

## **Kansas Released Items: Introduction**

The test questions, or items, presented here have been selected because they show a significant increase in student performance from one level to another. First, individual test scores were categorized into one of four performance levels: Level 1, Level 2, Level 3, or Level 4. Then, all items were analyzed for difficulty based on the individual test scores. That is, the same item had four different difficulty values calculated: the difficulty of the item for students whose overall test score was within Level 1, the difficulty of the item for students whose overall test score was within Level 2, and so forth.

The selected items had a high probability of being answered correctly by students whose test scores were in one category but a low probability of being answered correctly by students whose test scores were in the previous category. Each student's test form contained different items, so not all students saw all items. These items are not intended to show all the types of items on the test, rather they provide information about the types of skills that may be demonstrated by students whose test scores fall into each performance-level range.

The table below each item provides information about the overall difficulty of the item for students in Kansas, expressed as the percentage of students who responded correctly to the item. Additionally, the percentage of students who responded correctly, based on the students' overall test scores and the scores' categorization in each of the four performance levels, is shown. A higher percentage means the item is easier because a higher proportion of students responded correctly.

While the item difficulties should, in theory, range from 0% to 100%, very few items showed extreme overall difficulties. Because the tests contain rigorous, challenging content, it is reasonable from a data standpoint to not see items with difficulties of 100%.

## Grade 3, Level 2

Which number correctly completes  $2 \times \square = 18$ ?

- 8
- 9
- 12
- 16

Correct Answer: 9

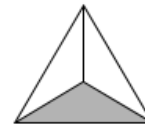
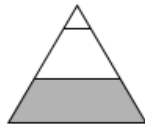
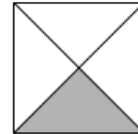
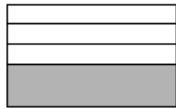
Aligned to: Claim 1, Target A / Represent and solve problems involving multiplication and division.

Students interpret or solve multiplication and division problems using equations and visual models. Students who score at Level 2 are more likely to successfully solve one-step multiplication problems to determine the value of an unknown number.

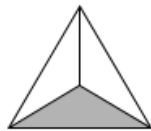
Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
90.2%	39.4%	81.9%	94.3%	99.5%

### Grade 3, Level 2

For which shape is  $\frac{1}{3}$  of its area shaded?



Correct Answer:



Aligned to: Claim 1, Target K / Reason with shapes and their attributes.

Students classify shapes based on shared attributes and partition a shape to model a fraction. Students who score at Level 2 are more likely to successfully identify a visual representation of the fraction provided.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
81.6%	26.0%	67.6%	87.4%	98.4%

### Grade 3, Level 3

Which number correctly completes  $\square \div 6 = 7$ ?

- 67
- 54
- 42
- 36

Correct Answer: 42

Aligned to: Claim 1, Target A / Represent and solve problems involving multiplication and division.

Students interpret or solve multiplication and division problems using equations and visual models. Students who score at Level 3 are more likely to successfully solve one-step division problems to determine the value of an unknown number.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
59.9%	4.5%	45.9%	85.6%	99.5%

**Grade 3, Level 3**

What is  $7 \times 9$ ? Enter your answer in the box.

Correct Answer: 63

Aligned to: Claim 1, Target C / Multiply and divide within 100.

Students multiply and divide two numbers. Students who score at Level 3 are more likely to successfully know how to multiply or divide two numbers whose product or quotient is within 100.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
77.9%	13.2%	58.1%	86.0%	99.0%

### Grade 3, Level 4

Gina ran 4 miles (mi) every day for 4 days and then only 3 mi on the last day. How many miles did she run in all?

- 7 mi
- 11 mi
- 15 mi
- 19 mi

Correct Answer: 19 mi

Aligned to: Claim 1, Target D / Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Students solve word problems using addition, subtraction, multiplication, and division and identify number patterns. Students who score at Level 4 are more likely to successfully solve two-step word problems.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
44.3%	7.0%	25.2%	48.0%	85.5%

### Grade 3, Level 4

A movie theater sold 30 tickets for \$5 each and 50 tickets for \$4 each. How much money did the theater make from ticket sales?

- \$170
- \$215
- \$350
- \$720

Correct Answer: \$350

Aligned to: Claim 2, Target A / Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace.

Students use mathematics in real-world situations. Students who score at Level 4 are more likely to successfully solve word problems by identifying the solution process and applying operations to solve the problem.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
46.5%	2.5%	18.9%	50.8%	94.1%

## Grade 4, Level 2

Which number is the largest?

- 5 hundreds, 7 tens, and 4 ones
- 4 thousands, 6 tens, and 1 one
- 3 thousands and 8 hundreds
- 2 hundreds and 9 ones

Correct Answer: 4 thousands, 6 tens, and 1 one

Aligned to: Claim 1, Target D / Generalize place value understanding for multidigit whole numbers.

