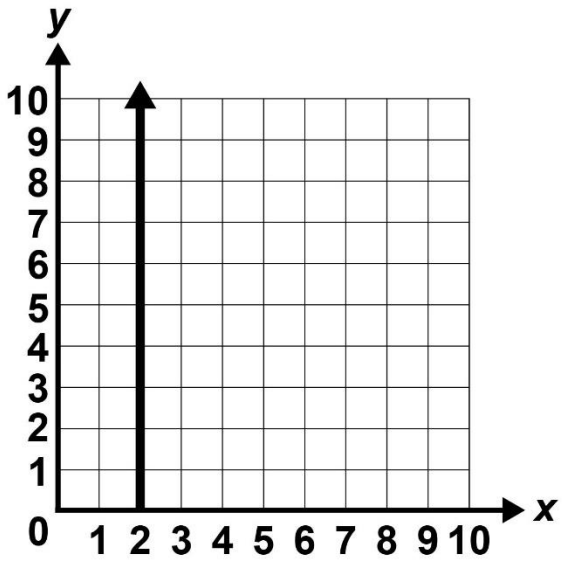
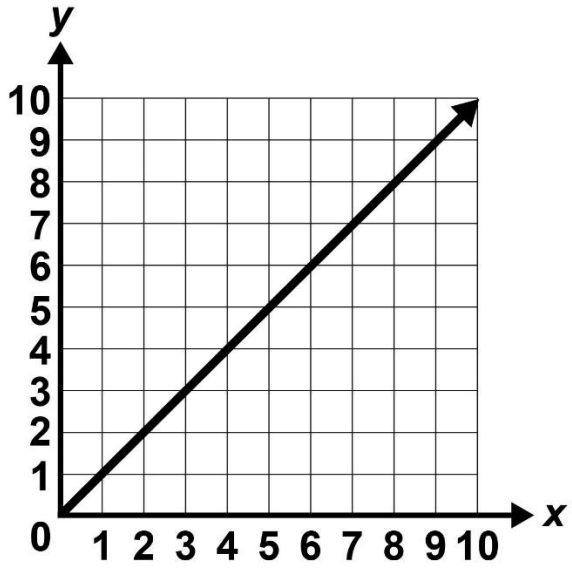
Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.1.a.1:** Solve linear equations with up to two steps based on real-world problems.
IAS Standard	**MA.8.AF.1:** Solve linear equations with rational number coefficients fluently, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems.
Content Limits	No more than one variable in an equation. Any decimal must terminate. Limited to two-step equations. Only use whole numbers. If a real-world context is used, provide the linear equation. Emphasis of item should be on solving a given equation, not interpreting the equation in context.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC) Equation Response (EQ)
Construct-Relevant Vocabulary	equation, solution
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given two choices of solved equations, student will choose the correct solution.
	Tier 2 Given three choices of solved equations (similar numbers in each equation), student will choose the correct solution.
	Tier 3 Given an equation, student will solve the equation.

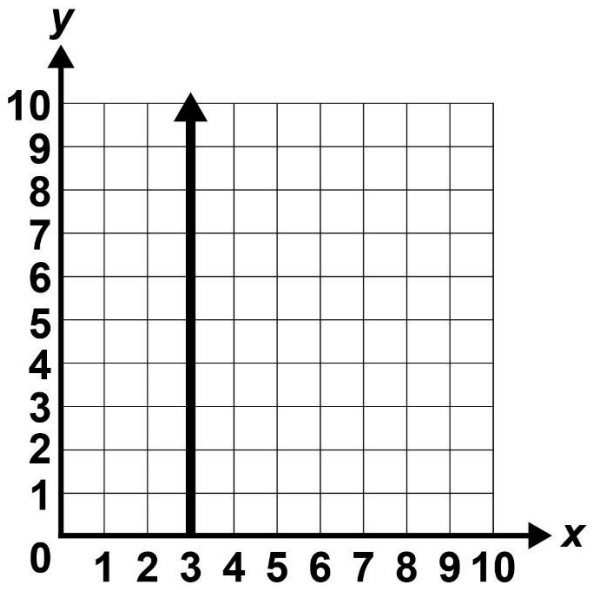
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 3	Here is an equation. $2x + 3 = 5$ What is the value of x? a. 0 **b. 1** c. 5

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.2.a.1:** Recognize when a linear equation has one solution, infinitely many solutions, or no solutions.
IAS Standard	**MA.8.AF.2:** Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by transforming a given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
Content Limits	Coefficient limited to 1. Solving is not necessary to determine the answer(s). Only use whole numbers.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	solution
Cognitive Complexity	4
Evidence Statements	
Evidence Statements	**Tier 1** Through the aid of visual supports for one solved linear equation, the students will identify the equation has only one solution.
	Tier 2 Through the aid of visual supports for one solved linear equation, the students will identify the equation has one solution, infinitely many solutions, or no solutions.
	Tier 3 The students will identify that an equation has one solution, infinitely many solutions, or no solutions.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

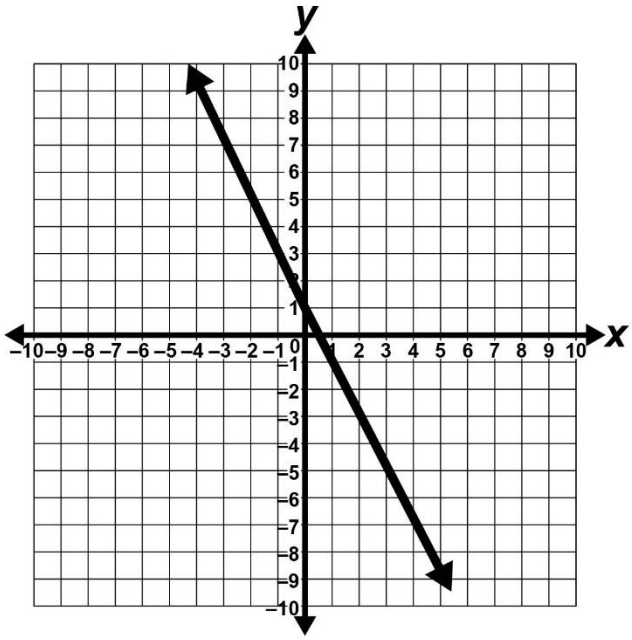
Sample Item	
Tier 3	Here is an equation. $2x + 3 = 2x + 4$ How many solutions does this equation have? **A. 0 solutions** B. 1 solution C. infinitely many solutions

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.3.a.1:** Distinguish between functions and non-functions in graphs, or tables.
IAS Standard	**MA.8.AF.3:** Understand that a function assigns to each *x*-value (independent variable) exactly one *y*-value (dependent variable) and that the graph of a function is the set of ordered pairs (*x*, *y*).
Content Limits	Limited to graphs for tiers 1 and 2. Limited to quadrant 1 of the coordinate plane for tier 1. Table option for tier 3. Table limitation: whole numbers only.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	function
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Student can determine which graph is a function.
	Tier 2 Student can determine which graph is a function.
	Tier 3 Student can determine if a table and/or graph is a function.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	ruler/straight edge

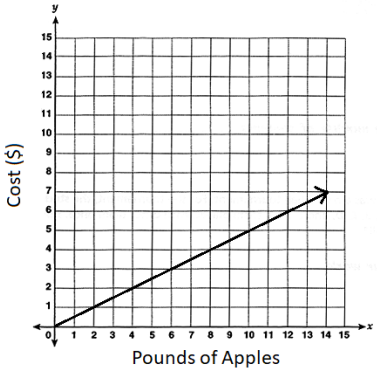
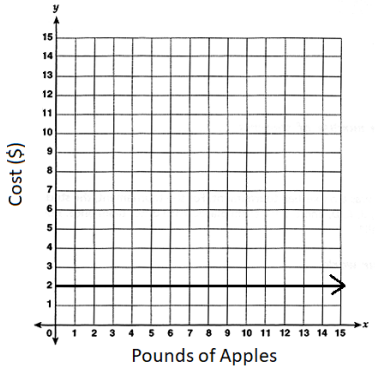
Sample Item	
Tier 2	Which graph is a function?  A. (Audio: Here is the graph of a line. The line goes through points x is two, y is two, and x is two, y is three.)  **B.** **(Audio: Here is the graph of a line. The line goes through points x is two, y is two, and x is three, y is three.)** **KEY**

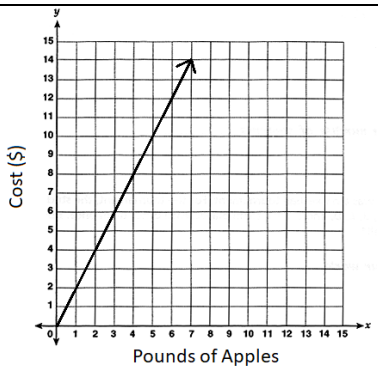
	C.  (Audio: Here is the graph of a line. The line goes through points x is three, y is three, and x is three, y is four.)

