

Grade 6 Target G

Domain, Target, Standards, DOK, Vertical Alignments, Achievement Levels, Evidence Required, Vocabulary, Response Types, Materials, Attributes, Question Types, and Question Banks (Examples)

[Content Domain: Expressions and Equation](#)

[Target G \[m\]: 6.EE.C Represent and analyze quantitative relationships between dependent and independent variables.](#)

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Content Domain: Expressions and Equation

Target G [m]: 6.EE.C Represent and analyze quantitative relationships between dependent and independent variables.

Standards included in Target G: 6.EE.C, 6.EE.C.9

6.EE.C Represent and analyze quantitative relationships between dependent and independent variables.

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

Vertical Alignment

Related Grade 5 standards

5.OA.B Analyze patterns and relationships.

5.OA.B.3. Generate two numerical patterns using two given rules. Identify apparent

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relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number is 0, and the given rule “Add 6” and the starting number is 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems

5.G.A.2 Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation

Related Grade 7 Standards

7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.

Achievement Level Descriptors

Level 1 Students should be able to identify a table that represents a relationship between two variables of the forms $y = kx$ and $y = x \pm c$ with rational numbers and plot points corresponding to equations on coordinate planes.

Level 2 Students should be able to use variables to represent and analyze two quantities that change in relationship to each other of the form $y = kx$ or $y = x \pm c$ with rational numbers; identify and create an equation that expresses one quantity in terms of another; and use graphs and tables to represent the relationship.

Level 3 Students should be able to use graphs, tables, or context to analyze the relationship between dependent and independent variables and relate them to a linear equation.

Level 4 Students should be able to use graphs, tables, or context to analyze nonlinear polynomial relationships between dependent and independent variables and relate them to

nonlinear polynomial equations.

Evidence Required

1. The student writes an equation to express one quantity versus another quantity using dependent and independent variables.
2. The student identifies the relationship between dependent and independent variables from graphs and tables and relates them to equations.

Vocabulary

variable, equation, inequality, dependent variable, independent variable, relation

Response Types

Multiple Choice, single correct response; Multiple Choice, multiple correct response; Equation/Numeric; Matching Tables; Fill-in Table

Materials

graph, tables

Attributes

none

Claim 1: Concepts and Procedures (DOK 2) Question Banks

Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Claim 1 6.EE.C.9 DOK Level 2

Use variables to represent two quantities in a realworld problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Evidence Required

The student writes an equation to express one quantity versus another quantity using dependent and independent variables.

Question Type 1: The student is presented with independent and dependent quantities in a real-world context.

Emily studies 40 minutes after lunch for a science exam. She studies x more minutes that evening.

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Enter an equation that represents the total number of minutes, y , Emily studies for the science exam.

Rubric: (1 point) Student gives a correct equation (e.g., $40 + x = y$).

Response Type: Equation/Numeric

Claim 1 6.EE.C.9 DOK Level 2

Use variables to represent two quantities in a realworld problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Evidence Required

The student identifies the relationship between dependent and independent variables from graphs and tables and relates them to equations.

Question Type 1: The student is presented with two related quantities in a real-world context.

Example Stem: Jack saves \$6.00 each week.

- Let w represent the number of weeks that Jack saves \$6.00.
- Let t represent the total amount saved, in dollars.

Which graph shows the relationship between t , the amount of money Jack saves, and w , the number of weeks he has been saving?

A.



B.



C.



D.



Answer Choices: Answer choices will be a graph with three to five ordered pairs plotted. Distractors will include switching the two variables and/or incorrectly plotting the points.

Rubric: (1 point) Student selects the correct graph (e.g., D).

Response Type: Multiple choice, single correct response

Question Type 2: The student is presented with a relationship between two quantities represented by a table or a graph.

- Jack saves the same amount of money each week as shown in the table.
 - Let w represent the number of weeks that Jack saves.
 - Let t represent the total amount saved, in dollars.

Number of Weeks w	Total Amount Saved t
1	\$ 6
2	\$12
3	\$18
4	\$24

Determine whether each statement is true. Select True or False for each statement.

Statement	True	False
The equation $t = 6 + w$ represents the relationship between the number of weeks and the total amount saved.		
The total amount saved is 6 times the number of weeks.		
The number of weeks that Jack saves depends on the total amount of money Jack saves.		

Rubric: (1 point) Student correctly identifies each statement as being either true or false (e.g., F, T, F).

Response Type: Matching Tables

2. Jack saves the same amount of money each week as shown in the graph.
- w represents the number of weeks that Jack saves.
 - t represents the total amount saved, in dollars.



Determine whether each statement is true. Select True or False for each statement.

Statement	True	False
Jack saved a total of \$12 at the end of week 2.		
The equation $t = 6w$ represents the relationship between the number of weeks and the total amount saved.		
The total amount of money Jack saves depends on the number of weeks that Jack saves.		

Rubric: (1 point) Student correctly identifies each statement as being either true or false (e.g., T, T, T).

Response Type: Matching Tables

Question Type 3: The student is presented with a relationship between two quantities represented by a table or a graph.

1. Jack saves the same amount of money each week as shown in the table.

- Let w represent the number of weeks that Jack saves.
- Let t represent the total amount saved, in dollars.

Number of Weeks w	Total Amount Saved t
1	\$ 6
2	\$12
3	\$18
4	\$24

Enter the total amount of money, in dollars, that Jack saves after 6 weeks.

Rubric: (1 point) Student enters the correct value (e.g., 36).

Response Type: Equation/Numeric

2. Jack saves the same amount of money each week as shown in the graph.

- Let w represent the number of weeks that Jack saves.
- Let s represents the total amount saved, in dollars



Enter the total amount of money, in dollars, that Jack saves after 6 weeks.