Students understand place value for multidigit whole numbers. Students who score at Level 2 are more likely to successfully compare multidigit whole numbers up to 10,000.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
81.0%	27.2%	76.5%	92.6%	98.9%



## Grade 4, Level 2

What is  $4,310 - 1,492$ ?

- 2,818
- 2,828
- 2,918
- 2,928

Correct Answer: 2,818

Aligned to: Claim 1, Target E / Use place value understanding and properties of operations to perform multidigit arithmetic.

Students use understanding of place value to add, subtract, multiply, and divide multidigit numbers. Students who score at Level 2 are more likely to successfully subtract multidigit whole numbers up to four digits.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
75.9%	24.6%	80.1%	95.0%	99.5%

### Grade 4, Level 3

At a carnival there are 65 people in line for a ride. The ride can have 24 people on it at a time. After two rides are finished, how many people are still waiting in line?

- 48
- 41
- 23
- 17

Correct Answer: 17

Aligned to: Claim 1, Target A / Use the four operations with whole numbers to solve problems.

Students use addition, subtraction, multiplication, and division to solve problems. Students who score at Level 3 are more likely to successfully solve multi-step problems using the four operations.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
63.0%	2.0%	47.1%	90.3%	99.7%

### Grade 4, Level 3

Daniel drove 15,400 miles (mi) last year. His friend, Matthew, drove 7,650 mi last year. How many **more** miles did Daniel drive than Matthew?

- 7,750 mi
- 8,850 mi
- 22,050 mi
- 23,050 mi

Correct Answer: 7,750 mi

Aligned to: Claim 1, Target E / Use place value understanding and properties of operations to perform multidigit arithmetic.

Students use understanding of place value to add, subtract, multiply, and divide multidigit numbers. Students who score at Level 3 are more likely to successfully subtract multidigit whole numbers of any size.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
74.0%	5.5%	72.6%	96.6%	99.9%

### Grade 4, Level 4

What is  $\frac{5}{100} + \frac{4}{10}$ ?

$\frac{45}{10}$

$\frac{9}{10}$

$\frac{45}{100}$

$\frac{9}{110}$

Correct Answer:  $\frac{45}{100}$

Aligned to: Claim 1, Target H / Understand decimal notation for fractions, and compare decimal fractions.

Students use decimal and fraction notation to compare and combine numbers. Students who score at Level 4 are more likely to successfully add fractions with denominators of 10 and 100.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
37.1%	4.0%	25.2%	55.4%	89.6%

## Grade 4, Level 4

The mass of a container filled with water is 4 kilograms 550 grams (g). What is the mass of the filled container in grams?

- 554 g
- 1554 g
- 2200 g
- 4550 g

Correct Answer: 4550 g

Aligned to: Claim 1, Target I / Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Students solve problems involving measurement and unit conversion. Students who score at Level 4 are more likely to successfully solve multi-step problems involving measurement conversion.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
34.3%	2.3%	21.1%	54.9%	92.0%

**Grade 5, Level 2**

What is  $2\frac{3}{8} - 1\frac{1}{3}$ ?

$1\frac{1}{24}$

$\frac{7}{5}$

$1\frac{17}{24}$

$\frac{12}{5}$

Correct Answer:  $1\frac{1}{24}$

Aligned to: Claim 1, Target E / Use equivalent fractions as a strategy to add and subtract fractions.

Students add and subtract fractions by converting to and using equivalent fractions. Students who score at Level 2 are more likely to successfully subtract mixed numbers by making equivalent fractions.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
77.2%	22.1%	75.4%	91.1%	98.8%

## Grade 5, Level 2

Which shapes **always** have four sides of equal length?

- squares and rectangles
- squares and rhombuses
- parallelograms and rectangles
- parallelograms and rhombuses

Correct Answer: squares and rhombuses

Aligned to: Claim 1, Target K / Classify two-dimensional figures into categories based on their properties.

Students classify two-dimensional figures based on their properties. Students who score at Level 2 are more likely to successfully identify properties of two-dimensional figures.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
54.5%	12.7%	65.0%	87.1%	98.5%

### Grade 5, Level 3

Which expression is equal to 13,825.629?