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.4.a.1:** Given a graph, describe the defining features of a function.
IAS Standard	**MA.8.AF.4:** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described.
Content Limits	Only one graph in prompts.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	slope, linear, increasing, decreasing
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a graph, student will determine if the graph is linear and nonlinear.
	Tier 2 Given a selection of graphs, student will select which graph has a specific point at it's maximum.
	Tier 3 Given numbers of how many times a graph of a polynomial (wavy) increases OR decreases, student will define how many times the graph increases OR decreases.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

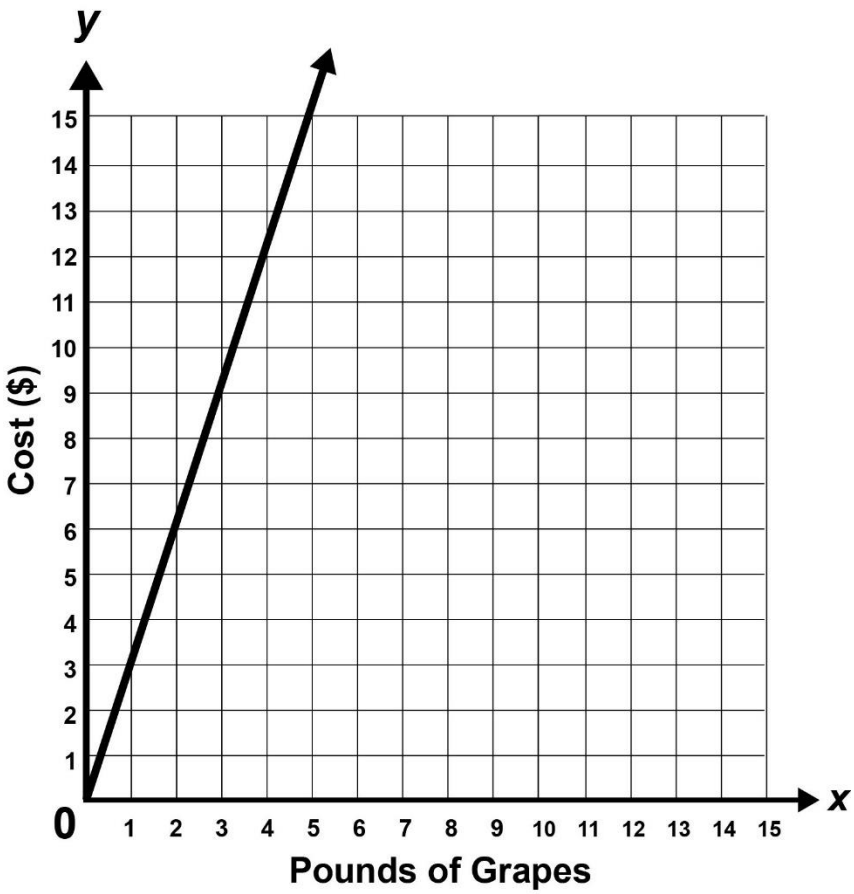
Sample Item	
Tier 1	Here is a graph.  What kind of graph is this? **A. linear** B. non-linear C. box plot

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.4.a.2:** Given a verbal situation, identify its corresponding graph.
IAS Standard	**MA.8.AF.4:** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described.
Content Limits	Real-world stories/situations.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Coordinate plane, graph, maximum value, minimum value
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a situation (story) with a single rate, student will identify which graph models that situation.
	Tier 2 Given a situation (story) with two rates, student will identify which graph models that situation.
	Tier 3 Given a situation (story) with varying rates, student will select the correct graph.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	A store sells apples for $2 per pound. Which graph shows this situation? a.  (Audio: A graph with the *x*-axis labeled “pounds of apples,” and a *y*-axis labeled “cost.” There is a line that starts at the point zero, zero, and has a slope of one-half.) b.  (Audio: A graph with the *x*-axis labeled “pounds of apples,” and a *y*-axis labeled “cost.” There is a line that starts at the point zero, two, and goes straight across.)

	 C. **(Audio: A graph with the *x*-axis labeled "pounds of apples," and a *y*-axis labeled "cost." There is a line that starts at the point zero, zero, and has a slope of two.)** **KEY**

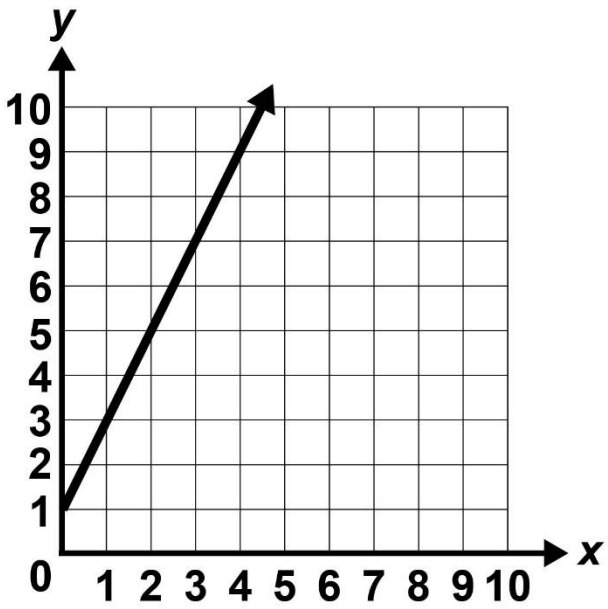
Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.4.a.3:** Given a line graph of a situation, describe or select its quantitative features.
IAS Standard	**MA.8.AF.4:** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described.
Content Limits	All graphs should include real-world labels and/or situations.
Allowable Stimulus Material	N/A
Context	context allowed
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	situation, rate
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given one graph of a single rate, student will select the correct situation (story) that matches the graph.
	Tier 2 Given one graph of two rates, student will select the correct situation (story) that matches the graph.
	Tier 3 Give one graph of varying rates, student will select the correct situation (story) that matches the graph.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Here is a graph.  Which situation matches the graph? **A. It costs $3.00 per pound of grapes.** B. There are 3 pounds of grapes for $1.00. C. It costs $0.33 per pound of grapes.

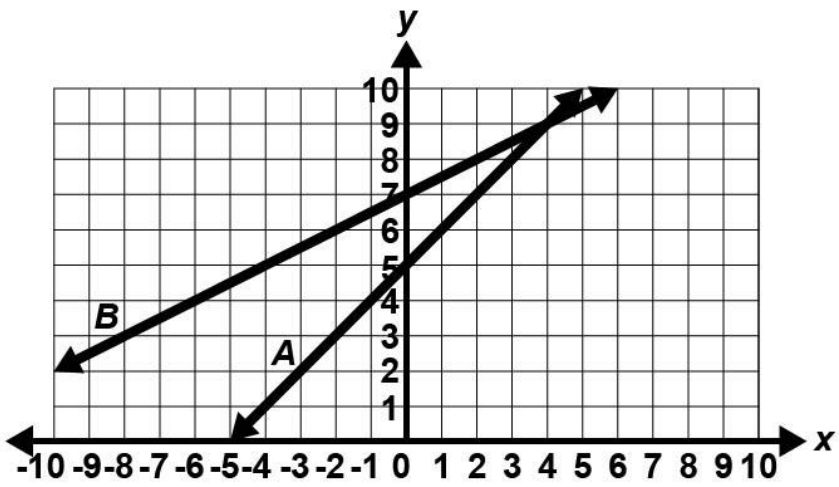
Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.5.a.1:** Given multiple representations, describe a function as linear and not linear.
IAS Standard	**MA.8.AF.5:** Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations.
Content Limits	Verbal descriptions limited to Audio Descriptions. Limited numerals to whole numbers. Equation has to be in the form of $y = mx + b$. For tables: x column must go up by 1s, y column cannot go up by more than 5.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	linear
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Through the representation of a graph, student can identify if graph is linear or nonlinear function.
	Tier 2 Through the representation of an equation, student can identify if graph is linear or nonlinear function.
	Tier 3 Through the representation of a table, student can identify if graph is a linear or nonlinear function.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 2	Which equation is linear? **A. $y = 2x + 5$** B. $y = 2x^2 + 3$ C. $y = \frac{2}{x} + 4$

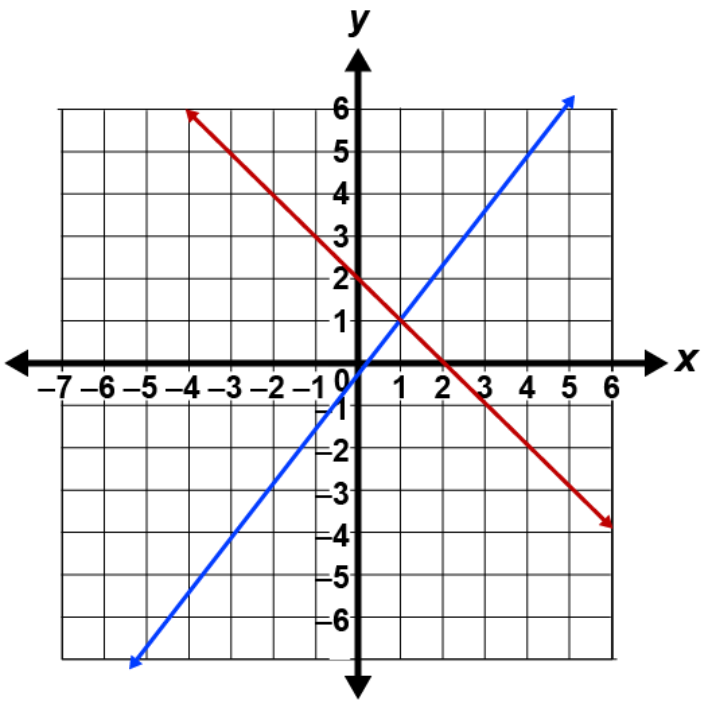
Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.6.a.1:** Identify the rate of change (slope) and initial value (y-intercept) from graphs.
IAS Standard	**MA.8.AF.6:** Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Recognize in $y = mx + b$ that m is the slope (rate of change) and b is the y-intercept of the graph and describe the meaning of each in the context of a problem.
Content Limits	Slopes must be given in whole numbers only. Points and increments must be labeled and not interpreted. Coordinate values cannot exceed 10.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	rate of change, initial value, y-intercept, slope
Cognitive Complexity (DOK)	3
Evidence Statements	
Evidence Statements	**Tier 1** Given a graph, student will identify the initial value/y-intercept.
	Tier 2 Given a graph, student will identify the slope/rate of change.
	Tier 3 Given a graph, student will identify the slope and initial value.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Here is the graph of a line.  What is the slope of the line? a. 1 b. $\frac{1}{2}$ **c. 2**

