

Interpreting Slope and Y-Intercept Formative Assessment 1

Link to Formative Assessment (original): <https://www.illustrativemathematics.org/content-standards/tasks/120>

Cluster & Content Standards

What content standards can be addressed by this formative assessment?

NC.8.F.4 Analyze functions that model linear relationships.

- Understand that a linear relationship can be generalized by $y = mx + b$.
- Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph.
- Construct a graph of a linear relationship given an equation in slope-intercept form.
- Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.

Mathematical Practice Standards

What practice standards can be addressed by this formative assessment?

3. Reason abstractly and quantitatively

Learning Targets

What learning targets will be assessed?

- Interpret the rate of change and initial value of a linear function in terms of the situation it models
- Interpret the rate of change and initial value of a linear function in terms of the slope and y-intercept of its graph or table of values

Timing: During or after completing the tasks on interpreting both the slope and the y-intercept. The second part of the assessment could be used to introduce instruction about comparing linear functions.

Anticipated Solutions and Possible Conceptions:

Part 1: Students are given direct instructions to interpret the meaning of the slope and y intercept in context, so answers should include:

- The slope of -250 means that the car is going downhill at a rate of 250 ft per mile
- The y-intercept of 7,500 means that the car started at an elevation of 7,500ft (or that the hill is 7,500ft tall)

Part 2: The first car started at a higher elevation than the second car. The justification is open-ended and students may answer by comparing the y-intercepts (initial values), by evaluating the function at $x=0$ and comparing the outputs, or by comparing the starting points on the graphs.

See the Illustrative Mathematics link for more possible solutions and explanations.

Interpreting Slope and Y-Intercept Formative Assessment 2

Link to Formative Assessment (original): <https://www.illustrativemathematics.org/content-standards/8/F/B/tasks/417>

Cluster & Content Standards

What content standards can be addressed by this formative assessment?

NC.8.F.4 Analyze functions that model linear relationships.

- Understand that a linear relationship can be generalized by $y = mx + b$.
- Write an equation in slope-intercept form to model a linear relationship by determining the rate of change and the initial value, given at least two (x, y) values or a graph.
- Construct a graph of a linear relationship given an equation in slope-intercept form.
- Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of the slope and y-intercept of its graph or a table of values.

Mathematical Practice Standards

What practice standards can be addressed by this formative assessment?

3. Reason abstractly and quantitatively

Learning Targets

What learning targets will be assessed?

- Interpret the rate of change and initial value of a linear function in terms of the situation it models
- Interpret the rate of change and initial value of a linear function in terms of the slope and y-intercept of its graph or table of values

Timing: After completing the tasks on interpreting both the slope and the y-intercept.

Correct Answers

Students may have trouble differentiating the initial value and the rate of change. They may not correctly connect the slope and y-intercept of the given function to the initial value and rate of change of the scenarios.

1. NO: If y is the amount of money in dollars Joaquin earns for selling x magazines, then for each magazine sold, Joaquin actually gets $2+5=7$ dollars. So this situation is modeled by the function $y=2x+5x=7x$.
2. YES: If y is the amount of money Sandy earns for x hours of babysitting, then $y=2x+5$ models this situation. She earns 2 dollars per hour and the extra term of 5 represents the 5 dollar penalty Sandy charges parents for coming home late.
3. NO: If y is the amount of money in dollars John owes for renting x videos, then this situation is modeled by the function $y=5x+2$. John pays 5 dollars per video and a one time initiation fee of 2 dollars.
4. Yes: If y is the amount of money (in dollars) Andy has saved after x weeks then this situation is modeled by the function $y=5+2x$. Andy already has 5 dollars to begin with and he saves an additional 2 dollars per week.

See the original Illustrative Mathematics link for more explanations and possible solutions.

Interpreting Slope and Y-Intercept

Formative Assessment 2

Which of the following could be modeled by $y = 2x + 5$? Explain why or why not for each situation.

- a. Joaquin earns \$2.00 for each magazine sale. Each time he sells a magazine he also gets a five-dollar tip. How much money will he earn after selling x magazines?

- b. Sandy charges \$2.00 an hour for babysitting. Parents are charged \$5.00 if they arrive home later than scheduled. Assuming the parents arrived late, how much money does she earn for x hours?

- c. Sneak Preview is a members-only video rental store. There is a \$2.00 initiation fee and a \$5.00 per video rental fee. How much would John owe on his first visit if he becomes a member and rents x videos?

- d. Andy is saving money for a new CD player. He began saving with a \$5.00 gift and will continue to save \$2.00 each week. How much money will he have saved at the end of x weeks?