

### Vertical Progression:

<b>8<sup>th</sup> Grade</b>	<b>8.F.A Define, evaluate, and compare functions.</b> <ul style="list-style-type: none"><li>○ <b>8.F.3</b> Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.</li></ul>
<b>Algebra 1</b>	<b>ELG.MA.HS.F.7 Interpret expressions for functions in terms of the situation they model.</b> <ul style="list-style-type: none"><li>○ <b>F-LE.5</b> Interpret the parameters in a linear or exponential function in terms of a context.</li></ul>
<b>Algebra 2</b>	<b>ELG.MA.HS.F.7 Interpret expressions for functions in terms of the situation they model.</b> <ul style="list-style-type: none"><li>○ <b>F-LE.5</b> Interpret the parameters in a linear or exponential function in terms of a context.</li></ul>

### Students will demonstrate command of the ELG by:

- Interpreting the slope and y-intercept of a linear function.
- Interpreting the values of  $a$ ,  $b$ ,  $r$ , and  $t$  in an exponential function.

### Vocabulary:

- exponential function
- linear function
- parameter

### Sample Instructional/Assessment Tasks:

#### 1) Standard(s): F-LE.5

**Source:** Illustrative Mathematics

<https://www.illustrativemathematics.org/content-standards/HSF/LE/B/5/tasks/579>

**Item Prompt:**

A fisherman illegally introduces some fish into a lake, and they quickly propagate. The growth of the population of this new species (within a period of a few years) is modeled by  $P(x) = 5b^x$  where  $x$  is the time in weeks following the introduction and  $b$  is a positive unknown base.

- Exactly how many fish did the fisherman release into the lake?
- Find  $b$  if you know the lake contains 33 fish after eight weeks. Show step-by-step work.
- Instead, now suppose that  $P(x) = 5b^x$  and  $b = 2$ . What is the weekly percent growth rate in this case? What does this mean in every-day language?

**Correct Answer(s):**

- 5 fish
- approximately 1.2
- there is a 100% weekly growth rate

#### 2) Standard(s): F-LE.5

**Source:** Illustrative Mathematics

<https://www.illustrativemathematics.org/content-standards/HSF/LE/B/5/tasks/243>

**Item Prompt:**

Lauren keeps records of the distances she travels in a taxi and what she pays:

Distance, $d$ , in miles	Fare, $F$ , in dollars
3	8.25
5	12.75
11	26.25

- If you graph the ordered pairs  $(d, F)$  from the table, they lie on a line. How can you tell this without graphing them?
- Show that the linear function in part A has equation  $F = 2.25d + 1.5$ .
- What does the 2.25 and the 1.5 in the equation represent in terms of taxi rides?

**Correct answer(s):**

- The slope or rate of change is constant.
- Student should substitute the ordered pairs into the equation and show that those ordered pairs satisfy the equation.
- The 2.25 represents the cost per mile for the ride. The 1.5 represents a fixed cost for every ride; it does not depend on the distance traveled.