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.7.a.1:** Given a table or a graph, compare two linear functions to answer a question about rates.
IAS Standard	**MA.8.AF.7:** Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed).
Content Limits	Whole numbers only (no negative numbers). *x* table column must use the same numbers.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Equation Response (EQ) Multiple Choice (MC)
Construct-Relevant Vocabulary	rate, graph, table, line, steeper, faster, slower
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given two lines on the same graph (two quadrants), student will identify which line is steeper/faster.
	Tier 2 Given two tables, student will identify which line is steeper/faster by solving slope.
	Tier 3 Given two tables, student will identify the rate AND THEN compare the rate.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Here is the graph of lines A and B.  Which line is steeper? **A. Line A** B. Line B C. Neither

Reporting Category	Algebraic Thinking
Content Connector	**MA.8.AF.8.a.1:** Given a graph, identify the solution to a system of linear equations.
IAS Standard	**MA.8.AF.8:** Understand that solutions to a system of two linear equations correspond to points of intersection of their graphs because points of intersection satisfy both equations simultaneously. Approximate the solution of a system of equations by graphing and interpreting the reasonableness of the approximation.
Content Limits	Coordinate pairs are whole numbers.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	system of linear equations, solution
Cognitive Complexity (DOK)	4
Evidence Statements	
Evidence Statements	**Tier 1** Given a graph with labeled points (A, B, or C), student will be given three multiple point options to identify the solution to the system of linear equations.
	Tier 2 Given a graph with numeric points, student will identify the solution to the system of linear equations.
	Tier 3 Given a graph without point labeling, student will identify the solution to the system of linear equations.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Here is the graph of a system of linear equations.  Which point is the solution to the system of linear equations? A. (0, 2) **B. (1, 1)** C. (2, 0)

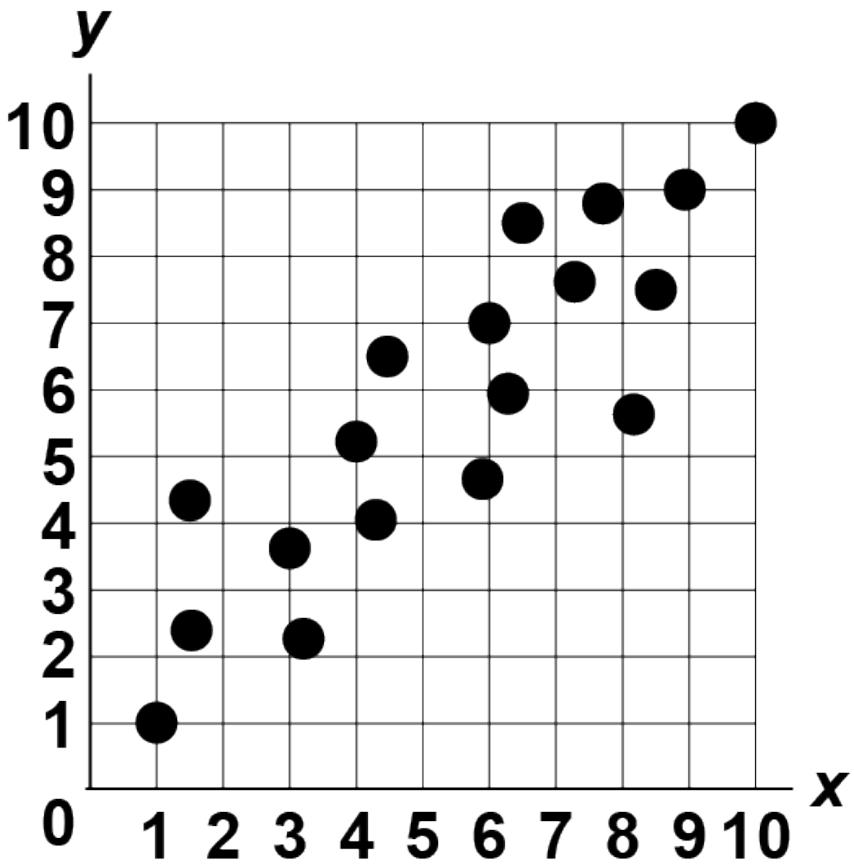
Reporting Category	Number Sense and Computation
Content Connector	**MA.8.C.1.a.1:** Solve real-world problems with rational numbers by using two operations.
IAS Standard	**MA.8.C.1:** Solve real-world problems with rational numbers by using multiple operations.
Content Limits	Limited to whole numbers for tier 1. Limited to rational numbers for tier 2 and 3.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** By adding whole numbers, students will solve real-world problems with rational numbers by using two operations.
	Tier 2 By adding and subtracting rational numbers, students will solve real-world problems with rational numbers by using two operations.
	Tier 3 By adding and then dividing the sum of rational numbers, students will solve real-world problems with rational numbers by using two operations.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	On Monday, Tim spends $30.00. On Tuesday, he spends $40.00. On Wednesday, Tim spends $10.00. How much does Tim spend in total? A. $10 **B. $80** C. $100

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.C.2.a.1:** Perform operations with numbers expressed in scientific notation.
IAS Standard	**MA.8.C.2:** Solve real-world and other mathematical problems involving numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology, such as a scientific calculator, graphing calculator, or Microsoft Excel spreadsheet.
Content Limits	Limited to addition for Tier 1. Limited to addition or subtraction for Tier 2. Limited to addition, subtraction, or division for Tier 3. Exponents matched in all tiers. Whole numbers only.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Scientific notation, expressed
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Through addition, student will perform operations with numbers expressed in scientific notation.
	Tier 2 Through subtraction, student will perform operations with numbers expressed in scientific notation.
	Tier 3 Through division, student will perform operations with numbers expressed in scientific notation.

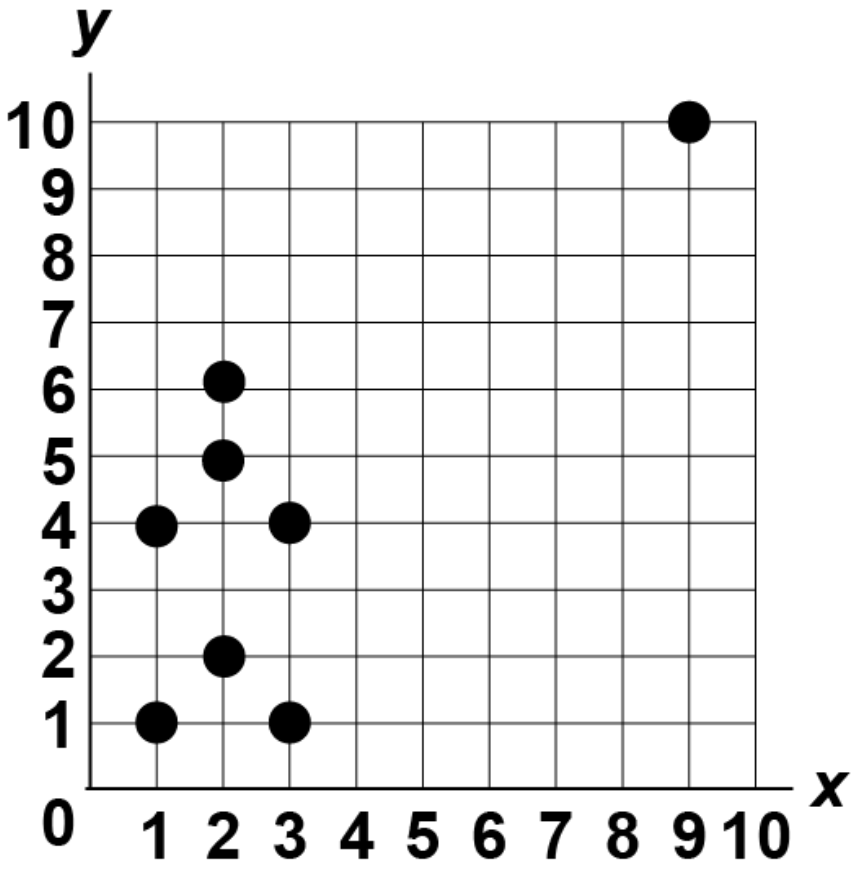
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 2	Here is an expression. $5 \times 10^2 - 2 \times 10^2$ What is the expression equal to? **A. 3×10^2** B. 7×10^2 C. 10×10^2

