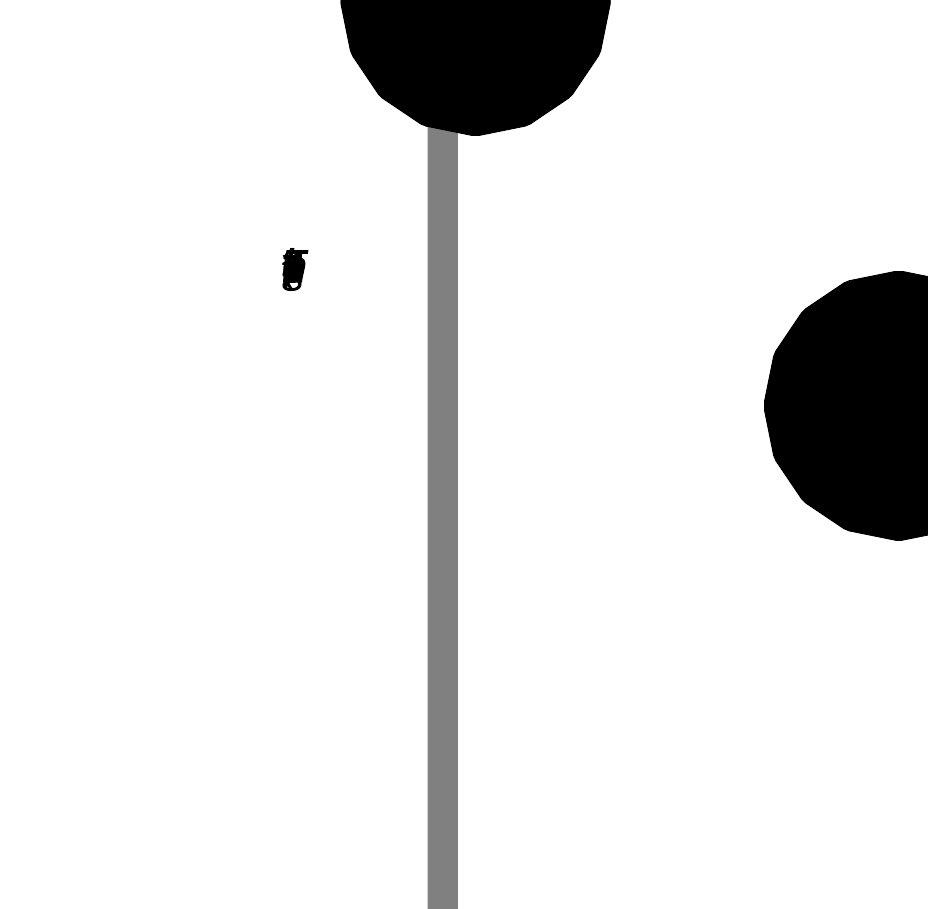
Let be the function given by .

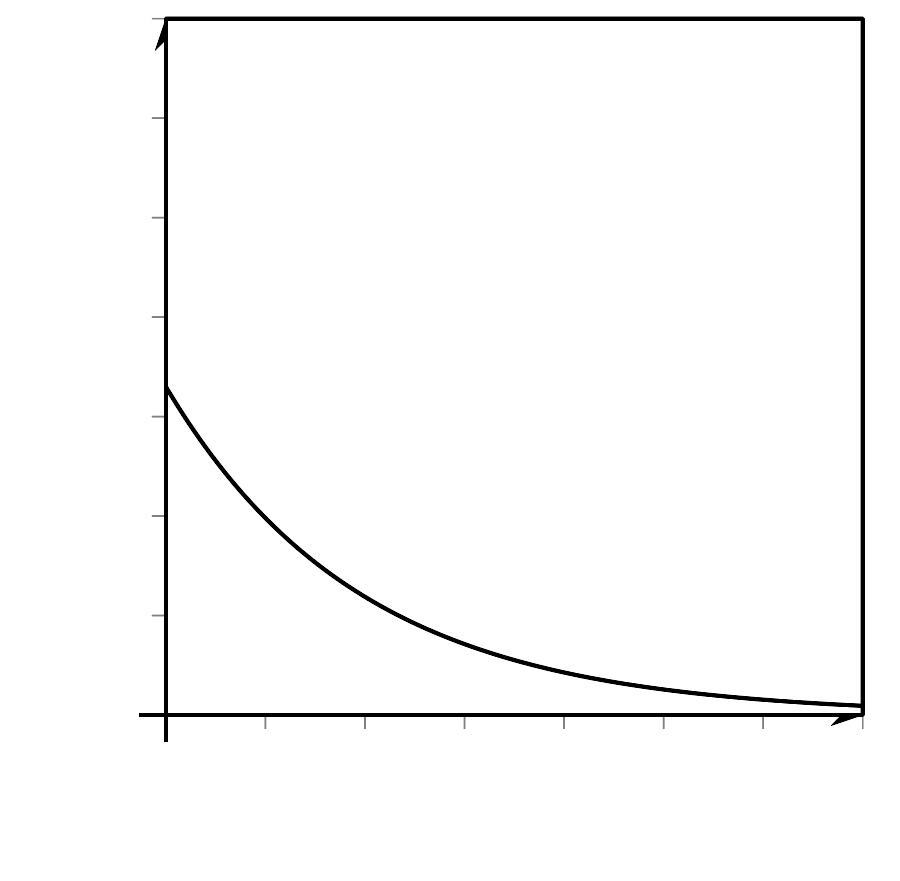
1. Write an equation for the function whose graph is the graph of translated 3 units left and up 5 units.
2. What is the vertex of the graph of ? Explain how you know.
3. Write an equation for a quadratic function whose graph has a vertex at .
4. Write an equation for a quadratic function whose graph opens downward and has a vertex at .

### 3 An Even Better Fit

#### Student Task Statement

In an earlier lesson, we looked at the temperature , in degrees Fahrenheit, of a bottle of soda water left outside for hours. Let’s model this data with a function. This time, we will start with the function . This graph has a shape that fits the data well.





1. Describe a translation of this graph that fits the data.
2. Write an equation defining a function that models the data.
3. What does your function tell you about the temperature outside?



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