Rubric: (1 point) Student enters the correct value (e.g.,36).

Response Type: Equation/Numeric

Question Type 4: The student is presented with independent or dependent variables in the form of a table.

1. The band members are selling chocolate bars for a fundraiser. The amount of money collected for each box of bars sold is the same.

- Let n represent the number of boxes sold.
- Let d represent the amount of money collected, in dollars.

Number of Boxes Sold n	Amount of Money Collected, in Dollars d
2	30
3	90
4	120
6	

Fill in the table for all missing values of n and d .

Rubric: (1 point) Student correctly enters all missing values in the table (e.g., 1, 60, and 180).

Response Type: Fill-in Table

Question Type 5: The student is presented with a relationship between two quantities represented by a table or a graph.

1. Jack saves the same amount of money each week as shown in the table.

- Let w represent the number of weeks that Jack saves.
- Let t represent the total amount saved, in dollars.

Number of Weeks w	Total Amount Saved t
1	\$ 6
2	\$12
3	\$18
4	\$24

Enter an equation that represents the relationship between the number of weeks Jack saves and the total amount of money saved.

Rubric: (1 point) Student enters the correct equation (e.g., $t = 6w$).

Response Type: Equation/Numeric

2. Jack saves the same amount of money each week as shown in the graph.

- Let w represent the number of weeks that Jack saves.
- Let s represent the total amount saved, in dollars.

Enter an equation that represents the relationship between the number of weeks Jack saves and the total amount of money saved.

Rubric: (1 point) Student enters the correct equation (e.g., $s = 6w$).

Response Type: Equation/Numeric

Claim 4 Modeling and Data Analysis Question Banks

[Claim Descriptors and Targets](#)

Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Example 1

Example Item 4F.1b (Grade 6)

Primary Target 4F (Content Domain EE), Secondary Target 1G (CCSS 6.EE.C), Tertiary Target 4D

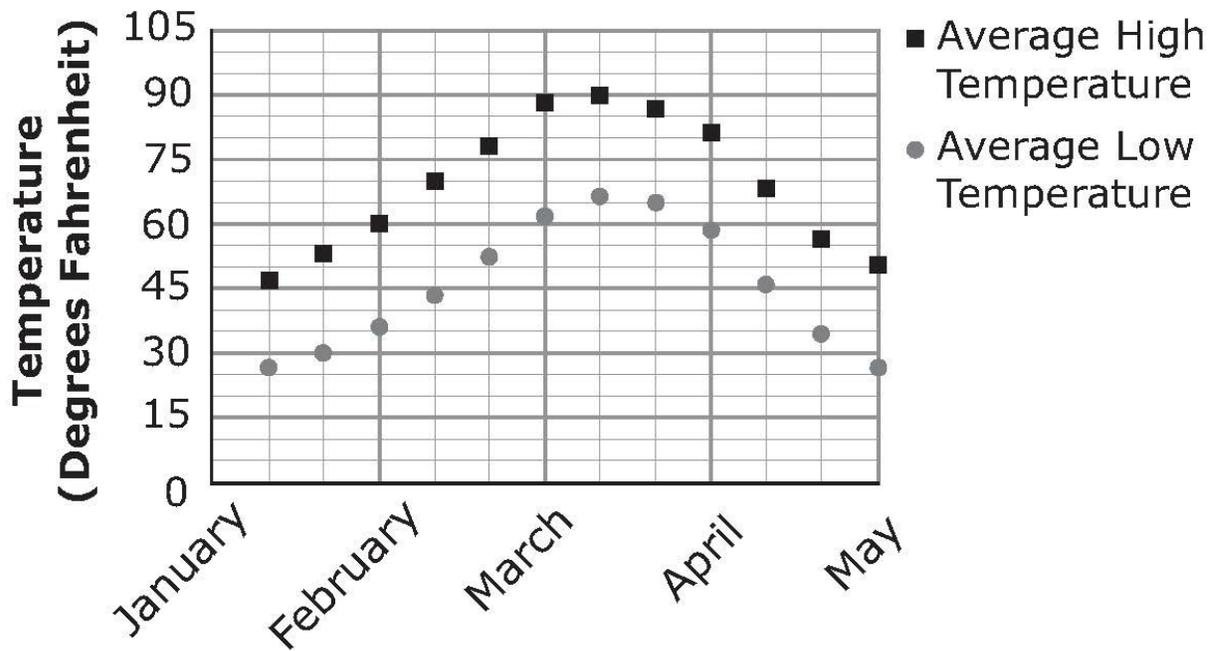
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Part A

If you were going to plan a picnic, what temperature would you hope to have for the picnic?
Enter the temperature, in degrees Fahrenheit, you think would be best in the first response box.
You may change your answer later if you wish.

Part B

The average monthly high and low temperatures for a town are shown in the graph below.



Select a month from the drop down menu where the temperature you chose would fall between the high and low temperatures for that month. [January, February,... December, no month will work]

Interaction: The student enters a temperature for a theoretical picnic in the first response box, then answers Part B with a drop down menu. The student can change his or her preferred temperature. The temperature a student chooses does not affect his or her score for the item except that the next choice must be consistent with it. When the student mouses over the points in the graph, the corresponding value appears (alternatively, there is a table of values as well).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average high in °F:	47	53	60	69	79	88	90	87	81	69	56	46
Average low in °F:	26	30	36	43	53	62	66	65	58	46	34	26

Rubric: (1 point) The student selects a month where the temperature he or she chose falls between the high and low temperatures for that (e.g., if the student selects 80, then they choose either June, July, August, or September).

Response Type: Equation/Numeric and Drop-down