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.1.a.1:** Graph bivariate data using scatter plots and identify possible associations between the variables.
IAS Standard	**MA.8.DSP.1:** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
Content Limits	The graph must either be positive or negative associations for Tiers 1 and 2. Table match for Tier 3.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC) Table Match (TM)
Construct-Relevant Vocabulary	association, positive or negative
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Given a positive association, student will identify possible associations between variables.
	Tier 2 Given a negative association, student will identify possible associations between variables.
	Tier 3 Given bivariate data, student will select corresponding graph and association.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

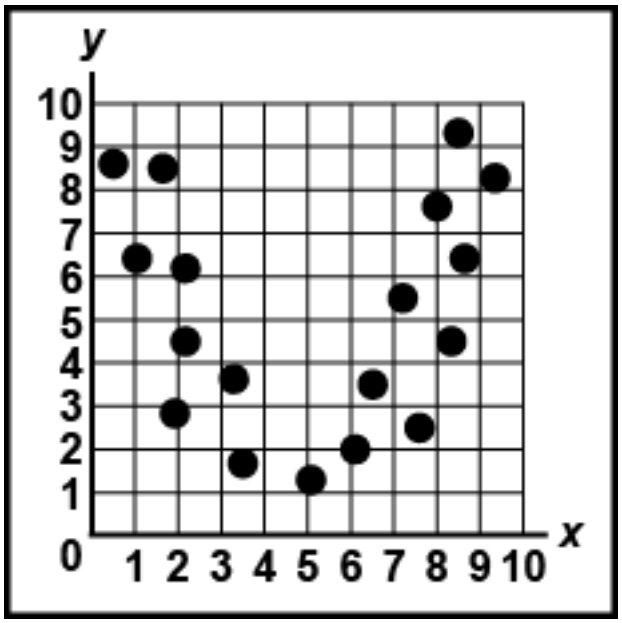
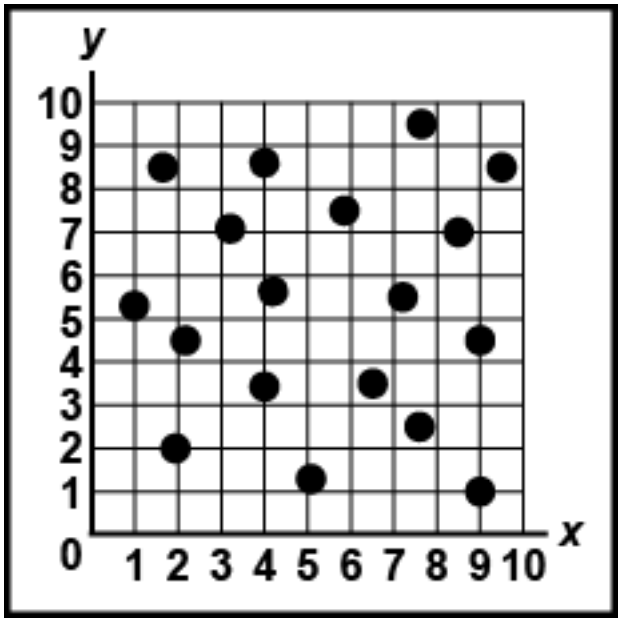
Sample Item	
Tier 1	Here is a scatter plot.  What type of association is shown on the graph? **a. Strong positive association** b. Weak positive association c. No association

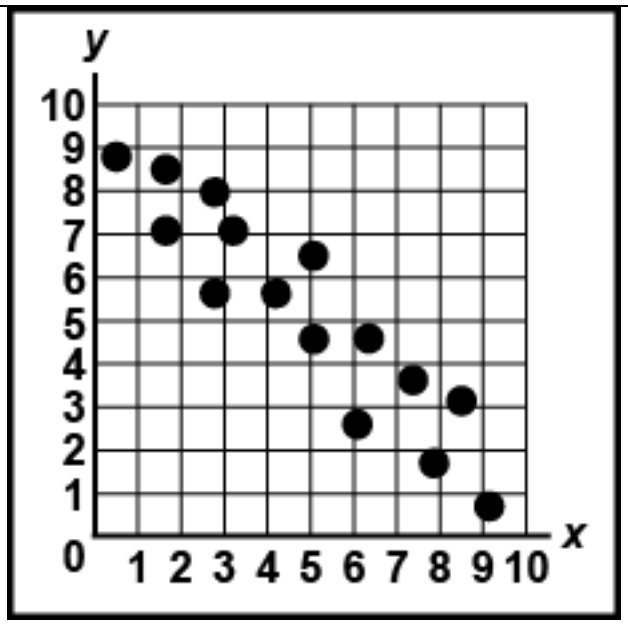
Updated: 07/19

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.1.a.2:** Using scatter plots, identify data points that appear to be outliers.
IAS Standard	**MA.8.DSP.1:** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
Content Limits	Tier 1 must be visually based (points), not coordinates. Keep in first quadrant.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC) Equation Response (EQ)
Construct-Relevant Vocabulary	outlier
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a graph, student will identify data points that appear to be outliers (points).
	Tier 2 Given a graph and coordinate pairs, student will identify data points that appear to be outliers (coordinates).
	Tier 3 Given coordinates, student will identify data points that appear to be outliers.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

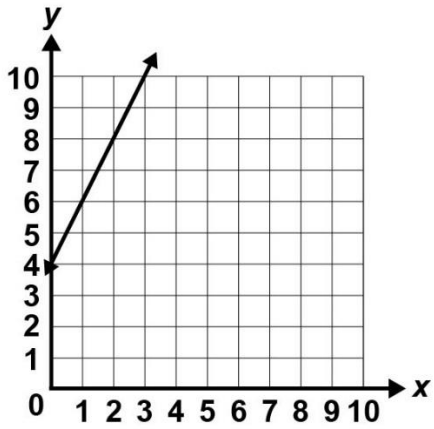
Sample Item	
Tier 3	Here is a graph.  What are the coordinates of the outlier? A. (1, 4) B. (3, 4) **C. (9, 10)**

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.2.a.1:** Identify a linear association when analyzing bivariate data on a scatter plot.
IAS Standard	**MA.8.DSP.2:** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and describe the model fit by judging the closeness of the data points to the line.
Content Limits	Limited to quadrant 1 of the coordinate plane. Exclude coordinates on graphs as distractors.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	linear association, line of best fit
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given two graphs, student will identify a linear association when analyzing bivariate data on a scatter plot.
	Tier 2 Given three graphs, student will identify a linear association when analyzing bivariate data on a scatter plot.
	Tier 3 Given one graph with three lines, student will differentiate identify a linear association when analyzing bivariate data on a scatter plot.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Which scatter plot shows a linear pattern? A.  (Audio: the points make a “u” shape) B.  (Audio: the points go up and down many times)

	C.  **(Audio: the points decrease from left to right)** **KEY**

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.3.a.1:** Use the line of best fit to find a point that answers a question about the data.
IAS Standard	**MA.8.DSP.3:** Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data; interpret the slope and y-intercept.
Content Limits	The *x* and *y* scales need to be different, and *x* and *y* axis lines are scaled differently. Quadrant 1 only. Equations have only whole numbers. Tier 2 must be an input on the graph. Tier 3 must be an input outside the graph.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC) Equation Response (EQ)
Construct-Relevant Vocabulary	line of best fit, scatter plot, slope, y-intercept
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given a graph only with the line of best fit (no equation), student will visually identify a point on the graph.
	Tier 2 Given a graph and equation, student will use the line of best fit OR the graph to visually identify a point on the graph.
	Tier 3 Given a graph with the equation, student will identify the point off the graph using numeric/equation input.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 3	Here is a graph.  The equation for this graph is $y = 2x + 4$. What does y equal if x equals 11? A. 17 B. 24 C. **26**

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.4.a.1:** Determine the probability of simple events.
IAS Standard	**MA.8.DSP.4:** Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. Understand and use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events.
Content Limits	Using vocabulary "complementary" only to stick to the "simple events" component of the connector and standard. Questions are not to include numbers, only words/verbal and visual.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Probability, complementary
Cognitive Complexity	4
Evidence Statements	
Evidence Statements	**Tier 1** Students will recognize a probability of one-half in cases where there are one of two possible outcomes.
	Tier 2 Students will recognize a probability of one-quarter or one-third in given probability situations.
	Tier 3 Students will determine the probability of simple events in given probability situations.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 1	Jessica tosses a coin with 2 sides. The coin has the same chance to land heads as it does to land on tails.  **Heads**  **Tails** What is the probability that the coin lands on heads? A. 0 **B.** $\frac{1}{2}$ C. 1

