Task Model 1

Response Type:
Equation/Numeric

DOK Level 2

7.RP.A.1
Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

7.RP.A.2b
Recognize and represent proportional relationships between quantities.
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

Evidence Required:
1. The student computes unit rates and finds the constant of proportionality of proportional relationships in various forms.

Tools: Calculator

Prompt Features: The student is prompted to give the constant of proportionality between two quantities in a proportional relationship.

Stimulus Guidelines:

- Ratios in the proportional relationship should be ratios of fractions.
- Context should be familiar to students 12 to 14 years old.
- Item difficulty can be adjusted via these example methods:
  - Fractions can be expressed as mixed numbers or not.
  - Constants of proportionality can be whole numbers or fractions.

TM1a
Stimulus: The student is presented with a verbal description of a real-world situation involving a proportional relationship.

Example Stem: David uses $\frac{1}{4}$ cup of apple juice for every $\frac{1}{2}$ cup of carrot juice to make a fruit drink.

Enter the number of cups of apple juice David uses for 1 cup of carrot juice.

Rubric: (1 point) The student enters the correct number (e.g., $\frac{1}{2}$).
Response Type: Equation/Numeric

TM1b
Stimulus: The student is presented with a table or diagram of a proportional relationship in a context.

Example Stem 1: This table shows a proportional relationship between the number of cups of sugar and flour used for a recipe.

Cups of Sugar	Cups of Flour
2	5
6	15
8	20

Enter the number of cups of sugar used for 1 cup of flour.

Example Stem 2: This table shows a proportional relationship between the number of cups of sugar and flour used for a recipe.

Cups of Sugar	Cups of Flour
$2\frac{1}{2}$	$7\frac{1}{2}$
$3\frac{3}{4}$	$11\frac{1}{4}$

Enter the number of cups of sugar used for 1 cup of flour.

Rubric: (1 point) Student enters the correct number (e.g., $\frac{2}{5}$; $\frac{1}{3}$).

Response Type: Equation/Numeric

Task Model 1
 	
Response Type: Equation/Numeric
 	
DOK Level 2
 	
7.RP.A.1
Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
 	
7.RP.A.2b
Recognize and represent proportional relationships between quantities.
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
 	
Evidence Required:
1. The student computes unit rates and finds the constant of proportionality of proportional relationships in various forms.
 	
Tools: Calculator
 	
Version 3 Update:
Retired TM1c and revised TM1d example stems.
	Prompt Features: The student is prompted to give the constant of proportionality for a proportional relationship between two quantities.
	
	Stimulus Guidelines:
	• Context should be familiar to students 12 to 14 years old.
	• Item difficulty can be adjusted via these example methods:
	    ○ The equation should come in the following forms: $y = rx$, where r is the constant of proportionality and [coefficient1][variable1] = [coefficient2][variable2].
	    ○ The constant of proportionality can be a whole number, positive fraction, or mixed number.
	    ○ Coefficients include whole numbers, fractions, and exclude the number one.
	
	TM1d
	Stimulus: The student is presented with an equation of a proportional relationship.
	
	Example Stem 1: A drink recipe calls for papaya juice and carrot juice. This equation represents the proportional relationship between the number of quarts of papaya juice (p) and carrot juice (c) in the recipe.
	
	$2p = 8c$
	
	Enter the number of quarts of papaya juice used for 1 quart of carrot juice.
	
	Example Stem 2: A drink recipe calls for papaya juice and carrot juice. This equation represents the proportional relationship between the number of quarts of papaya juice (p) and carrot juice (c) in the recipe.
	
	$(1\frac{1}{3})p = (3\frac{1}{3})c$
	
	Enter the number of quarts of papaya juice used for 1 quart of carrot juice.
	
	Rubric: (1 point) The student enters the correct number (e.g., 4; $\frac{5}{2}$).
	
	Response Type: Equation/Numeric

Task Model 2
 	
Response Type: Multiple Choice, multiple correct response
 	
DOK Level 2
 	
7.RP.A.2a
Recognize and represent proportional relationships between quantities.
a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
 	
Evidence Required:
2. The student determines whether two quantities, shown in various forms, are in a proportional relationship.
 	
Tools: Calculator
	Prompt Features: The student is prompted to identify tables of values that represent proportional relationships.
	
	Stimulus Guidelines:
	• Tables should be labeled and have four to five ordered pairs. All tables within an item should follow the same format.
	• Where possible, tables should contain values arising out of contextual relationships.
	• Item difficulty can be adjusted via these example methods:
	    ○ Table values are whole numbers or fractions.
	    ○ Fractions may be mixed numbers.
	    ○ For graphs, distractors should include graphs with the equation in the form of $y = x^2$ and the equation in the form of $y = mx + b$ (where $b \neq 0$).
	