- $(1 \times 10,000) + (3 \times 1,000) + (8 \times 100) + (2 \times 10) + (5 \times \frac{1}{10}) + (6 \times \frac{1}{100}) + (2 \times \frac{1}{1000}) + (9 \times \frac{1}{10000})$
- $(1 \times 10,000) + (3 \times 1,000) + (8 \times 100) + (2 \times 10) + (5 \times 1) + (6 \times \frac{1}{10}) + (2 \times \frac{1}{100}) + (9 \times \frac{1}{1000})$
- $(1 \times 10,000) + (3 \times 1,000) + (8 \times 100) + (2 \times 10) + (5 \times 1) + (6 \times \frac{1}{10}) + (2 \times \frac{1}{10}) + (9 \times \frac{1}{100})$
- $(1 \times 100,000) + (3 \times 10,000) + (8 \times 1,000) + (2 \times 100) + (5 \times 10) + (6 \times 1) + (2 \times \frac{1}{10}) + (9 \times \frac{1}{100})$

Correct Answer:

$$(1 \times 10,000) + (3 \times 1,000) + (8 \times 100) + (2 \times 10) + (5 \times 1) + (6 \times \frac{1}{10}) + (2 \times \frac{1}{100}) + (9 \times \frac{1}{1000})$$

Aligned to: Claim 1, Target C / Understand the place value system.

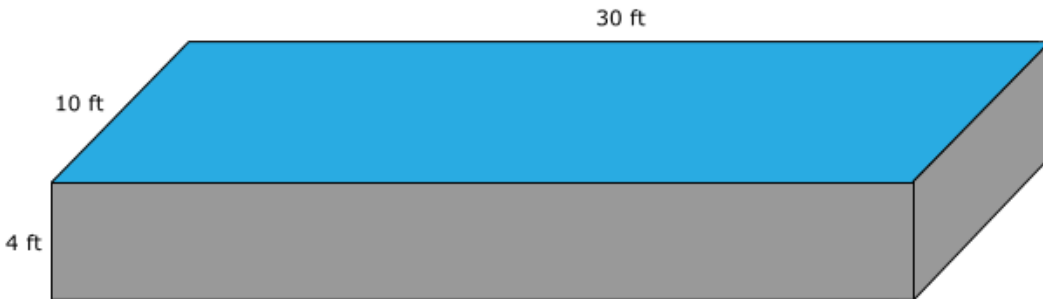
Students use the place-value system to compare, read, write, and round decimal numbers. Students who score at Level 3 are more likely to successfully write decimal numbers in expanded form.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
65.3%	7.7%	60.0%	86.6%	98.8%



### Grade 5, Level 3

A swimming pool is 30 feet (ft) long, 10 ft wide, and 4 ft deep.



How much water, in cubic feet ( $\text{ft}^3$ ), can the swimming pool hold?

- 44  $\text{ft}^3$
- 88  $\text{ft}^3$
- 620  $\text{ft}^3$
- 1200  $\text{ft}^3$

Correct Answer: 1,200  $\text{ft}^3$

Aligned to: Claim 2, Target A / Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.

Students use mathematics in real-world situations. Students who score at Level 3 are more likely to successfully relate the situation of the problem to the graphic provided to identify the process and to apply operations to solve the problem.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
49.5%	4.1%	60.4%	90.3%	99.6%

### Grade 5, Level 4

Which expression can be represented as  $1\frac{2}{7}$ ?

- $2 \div 7$
- $7 \div 2$
- $7 \div 9$
- $9 \div 7$

Correct Answer:  $9 \div 7$

Aligned to: Claim 1, Target F / Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Students relate multiplication and division to operations with fractions. Student who score at Level 4 are more likely to successfully relate the division of two numbers to an equivalent mixed number.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
27.2%	3.4%	27.5%	55.6%	91.3%

## Grade 5, Level 4

Eric walks 4.8 kilometers per hour (hr). How many meters (m) does Eric walk in 2 hr?

- 240 m
- 960 m
- 2400 m
- 9600 m

Correct Answer: 9600 m

Aligned to: Claim 1, Target G / Convert like measurement units within a given measurement system.

Students convert units within a measurement system. Students who score at Level 4 are more likely to successfully convert a measurement represented by a decimal number to a different unit to solve multi-step problems.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
27.0%	0.4%	12.2%	44.1%	94.5%

## Grade 6, Level 2

There are 5 plates and 3 bowls. How does the ratio 8:3 describe these dishes?

- There are 8 dishes, and 3 are bowls.
- There are 8 dishes, and 3 are plates.
- There are 8 dishes, and there are 3 fewer bowls than plates.
- There are 8 dishes, and there are 3 more bowls than plates.

Correct Answer: There are 8 dishes, and 3 are bowls.

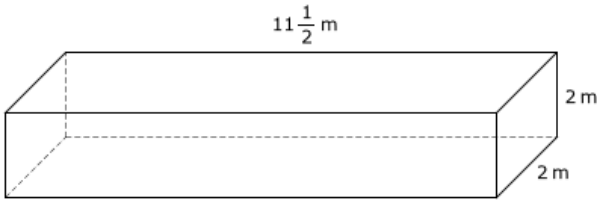
Aligned to: Claim 1, Target A / Understand ratio concepts and use ratio reasoning to solve problems.