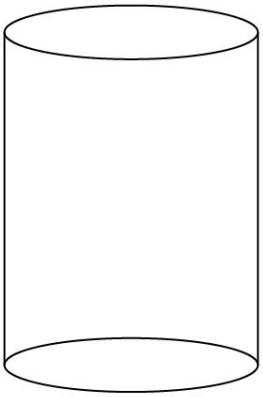
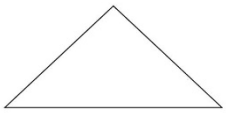
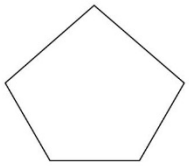
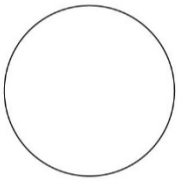
Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.5.a.1:** Determine the theoretical probability of multi-stage probability experiments (two coins, two dice).
IAS Standard	**MA.8.DSP.5:** Represent sample spaces and find probabilities of compound events (independent and dependent) using methods such as organized lists, tables, and tree diagrams.
Content Limits	Tier 3 answer choices must provide full operational statements.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	probability, tree diagram
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given visual representation of all probability possibilities, student will determine the theoretical probability of multi-stage probability experiments.
	Tier 2 Given a probability tree diagram, student will determine the theoretical probability of multi-stage probability experiments.
	Tier 3 Given visuals, student will choose the correct operation out of a selection of operations, student will determine the theoretical probability of multi-stage probability experiments.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 3	Megan flips a coin and spins a spinner with 4 sections colored red, blue, green, and yellow. How can Megan find the probability of getting tails and a blue? a. $\frac{1}{2} \times \frac{1}{4}$ **KEY** b. $\frac{1}{2} + \frac{1}{4}$ c. $\frac{1}{2} \times \frac{3}{4}$

Reporting Category	Data Analysis
Content Connector	**MA.8.DSP.6.a.1:** Use the multiplication counting principle to determine the total number of outcomes.
IAS Standard	**MA.8.DSP.6:** For events with a large number of outcomes, understand the use of the multiplication counting principle. Develop the multiplication counting principle and apply it to situations with a large number of outcomes.
Content Limits	No more than four selections on Tier 3, three on Tier 2, and two on Tier 1.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Outcomes, probability, events, multiplication counting principle
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a real-world situation and no more than two selections, student will determine the number of outcomes with visuals.
	Tier 2 Given a real-world situation and no more than three selections, student will determine the number of outcomes with visuals.
	Tier 3 Given a real-world situation and no more than four selections, student will determine the number of outcomes with visuals.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	tables; lists; visuals

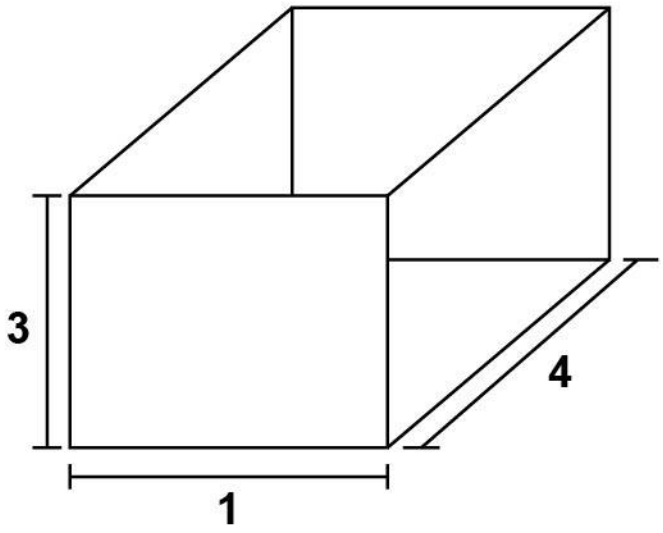
Sample Item	
Tier 3	Jane has 4 pairs of pants, 3 shirts, and 2 pairs of shoes.  How many different outfits can Jane wear? A. 9 B. 18 **C. 24**

Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.1.a.1:** Identify and describe attributes of three-dimensional geometric objects.
IAS Standard	**MA.8.GM.1:** Identify, define, and describe attributes of three-dimensional geometric objects (right rectangular prisms, cylinders, cones, spheres, and pyramids). Explore the effects of slicing these objects using appropriate technology and describe the two-dimensional figure that results.
Content Limits	Should include the right angle as an attribute.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC) Table Match (TM)
Construct-Relevant Vocabulary	shape names and attributes
Cognitive Complexity (DOK)	3
Evidence Statements	
Evidence Statements	**Tier 1** Given three-dimensional shapes, student will identify the requested shape.
	Tier 2 Given three-dimensional shapes, student will identify shape attributes.
	Tier 3 Given multiple shapes, student will be able to identify a common attribute.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Here is a cylinder.  Which shape is a face of the cylinder?  A. (Audio: A triangle)  B. (Audio: A pentagon)  **C.** **(Audio: A circle)** **KEY**

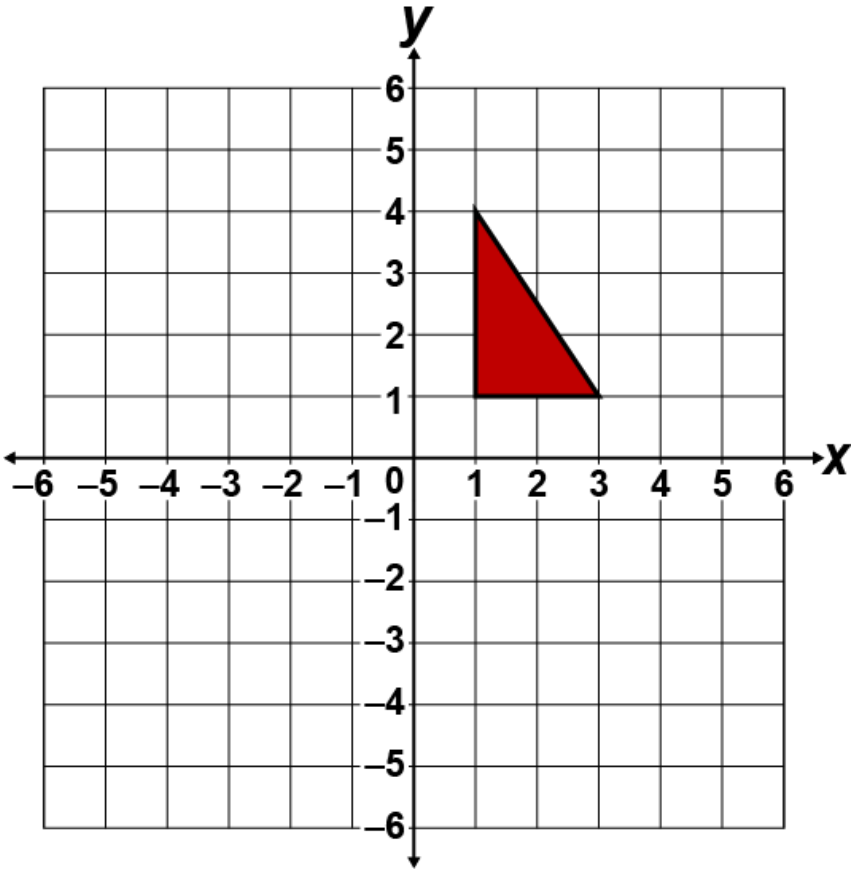
Updated: 07/19

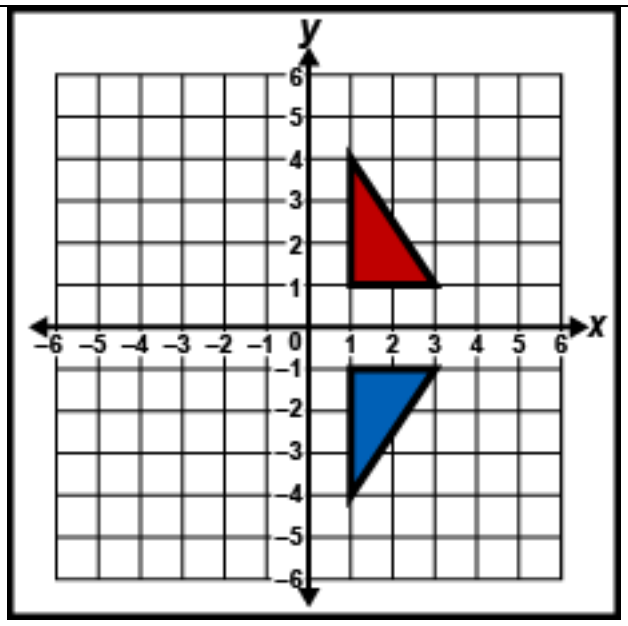
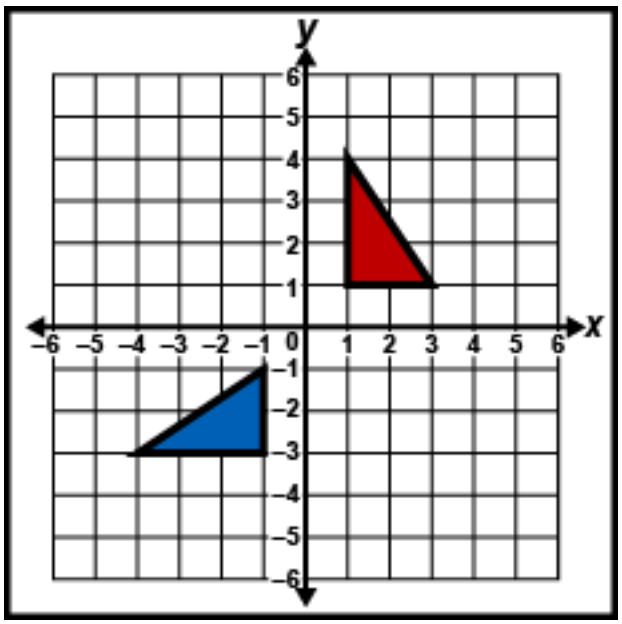
Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.2.a.1:** Apply the formula to find the volume of three-dimensional shapes (e.g., cubes, spheres, cylinders).
IAS Standard	**MA.8.GM.2:** Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres.
Content Limits	Exclude cylinders, spheres, and cones. Pyramid must have a square base. Pyramid formula does not contain fractions. Pyramid picture must be provided. Pictures of any shape must have the dimensions listed. Formula for volume will be provided.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	volume, pyramid, cube, rectangular prism
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given a rectangular prism, student will formulate volume.
	Tier 2 Given a cube with one side's dimension given, student will formulate volume.
	Tier 3 Given the picture of a pyramid, student will formulate volume.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	formula must be provided with the questions