	TM2a
	Stimulus: The student is presented with one table per answer choice. Where possible, include a contextual reason for the tables of relationships.
	
	Example Stem 1: Select **all** tables that represent a proportional relationship between x and y.
	
	A.
	x: 0, 1, 2, 3
	y: 0, 2, 4, 6
	
	B.
	x: 0, 2, 4, 6
	y: 0, 4, 16, 36
	
	C.
	x: 0, 3, 6, 9
	y: 0, 15, 30, 45
	
	D.
	x: 0, 4, 6, 8
	y: 0, 16, 36, 64
	
	Answer Choices: Answer choices should be tables showing a relationship between two quantities. There should be one to two tables showing proportional relationships. Distractors should be tables that do not show a proportional relationship, which may include a relationship following an equation in the form of $y = mx + b$ (where $b \neq 0$) or $y = x^2$.
	
	Rubric: (1 point) Student selects all the correct tables. (e.g., A and C).
	
	Response Type: Multiple Choice, multiple correct response

Task Model 2 **Response Type: Multiple Choice, multiple correct response** **DOK Level 2** **7.RP.A.2a** Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. **Evidence Required:** 2. The student determines whether two quantities, shown in various forms, are in a proportional relationship. **Tools:** Calculator	**Example Stem 2**: Select **all** tables that represent a proportional relationship between x and y. A. x: 0, 1, 2, 3 y: 0, 2, 4, 6 B. x: 0, 2, 4, 6 y: 0, 4, 16, 36 C. x: 0, $\frac{1}{9}$, $\frac{1}{4}$, $\frac{1}{2}$ y: 0, $\frac{1}{81}$, $\frac{1}{16}$, $\frac{1}{4}$ D. x: 0, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$ y: 0, $\frac{1}{9}$, $\frac{2}{9}$, $\frac{3}{9}$ **Answer Choices:** Answer choices should be tables showing a relationship between two quantities. There should be one to two tables showing proportional relationships. Distractors should be tables that do not show a proportional relationship, which may include a relationship following an equation in the form of $y = mx + b$ (where $b \neq 0$) or $y = x^2$. **Rubric:** (1 point) Student selects all the correct tables. (e.g., A and D). **Response Type:** Multiple Choice, multiple correct response

Task Model 2

Response Type: Multiple Choice, multiple correct response

DOK Level 2

7.RP.A.2a
Recognize and represent proportional relationships between quantities.
a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Evidence Required:
2. The student determines whether two quantities, shown in various forms, are in a proportional relationship.

Tools: Calculator

Prompt Features: The student is prompted to identify which graphs represent proportional relationships.

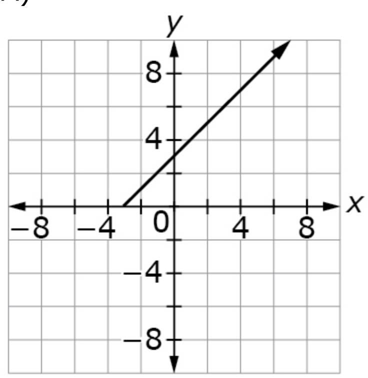
Stimulus Guidelines:

- Context should be familiar to students 12 to 14 years old.
- Item difficulty can be adjusted via these example methods:
    - Unit rate is a whole number or fraction.
    - Distractors should include graphs with the equation in the form of $y = x^2$ and the equation in the form of $y = mx + b$ (where $b \neq 0$).

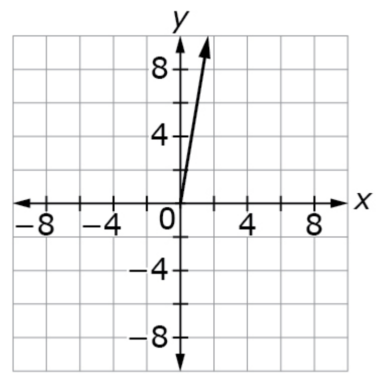
TM2b
Stimulus: The student is presented with one table or one graph per answer choice.

Example Stem: Select **all** the graphs that represent a proportional relationship between *x* and *y*.