Students use ratios and rates to solve problems. Students who score at Level 2 are more likely to successfully interpret the meaning of a ratio in a real-world context.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
67.3%	30.8%	74.5%	88.7%	97.7%

## Grade 6, Level 2

The sides of this right rectangular prism are measured in meters (m).



What is the volume of the prism in cubic meters ( $\text{m}^3$ )?

- 100  $\text{m}^3$
- 62  $\text{m}^3$
- 46  $\text{m}^3$
- 31  $\text{m}^3$

Correct Answer: 46  $\text{m}^3$

Aligned to: Claim 1, Target H / Solve real-world and mathematical problems involving area, surface area, and volume.

Students use area, surface area, and volume to solve problems. Students who score at Level 2 are more likely to successfully find the volume of prisms given side lengths.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
64.9%	12.9%	59.8%	83.4%	97.6%

### Grade 6, Level 3

Cody picks 180 apples in 4 days. Isaac picks 210 apples in 3 days. With each picking at his same rate of speed, what is the total number of apples Cody and Isaac pick in 1 day?

- 45 apples
- 56 apples
- 70 apples
- 115 apples

Correct Answer: 115 apples

Aligned to: Claim 1, Target A / Understand ratio concepts and use ratio reasoning to solve problems.

Students use ratios and rates to solve problems. Students who score at Level 3 are more likely to successfully apply ratio reasoning to solve multi-step problems.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
69.0%	11.5%	65.7%	88.8%	98.9%

**Grade 6, Level 3**

What is the value of  $(4 + 8)^2 \div 4$ ?

- 6
- 20
- 32
- 36

Correct Answer: 36

Aligned to: Claim 1, Target E / Apply and extend previous understandings of arithmetic to algebraic expressions.

Students write and evaluate expressions. Students who score at Level 3 are more likely to successfully evaluate multi-step expressions, including exponents and parentheses.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
40.5%	1.9%	43.0%	83.9%	99.3%

## Grade 6, Level 4

The total price for a rental car is shown in this table.

<b>Number of Days (<math>d</math>)</b>	<b>Price (<math>r</math>)</b>
3	\$150
6	\$300
9	\$450
12	\$600

Which equation shows the price of the rental car ( $r$ ) for any number of days ( $d$ )?

- $d = 50r$
- $d = 150r$
- $r = 50d$
- $r = 150d$

Correct Answer:  $r = 50d$

Aligned to: Claim 1, Target G / Represent and analyze quantitative relationships between dependent and independent variables.

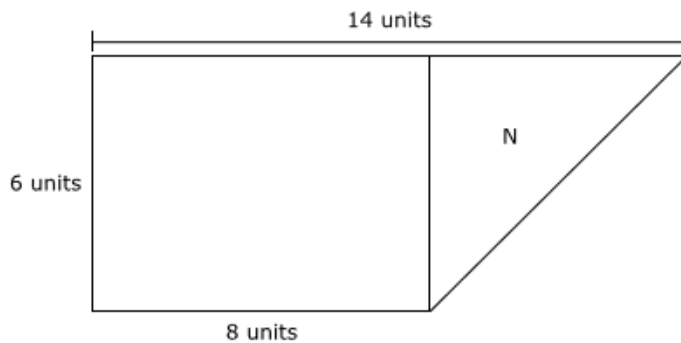
Students represent the relationship between dependent and independent variables. Students who score at Level 4 are more likely to successfully write equations using variables to relate quantities.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
30.3%	3.5%	22.5%	46.4%	84.7%



### Grade 6, Level 4

A rectangle and a triangle are placed next to each other as shown.



What is the area of triangle N in square units ( $\text{units}^2$ )?

- 18  $\text{units}^2$
- 24  $\text{units}^2$
- 36  $\text{units}^2$
- 48  $\text{units}^2$

Correct Answer: 18  $\text{units}^2$

Aligned to: Claim 1, Target H / Solve real-world and mathematical problems involving area, surface area, and volume.

Students use area, surface area, and volume to solve problems. Students who score at Level 4 are more likely to successfully find the area of composite figures using problem-solving methods.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
31.5%	6.3%	30.0%	53.2%	85.6%

## Grade 7, Level 2

The table shows the proportional relationship between megabytes and gigabytes of data.

Megabytes	Gigabytes
100	0.098
10,000	9.8
1,000,000	980
100,000,000	98,000

How many gigabytes is 1 megabyte equal to?

- 0.00098
- 0.0098
- 102.0
- 1,020.4

Correct Answer: 0.00098

Aligned to: Claim 1, Target A / Analyze proportional relationships and use them to solve real-world and mathematical problems.