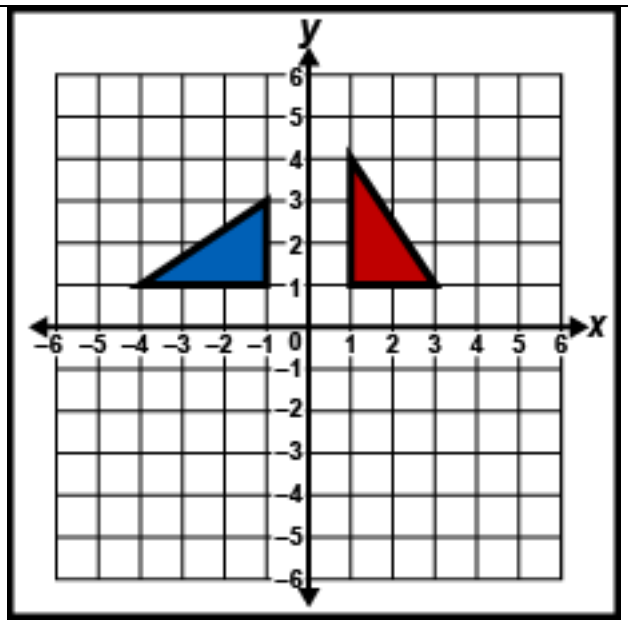
Sample Item	
Tier 1	Here is a rectangular prism.  The volume of a rectangular prism equals the length times the width times the height. $V = l \cdot w \cdot h$ What is the volume of this rectangular prism? **a. 12** b. 8 c. 7

Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.3.a.1:** Recognize a rotation, reflection, or translation of a figure.
IAS Standard	**MA.8.GM.3**: Verify experimentally the properties of rotations, reflections, and translations, including: lines are mapped to lines and line segments to line segments of the same length; angles are mapped to angles of the same measure; and parallel lines are mapped to parallel lines.
Content Limits	Do not overlap figures on graphs on *x* or *y* axis. Limit items to single transformation. The multiple-choice answers must be visual for Tier 1.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	rotation, reflection, translation
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Given a picture, student will identify if this is a reflection or translation of a figure.
	Tier 2 Given a picture, student will identify if this is a rotation, reflection, or translation of a figure.
	Tier 3 Given a graph, student will recognize a rotation, reflection, or translation of a figure.

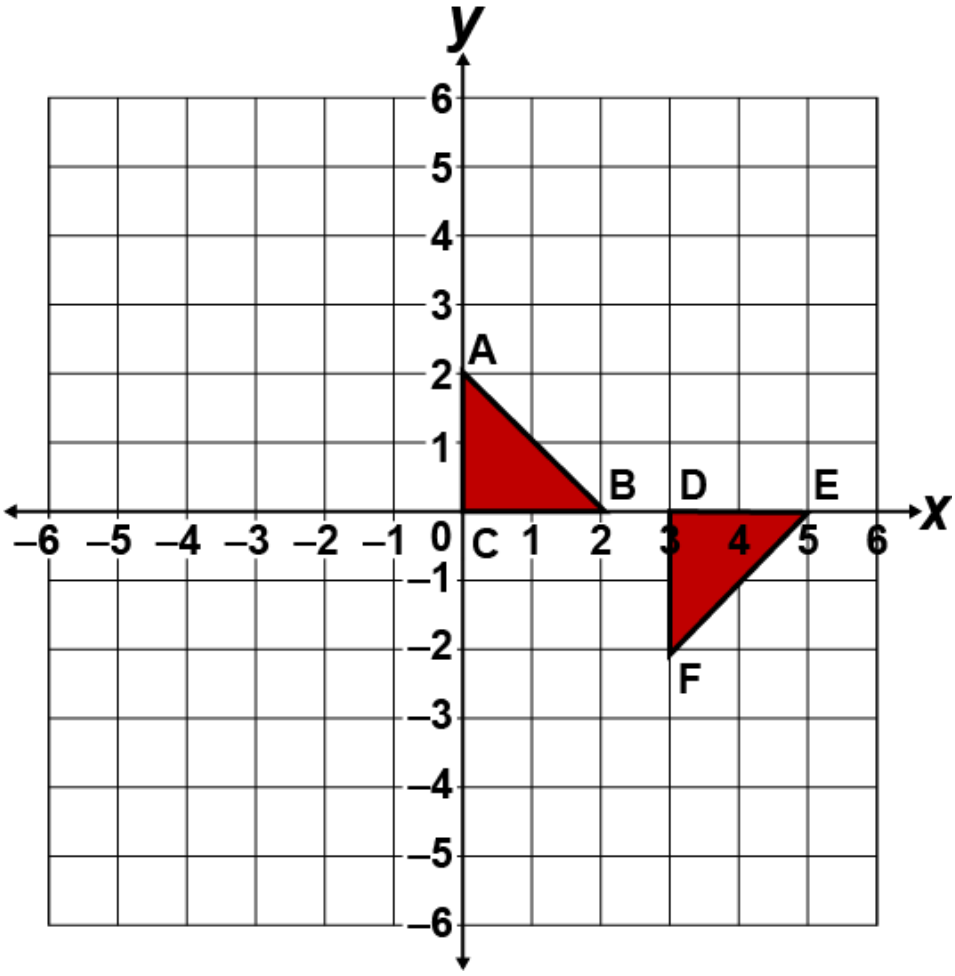
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	if possible, figures for Tier 1 and 2 need to be animation OR color differential

Sample Item	
Tier 1	Here is a graph with a triangle in the first quadrant.  Which graph shows a reflection across the x-axis?

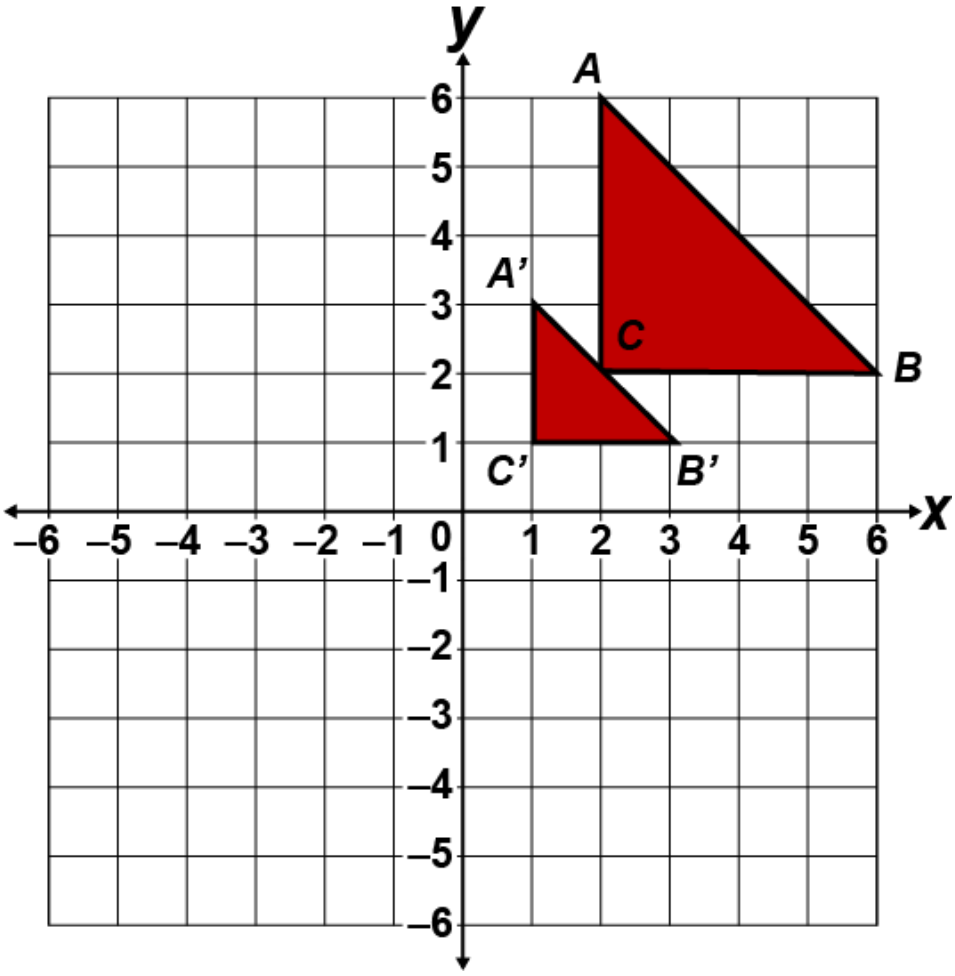
	A.  **(Audio: There is a triangle in the fourth quadrant)** **KEY** B.  (Audio: There is a triangle in the third quadrant)