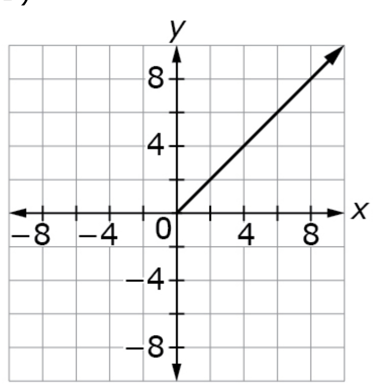
A)



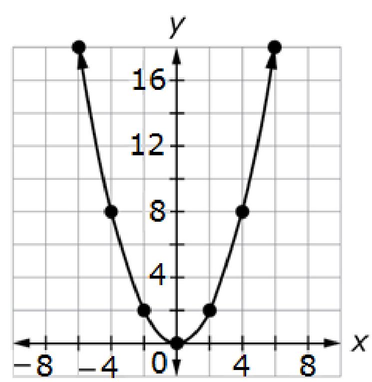
C)



B)



D)



Answer Choices: Distractors should be graphs that do not show a proportional relationship, which may show a nonlinear relationship or a relationship following an equation in the form of $y = mx + b$ (where $b \neq 0$) or $y = x^2$.

Rubric: (1 point) Student selects all the correct graphs (e.g., B and C).

Response Type: Multiple Choice, multiple correct response

Task Model 3

Response Type:
Equation/Numeric

DOK Level 2

7.RP.A.2c
Recognize and represent proportional relationships between quantities.
c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*

Evidence Required:
3. The student represents proportional relationships between quantities using equations.

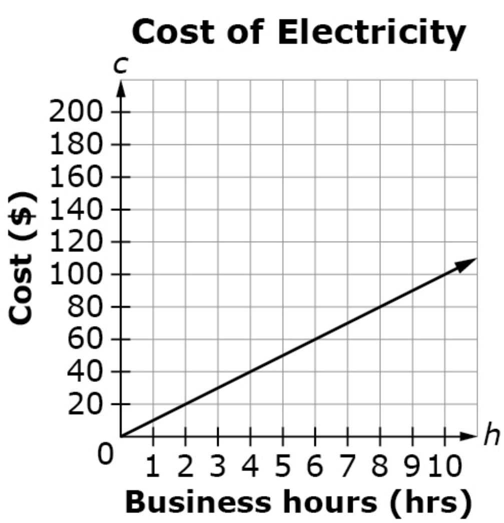
Tools: Calculator

Prompt Features: The student is prompted to give an equation that represents the proportional relationship between two given quantities.

Stimulus Guidelines:
- Context should be familiar to students 12 to 14 years old.
- Graph is linear and begins at (0, 0) or a set of plotted points which includes (0, 0).
- Tables should be labeled, represent the relationship between two variables, and have 3-5 ordered pairs.
- For graphs, axes are labeled and include whole numbers and/or fractions.
- The constant of proportionality is a whole number or fraction.
- Item difficulty can be adjusted via these example methods:
  - Scaling of the graph may be fractional or in units other than multiples of 2 or 10.
  - Table values are whole numbers or fractions.
  - Fractions are not mixed numbers.

TM3
Stimulus: The student is presented with two quantities in a contextual proportional relationship given in a graph or table.

Example Stem 1: This graph shows the relationship between the number of hours (*h*) a business operates and the total cost of electricity (*c*).



Find the constant of proportionality (*r*) for this relationship. Using the value for *k*, enter an equation in the form of *c* = *rh* that represents the relationship between the number of hours (*h*) and the total cost (*c*).

Task Model 3

Response Type: Equation/Numeric

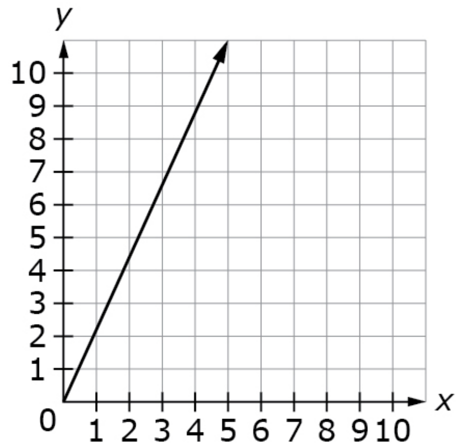
DOK Level 2

7.RP.A.2c
Recognize and represent proportional relationships between quantities. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*

Evidence Required:
3. The student represents proportional relationships between quantities using equations.

Tools: Calculator

Example Stem 2: This graph shows a proportional relationship between x and y.



Find the constant of proportionality (k). Using the value for k, enter an equation in the form of $y = kx$.

Example Stem 3: This table shows a proportional relationship between x and y.

x	y
4	48
5	60
8	96

Find the constant of proportionality (k). Using the value for k, enter an equation in the form of $y = kx$.

Rubric: (1 point) Student enters the correct equation (e.g., $c = 10h$; $y = 2x$; $y = 12x$).