Students solve real-world and mathematical problems involving proportional relationships. Students who score at Level 2 are more likely to successfully find the unit rate from information presented in a table.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
62.7%	13.7%	57.4%	85.8%	97.4%

## Grade 7, Level 2

Mr. Palmer is buying art supplies for his students. He has 160 students and each one needs a paintbrush. He has 24 brushes left over from last year, and paintbrushes are sold in packs of 3. Which equation can Mr. Palmer use to find how many packs,  $p$ , of paintbrushes he needs to buy?

- $3p + 24 = 160$
- $3p - 24 = 160$
- $24p + 3 = 160$
- $24p - 3 = 160$

Correct Answer:  $3p + 24 = 160$

Aligned to: Claim 1, Target D / Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Students write and solve expressions and equations in mathematical problems and real-world problems. Students who score at Level 2 are more likely to successfully write an equation that represents a real-world situation.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
65.5%	16.0%	60.8%	87.1%	97.6%

### Grade 7, Level 3

A coach is ordering a jersey for each of the 11 players on a team. Each jersey costs \$45. The delivery fee is \$1.50 per pound. Each jersey weighs  $\frac{1}{2}$  pound. What is the total cost of the order?

- \$371.25
- \$496.50
- \$503.25
- \$511.50

Correct Answer: \$503.25

Aligned to: Claim 1, Target B / Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Students add, subtract, multiply, and divide rational numbers in mathematical and real-world problems. Students who score at Level 3 are more likely to successfully solve real-world problems involving computation with rational numbers represented in different forms.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
57.8%	5.2%	49.9%	88.4%	98.9%

### Grade 7, Level 3

Becca, a seventh-grade student, wants to estimate the percentage of students in her middle school who have cellphones. Whom should Becca sample?

- Thirty seventh-grade students.
- Thirty middle school students.
- Thirty seventh-grade students who have cellphones.
- Thirty middle school students who have cellphones.

Correct Answer: Thirty middle school students.

Aligned to: Claim 1, Target G / Use random sampling to draw inferences about a population.

Students relate the relevance of statistics to surveying a representative random sample. Students who score at Level 3 are more likely to successfully identify a random sample of a population from which they could gather information.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
59.7%	10.2%	53.5%	85.5%	97.7%

## Grade 7, Level 4

A proportional relationship is shown in this table.

<b>x</b>	2	4	6	8
<b>y</b>	6	12	18	24

Which tables show the same proportional relationship? Select all that apply.

<b>x</b>	30	50	70	90
<b>y</b>	90	150	210	270

<b>x</b>	5	6	11	12
<b>y</b>	8	18	14	15

<b>x</b>	0	1	2	3
<b>y</b>	3	4	5	6

<b>x</b>	0	2	3	4
<b>y</b>	0	4	6	8

<b>x</b>	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{2}{5}$	$\frac{1}{12}$
<b>y</b>	$\frac{3}{4}$	$\frac{9}{10}$	$\frac{6}{5}$	$\frac{1}{4}$

Correct Answers:

<b>x</b>	30	50	70	90
<b>y</b>	90	150	210	270

<b>x</b>	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{2}{5}$	$\frac{1}{12}$
<b>y</b>	$\frac{3}{4}$	$\frac{9}{10}$	$\frac{6}{5}$	$\frac{1}{4}$

Aligned to: Claim 1, Target A / Analyze proportional relationships and use them to solve real-world and mathematical problems.

Students solve real-world and mathematical problems involving proportional relationships. Students who score at Level 4 are more likely to successfully compare proportional relationships presented in a table.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
34.1%	4.5%	25.2%	57.5%	87.9%

**Grade 7, Level 4**

What is  $\frac{4}{7}(1.5 - 3\frac{1}{2})$ ?

- $-1\frac{1}{7}$
- $-1\frac{3}{7}$
- $-2\frac{4}{7}$
- $-2\frac{9}{14}$

Correct Answer:  $-1\frac{1}{7}$

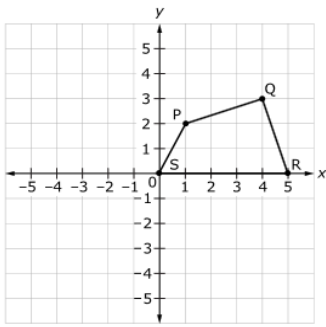
Aligned to: Claim 1, Target D / Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Students write and solve expressions and equations in mathematical problems and real-world problems. Students who score at Level 4 are more likely to successfully solve mathematical problems by simplifying an expression with different forms of rational numbers.