	C.  (Audio: There is a triangle in the second quadrant)

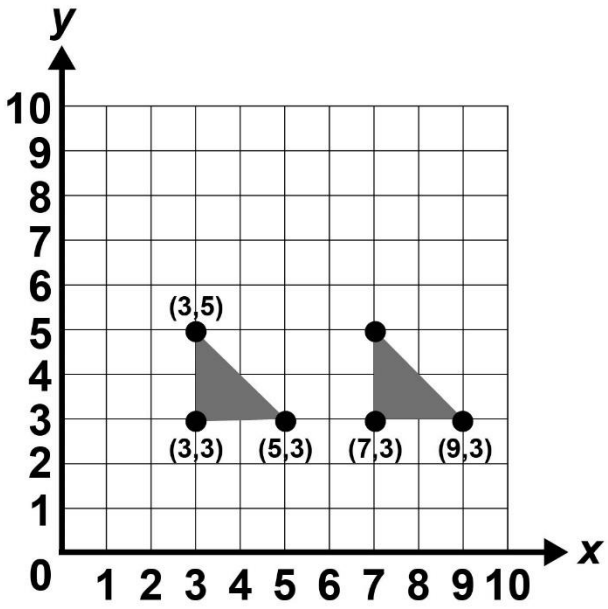
Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.4.a.1:** Describe a sequence of transformations between two congruent figures.
IAS Standard	**MA.8.GM.4:** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. Describe a sequence that exhibits the congruence between two given congruent figures.
Content Limits	Do not overlap figures on graphs on *x* or *y* axis. Exclude rotation. The multiple-choice answers must be visual for Tier 1.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	transformation, rotation, reflection, translation, congruent
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given two translations, student will identify the sequence.
	Tier 2 Given a translation AND THEN reflection, student will determine the second transformation given the first transformation.
	Tier 3 Given a graph with the pre-image and image, student will identify the the two transformations that create the image.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Here is a graph of two triangles.  There are two transformations to move the Triangle ABC to the triangle DEF. The first is a translation. What is the second? A. translation **B. reflection** C. dilation

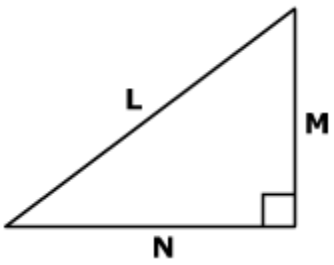
Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.5.a.1:** Describe a sequence of transformations between two similar figures.
IAS Standard	**MA.8.GM.5:** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. Describe a sequence that exhibits the similarity between two given similar figures.
Content Limits	Begin with dilations in the questions. Use of visuals in at least Tiers 1 and 2. The multiple-choice answers must be visual for Tier 1.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	rotation, reflection, translation, dilation
Cognitive Complexity	4
Evidence Statements	
Evidence Statements	**Tier 1** Given a dilation and translation, student will identify the sequence.
	Tier 2 Given a dilation and reflection, student will identify the sequence.
	Tier 3 Given a dilation and rotations, student will identify the sequence.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 3	Here are triangles *ABC* and *A'B'C'*.  Which transformation shows that triangle *ABC* and *A'B'C'* are similar? **A. dilation** B. rotation C. translation

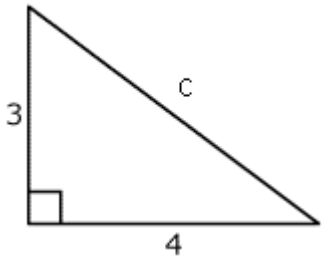
Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.6.a.1:** Describe the effects of transformations on the coordinates of a figure.
IAS Standard	**MA.8.GM.6:** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
Content Limits	Exclude rotations. Limit transformations to a single transformation.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC) Equation Response (EQ)
Construct-Relevant Vocabulary	Coordinate
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given graph and ordered pairs for the first image and then the graph and ordered pairs (excluding one pair) for the final image, student will identify a missing set of coordinates of a translation on the final image.
	Tier 2 Given graph and ordered pairs for the first image and then the graph and ordered pairs (excluding one pair) for the final image, student will identify a missing set of coordinates of a dilation on the final image.
	Tier 3 Given graph and ordered pairs for the first image and then the graph and ordered pairs (excluding one pair) for the final image, student will identify a missing set coordinates of a reflection across the *y*-axis on the final image.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 1	Here are two graphs of triangles. The second triangle is a translation of the first triangle.  What is the missing coordinate? **A. (7, 5)** B. (5, 7) C. (7, 7)

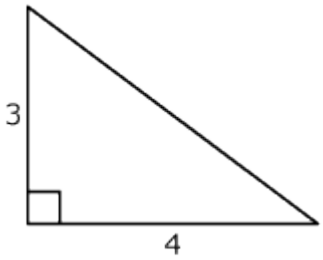
Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.7.a.1:** Students will use a pattern to discover the relationship of the Pythagorean Theorem.
IAS Standard	**MA.8.GM.7:** Use inductive reasoning to explain the Pythagorean relationship.
Content Limits	Numeral limited to whole numbers only. Limit side lengths to no more than 1.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	right triangle, hypotenuse
Cognitive Complexity	2
Evidence Statements	
Evidence Statements	**Tier 1** Given a visual of a right triangle with all labeled sides, student will identify the hypotenuse.
	Tier 2 Given a visual of a right triangle with numbered legs (blank hypotenuse), student will identify which number is the most reasonable hypotenuse.
	Tier 3 Given written/verbal numbered legs, student will identify which number is the most reasonable hypotenuse.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Here is a right triangle.  Which is the hypotenuse? **A. L** B. M C. N

Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.8.a.1:** Apply the Pythagorean Theorem to determine lengths/distances in real-world situations.
IAS Standard	**MA.8.GM.8:** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions**.**
Content Limits	Whole number solutions only. Pythagorean Theorem formula provided for question.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Pythagorean Theorem
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a visual with the leg lengths provided, student will select the correct Pythagorean Theorem equation.
	Tier 2 Given a visual with the leg lengths provided, student will identify the hypotenuse.
	Tier 3 Given a visual with one leg and the hypotenuse lengths provided, student will identify the unknown leg length.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

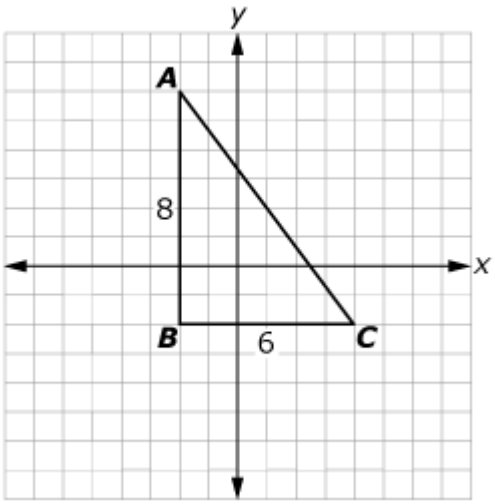
Sample Item	
Tier 1	Here is a right triangle.  Which equation is correct for this triangle? **A.** $\mathbf{3^2 + 4^2 = c^2}$ B. $c^2 + 3^2 = 4^2$ C. $4^2 + c^2 = 3^2$

Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.8.a.2:** Find the hypotenuse of a right triangle using the Pythagorean Theorem.
IAS Standard	**MA.8.GM.8:** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions.
Content Limits	Limit numerals to whole numbers only. Solutions and side lengths under 15. Pythagorean Theorem formula provided for question.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC) Equation Response (EQ)
Construct-Relevant Vocabulary	hypotenuse, Pythagorean Theorem
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a visual of a right triangle with the leg lengths provided, student will select the correct Pythagorean theorem solution.
	Tier 2 Given a visual of a right triangle with the leg lengths provided, student will calculate the hypotenuse.
	Tier 3 Given a visual of a right triangle with the leg lengths provided, student will calculate the hypotenuse.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 3	Here is a right triangle.  What is the length of the hypotenuse? **A. 5** B. 7 C. 12

Updated: 07/19

Reporting Category	Geometry and Measurement
Content Connector	**MA.8.GM.9.a.1:** Apply the Pythagorean Theorem to determine lengths/distances on a coordinate plane.
IAS Standard	**MA.8.GM.9:** Apply the Pythagorean Theorem to find the distance between two points on a coordinate plane.
Content Limits	Ensure lines are horizontal and vertical. Right triangle sides will be composed of Pythagorean triples only. Graphs must have gridlines. Pythagorean Theorem should be provided in the problem.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Pythagorean Theorem, hypotenuse
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given the image and lengths of legs, student will apply the Pythagorean theorem to determine length/distances on a coordinate plane.
	Tier 2 Given the image and coordinates of the points on legs, student will apply the Pythagorean theorem to determine length/distances on a coordinate plane.
	Tier 3 Given the image length of one leg and the hypotenuse, student will apply the Pythagorean theorem to determine length/distances on a coordinate plane.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 1	Here is a right triangle.  The squares of the two legs are equal to the square of the hypotenuse. $a^2 + b^2 = c^2$ What is the length of the hypotenuse? **A. 10 units** B. 14 units C. 48 units