Response Type: Equation/Numeric

Task Model 4

Response Type: Matching Tables

DOK Level 2

7.RP.A.2d
Recognize and represent proportional relationships between quantities.
d. Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate.

Evidence Required:
4. The student interprets specific values from a proportional relationship in the context of a problem situation.

Tools: Calculator

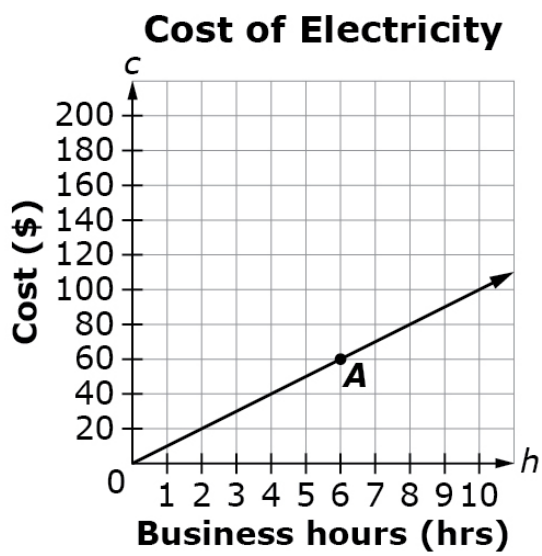
Prompt Features: The student is prompted to select specific values from a proportional relationship in the context of a problem situation.

Stimulus Guidelines:

- Context should be familiar to students 12 to 14 years old.
- Graph is linear and begins at (0, 0) or a set of plotted points which includes (0, 0).
- Graph axes are labeled and include whole numbers and/or fractions.
- The constant of proportionality is a whole number or fraction.
- Item difficulty can be adjusted via these example methods:
    - One answer choice which assesses the interpretation of a single point on the graph that is not the unit rate is easier than an answer choice that compares the interpretation of two different points.

TM4
Stimulus: The student is presented with a graph of a proportional relationship where specific values may be emphasized.

Example Stem: This graph shows the relationship between the number of hours (*h*) a business operates and the total cost (*c*) of electricity.



Select True or False for each statement about the graph.

Statement	True	False
Point A represents the total cost of electricity when operating the business for 6 hours.		
The total cost of electricity is $8 when operating the business for 80 hours.		
The total cost of electricity is $10 when operating the business for 1 hour.		

	Rubric: (1 point) Student determines each statement as being either true or false (e.g., T, F, T). Each statement is a sentence describing one of the points in the context. False statements should be statements that use the wrong values or switch the values when interpreting the graph. More difficult statements are about points beyond the visible portion of the graph. **Response Type:** Matching Tables

Task Model 5
 	
Response Type: Equation/Numeric
 	
DOK Level 2
 	
7.RP.A.3
Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*
 	
Evidence Required:
5. The student computes with percentages in context.
 	
Tools: Calculator
	Prompt Features: The student is prompted to compute with percentages in a real-world context that requires multiple steps to solve.
	
	Stimulus Guidelines:
	• Context of problems should be familiar to students 12 to 14 years old.
	• For items asking for a percentage, the percent symbol (%) should not be required for full credit.
	• For items asking for a dollar amount, the dollar sign ($) should not be required for full credit.
	• Item difficulty can be adjusted via these example methods:
	    o 1-3 step(s) problem.
	    o Multiplying by a percent which should include benchmark percentages, i.e., 25%, 50%, etc.
	    o Divide two numbers or by a percent which should include benchmark percents, 25%, 50%, etc.
	
	TM5
	Stimulus: The student is presented with a real-world context involving adding or subtracting a percent to the whole (simple interest, tax, commission, markup, markdowns, tips, coupons, and discounts).
	
	Example Stem 1: Dave buys a baseball for $15 plus an 8% tax. Mel buys a football for $20 plus an 8% tax. Enter the difference in the amount Dave and Mel paid, including tax. Round your answer to the nearest cent.
	
	Rubric: (1 point) Student gives the correct difference in the amount between David and Mel (e.g., 5.40).
	
	Response Type: Equation/Numeric
	
	Example Stem 2: A bicycle is originally priced at $80. The store owner gives a discount and the bicycle is now priced at $60. Enter the percentage discount for the cost of the bicycle.
	
	Rubric: (1 point) Student gives the correct percentage discount (e.g., 25).
	
	Response Type: Equation/Numeric
	
	Example Stem 3: Dave has a 32 ounce energy drink. He drinks 10 ounces. Enter the percentage of ounces Dave has left of his energy drink. Round your answer to the nearest hundredth.
	
	Rubric: (1 point) Student gives the correct percentage (e.g., 68.75).
	
	Response Type: Equation/Numeric