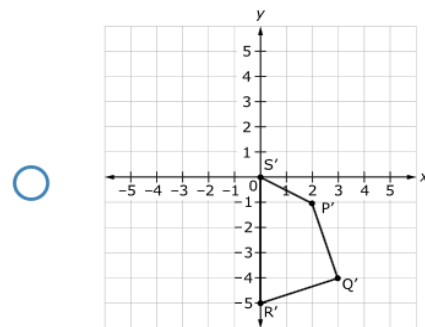
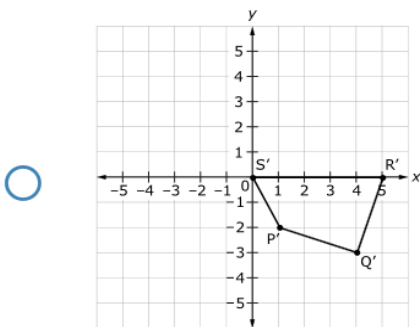
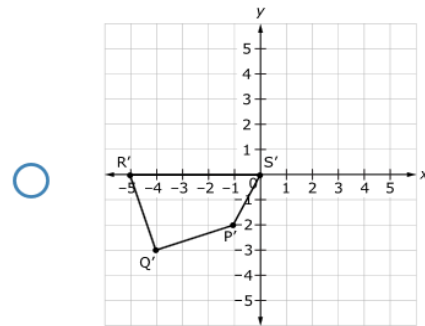
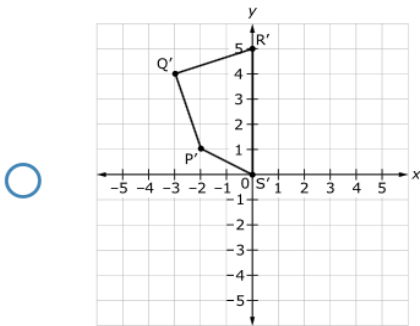
Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
29.1%	2.7%	19.5%	52.4%	87.3%

## Grade 8, Level 2

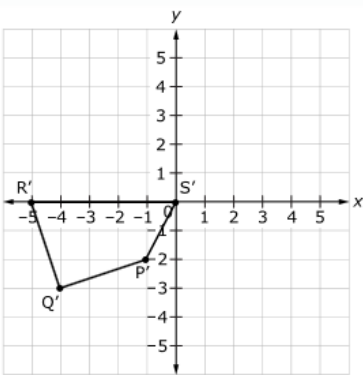
Quadrilateral PQRS is shown on this coordinate plane.



Which picture shows the image of quadrilateral P'Q'R'S' after a rotation of  $180^\circ$  about the origin?



Correct Answer:





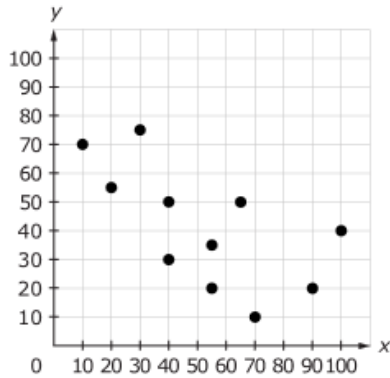
Aligned to: Claim 1, Target G / Understand congruence and similarity using physical models, transparencies, or geometry software.

Students use transformations to show similarity between figures. Students who score at Level 2 are more likely to successfully perform operations on figures in the coordinate plane.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
69.9%	18.1%	74.1%	92.2%	98.8%

## Grade 8, Level 2

The scatter plot shown represents the relationship between two variables.



Which set of points, when connected, creates a line of best fit to the data?

- (0, 20) and (70, 100)
- (0, 70) and (100, 20)
- (20, 0) and (100, 70)
- (70, 0) and (20, 100)

Correct Answer: (0, 70) and (100, 20)

Aligned to: Claim 1, Target J / Investigate patterns of association in bivariate data.

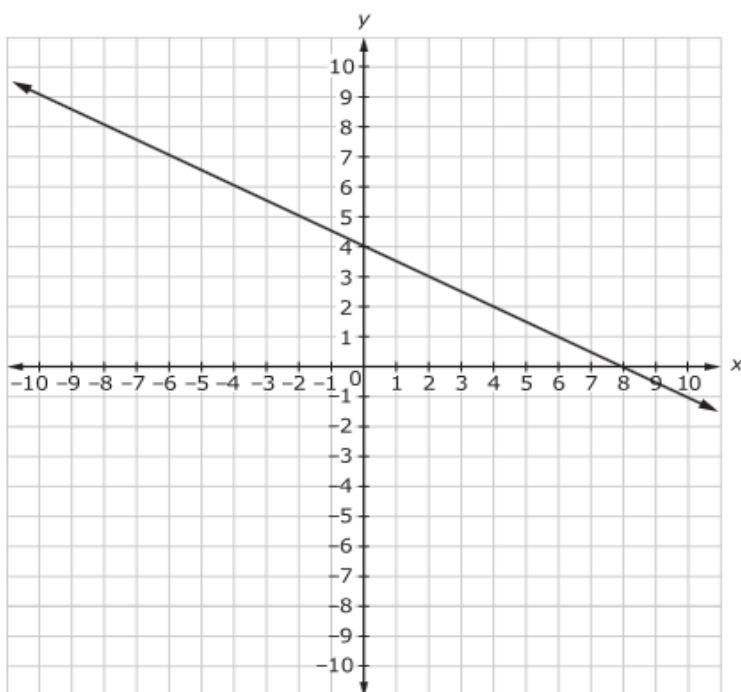
Students investigate patterns found in data comparing two variables.

Students who score at Level 2 are more likely to successfully find the line of best fit for a given data set.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
55.2%	16.3%	57.8%	80.0%	94.7%

### Grade 8, Level 3

What is the equation of this line?



- $y = -\frac{1}{2}x + 8$
- $y = -\frac{1}{2}x + 4$
- $y = \frac{1}{2}x + 8$
- $y = \frac{1}{2}x + 4$

Correct Answer:  $y = -\frac{1}{2}x + 4$

Aligned to: Claim 1, Target C / Understand the connections between proportional relationships, lines, and linear equations.

Students connect proportional relationships and linear equations. Students who score at Level 3 are more likely to successfully find the equation of a given line.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
48.9%	7.4%	61.2%	89.1%	98.8%

### Grade 8, Level 3

This table lists ordered pairs from the function  $f(x)$ .

$x$	$f(x)$
-2	3.70
-1	3.85
0	4.00
1	4.15
2	4.30

What is another ordered pair from the same function?

- (-4, 3.45)
- (-3, 3.55)
- (3, 4.55)
- (4, 4.70)

Correct Answer: (-3, 3.55)

Aligned to: Claim 1, Target E / Define, evaluate, and compare functions.

Students define, evaluate, and compare functions. Students who score at Level 3 are more likely to successfully produce input and output pairs for a function given in the form of a table.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
60.1%	11.8%	62.7%	87.2%	97.9%

**Grade 8, Level 4**

Which lengths make a right triangle?

- 2, 7, 7
- 3, 4, 5
- 4, 6, 8
- 5, 5, 7

Correct Answer: 3, 4, 5

Aligned to: Claim 1, Target H / Understand and apply the Pythagorean Theorem.

Students understand the Pythagorean theorem. Students who score at Level 4 are more likely to successfully use the Pythagorean theorem to determine whether a set of side lengths defines a right triangle.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
30.5%	6.1%	32.7%	59.5%	87.3%

**Grade 8, Level 4**

Which expression is equivalent to  $(6^2 \cdot 6^{-5})^3 \cdot 6^4$ ?

- $6^{-5}$
- $6^{-3}$
- $6^4$
- $6^7$

Correct Answer:  $6^{-5}$

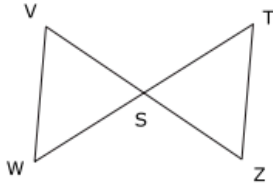
Aligned to: Claim 1, Target B / Work with radical and integer exponents.

Students work with radical and integer exponents. Students who score at Level 4 are more likely to successfully simplify expressions by applying exponent properties to integer exponents.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
26.2%	2.5%	22.2%	51.6%	87.0%

## Grade 10, Level 2

A proof is shown.



Given:  $\overline{VZ}$  bisects  $\overline{WT}$   
 $\overline{WT}$  bisects  $\overline{VZ}$

Prove:  $\triangle VSW$  is congruent to  $\triangle ZST$ .

Statements	Reasons
1. $\overline{VZ}$ bisects $\overline{WT}$	Given.
2. $\overline{WS}$ and $\overline{ST}$ are congruent	Two segments are congruent when they are bisected.
3. $\overline{WT}$ bisects $\overline{VZ}$	Given.
4. $\overline{VS}$ and $\overline{SZ}$ are congruent	Two segments are congruent when they are bisected.
5. $\angle VSW$ and $\angle ZST$ are congruent	Vertical angles are congruent.
6. $\triangle VSW$ and $\triangle ZST$ are congruent	

Which theorem is used for the last step in the proof?

- AAS
- ASA
- SSS
- SAS

Correct Answer: SAS

Aligned to: Claim 1, Target Q / Prove geometric theorems.

Students prove geometric theorems. Students who score at Level 2 are more likely to successfully identify the property used to solve a theorem.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
58.4%	18.1%	61.2%	81.3%	95.2%

**Grade 10, Level 2**

What is the solution to the equation  $\frac{6x+2}{2} = 3x + 2$ ?

- 1
- 2
- no solution
- all real numbers

Correct Answer: no solution

Aligned to: Claim 1, Target H / Understand solving equations as a process of reasoning and explain the reasoning.

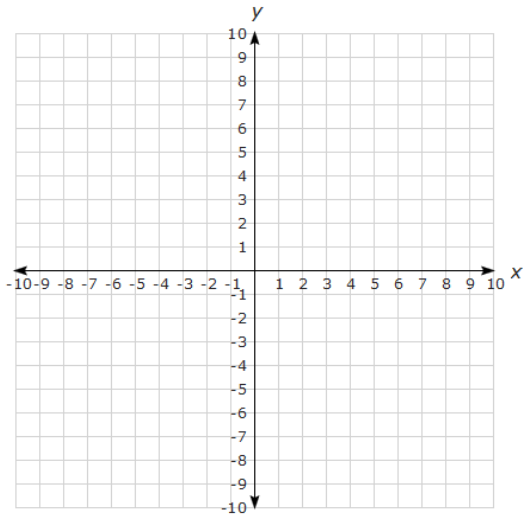
Students understand the process of solving equations. Students who score at Level 2 are more likely to successfully solve equations and to determine when there is no solution.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
57.0%	15.3%	62.6%	84.0%	96.7%

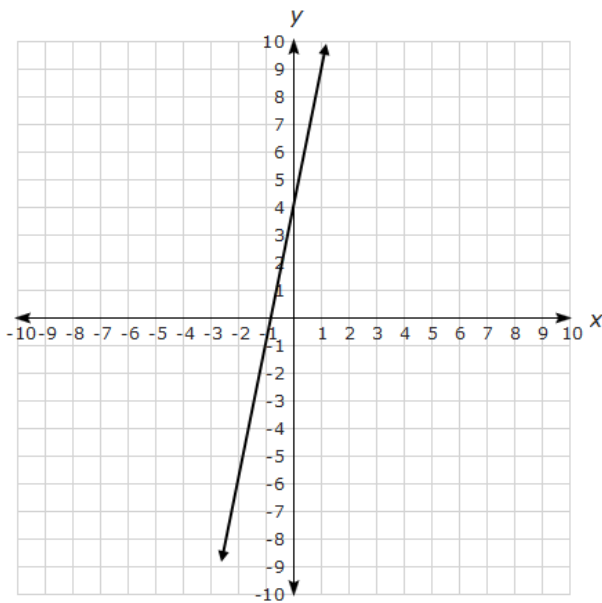


### Grade 10, Level 3

Graph the equation  $y = 5x + 4$ .



Correct Answer:



Aligned to: Claim 1, Target G / Create equations that describe numbers or relationships.

Students create equations to describe relationships. Students who score at Level 3 are more likely to successfully graph lines given equations.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
43.9%	0.9%	43.3%	88.4%	99.6%

### Grade 10, Level 3

What is the product of  $-2x^2$  and  $-x^2 + 3x - 1$ ?

- $-3x^2 + 3x - 1$
- $-3x^4 + 5x^3 - 3x^2$
- $-2x^4 - 6x^3 + 2x^2$
- $2x^4 - 6x^3 + 2x^2$

Correct Answer:  $2x^4 - 6x^3 + 2x^2$

Aligned to: Claim 1, Target F / Perform arithmetic operations on polynomials.

Students add, subtract, and multiply polynomials. Students who score at Level 3 are more likely to successfully multiply polynomials of degree 2 or less.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
37.7%	2.0%	39.5%	79.6%	98.3%

### Grade 10, Level 4

A cylinder has a radius of 5 inches (in.) and a height of 8 in. Water inside the cylinder reaches a height of 4 in. A rectangular prism is 11 in. long, 9 in. wide, and 5 in. tall. All of the water is poured from the cylinder into the prism. What is the depth of the water in the prism, rounded to the nearest inch?

- 3 in.
- 4 in.
- 5 in.
- 8 in.

Correct Answer: 3 in.

Aligned to: Claim 2, Target A / Apply mathematics to solve well-posed problems in pure mathematics and arising in everyday life, society, and the workplace.

Students apply mathematics to solve real-world problems. Students who score at Level 4 are more likely to successfully compare volumes of figures and to find missing measurements.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
33.7%	8.1%	32.9%	54.2%	81.4%

### Grade 10, Level 4

Which is the correct form to find the vertex of  $y = x^2 - 3x + \frac{9}{4}$ ?

- $y = (x - \frac{3}{2})^2$
- $y = (x + \frac{3}{2})^2$
- $y = (x - \frac{3}{2})(x + \frac{3}{2})$
- $y = (x - \frac{3}{4})(x + \frac{3}{4})$

Correct Answer:  $y = (x - \frac{3}{2})^2$

Aligned to: Claim 1, Target E / Write expressions in equivalent forms to solve problems.

Students can solve problems using equivalent expressions. Students who score at Level 4 are more likely to successfully understand that completing the square reveals the vertex of a polynomial.

Overall Difficulty	Level 1 % Correct	Level 2 % Correct	Level 3 % Correct	Level 4 % Correct
26.7%	3.4%	23.5%	48.3%	83.1%