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.NS.1.a.1:** Identify rational and irrational numbers.
IAS Standard	**MA.8.NS.1:** Give examples of rational and irrational numbers and explain the difference between them. Understand that every number has a decimal expansion; for rational numbers, show that the decimal expansion terminates or repeats, and convert a decimal expansion that repeats into a rational number.
Content Limits	Sequences should be no more than three.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Select (MS) Multiple Choice (MC) Table Match (TM)
Construct-Relevant Vocabulary	rational numbers, irrational numbers
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given a rational OR irrational number, a student will identify if a number is rational or irrational.
	Tier 2 Student will identify a rational or irrational number when given 3 roots.
	Tier 3 Evaluating options of sequences, a student will identify which sequence is all rational or all irrational.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

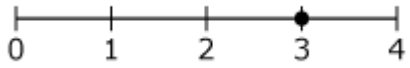
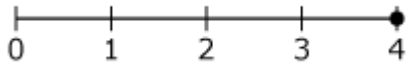
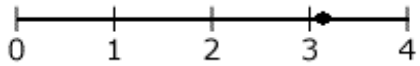
Sample Item	
Tier 2	Which number is irrational? A. $\sqrt{4}$ B. $\sqrt{5}$ KEY C. $\sqrt{9}$

Updated: 07/19

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.NS.1.a.2:** Round irrational numbers to the hundredths place.
IAS Standard	**MA.8.NS.1:** Give examples of rational and irrational numbers and explain the difference between them. Understand that every number has a decimal expansion; for rational numbers, show that the decimal expansion terminates or repeats, and convert a decimal expansion that repeats into a rational number.
Content Limits	Limited to rational numbers for Tier 1. Limited to radical numbers for Tier 2. Limited to irrational numbers for Tier 3.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	round, hundredths
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Given a rational number, students will round to the nearest hundredths place.
	Tier 2 Given a radical number, students will round to the nearest hundredths place.
	Tier 3 Given an irrational number, students will round to the nearest hundredths place.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 3	Here is an irrational number. $e = 2.7182818284 \ldots$ What is this number rounded to the nearest hundredth? A. 2.7 **B. 2.72** C. 2.718

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.NS.2.a.1:** Use the estimate of irrational numbers to locate them on a number line.
IAS Standard	**MA.8.NS.2:** Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers.
Content Limits	No irrational numbers with an approximation less than –10.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	number line
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given any positive number between 1–5, student will use the estimate of irrational numbers to locate them on a number line.
	Tier 2 Given any number between -10 and 10, student will use the estimate of irrational numbers to locate them on a number line.
	Tier 3 Given an irrational (example: π), student will use the estimate of irrational numbers to locate them on a number line.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 3	Which number line shows π? A.  (Audio: a number line with a point on three) B.  (Audio: a number line with a point on four) **C.**  **(Audio: a number line with a point between three and four) KEY**

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.NS.3.a.1:** Use properties of integer exponents to produce equivalent expressions.
IAS Standard	**MA.8.NS.3:** Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions.
Content Limits	Limit numbers to single digits. Limited to positive numbers in Tiers 1 or 2.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	Integer, exponent
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given an exponent, student will expand the expression to use properties of integer exponents to produce equivalent expressions.
	Tier 2 Given an exponent, student will solve the expression to use properties of integer exponents to produce equivalent expressions.
	Tier 3 Given an equation with exponents, student will solve the expression to use properties of integer exponents to produce equivalent expressions.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Which expression is equivalent to 2^3? **A. $2 \times 2 \times 2$** B. 2×3 C. 3×3

Reporting Category	Number Sense and Computation
Content Connector	**MA.8.NS.4.a.1:** Solve equations using properties of square roots.
IAS Standard	**MA.8.NS.4:** Use square root symbols to represent solutions to equations of the form $x^2 = p$, where p is a positive rational number.
Content Limits	Limited to whole number solutions in Tier 2. No irrational solutions allowed.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Students will solve for the square root of x, using properties of square roots.
	Tier 2 Students will solve for x for $x^2 = p$, using properties of square roots.
	Tier 3 Students will solve for the square root of x by numeric input, using properties of square roots.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Here is an equation. $\sqrt{x} = 4$ What is x? A. 2 B. 8 **C. 16**

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.1:** Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway, rather than simply jumping into a solution attempt. They consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” and "Is my answer reasonable?" They understand the approaches of others to solving complex problems and identify correspondences between different approaches. Mathematically proficient students understand how mathematical ideas interconnect and build on one another to produce a coherent whole**.**
Content Limits	Below grade level curriculum. Limited to whole numbers. Limit outcome to 20 in Tiers 2 and 3.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	4
Evidence Statements	
Evidence Statements	**Tier 1** Student will know if a given option is an entry point to a problem.
	Tier 2 Student will be able to determine if an answer is reasonable.
	Tier 3 Student will persevere in solving a problem.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 2	Michael has 3 toys. His friend gives him *x* more toys. Which expression will help Michael find how many toys he has now? **A. $3 + x$** B. $3x$ C. $x + x + x$

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.2:** Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
Content Limits	Tier 1: Solutions should be under 5. Tiers 2 and 3: Solutions should be under 12.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Student will be able to translate mathematical terms to symbols.
	Tier 2 Student will be able to reason using mathematical symbols.
	Tier 3 Student will be able to flexibly use different properties of operations.

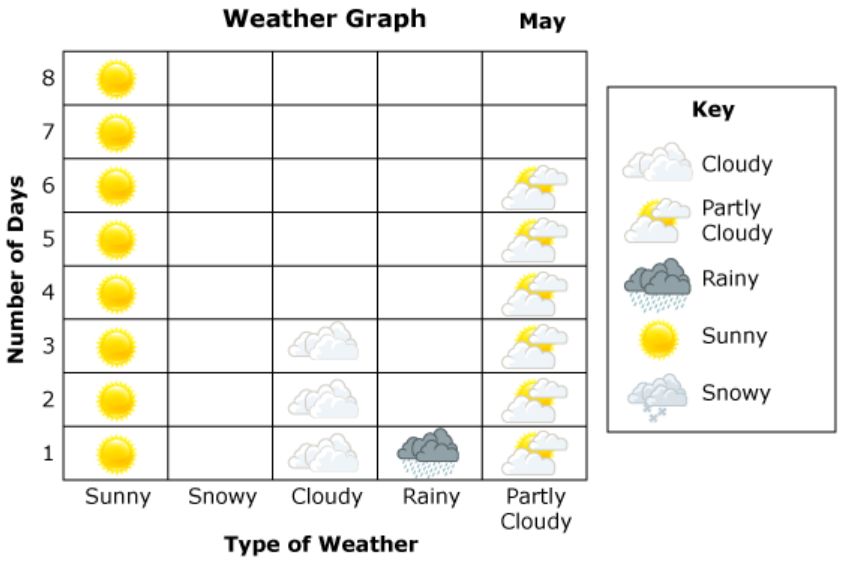
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 1	Abby, Zion and Mike share a pizza. When the bill arrives, they decide to split it equally. Which operation should they use? A. addition B. subtraction **C. division**

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.3:** Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They analyze situations by breaking them into cases and recognize and use counterexamples. They organize their mathematical thinking, justify their conclusions and communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. They justify whether a given statement is true always, sometimes, or never. Mathematically proficient students participate and collaborate in a mathematics community. They listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
Content Limits	assess reasoning about mathematics, not about reasoning about assumptions or conclusions related to a contextual situation; a context may be included, if the emphasis is on the mathematical reasoning
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	4

Evidence Statements	
Evidence Statements	**Tier 1** Student will determine the validity of an argument.
	Tier 2 Student will use facts, definitions, and formulas to identify a valid counterexample to an argument.
	Tier 3 Student will make a conjecture based on a pattern.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 1	Rosa measures the base and height of a right triangle to be 3 inches and 4 inches. She concludes that the hypotenuse is 7 inches long because 3 + 4 = 7. Is she correct? **A. No. The hypotenuse is equal to $\sqrt{(3^2 + 4^2)}$** B. Yes. The hypotenuse is equal to 3 + 4 C. No. The hypotenuse is equal to 3 * 4

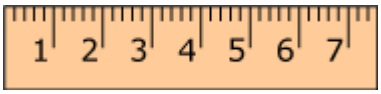
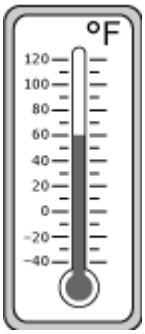
Updated: 07/19

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.4:** Model with mathematics. Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
Content Limits	Limited to content limits below rest of grade.
Allowable Stimulus Material	N/A
Context	Context required
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Given a model, students will identify the appropriate title.
	Tier 2 Given a model, students will determine the value of a category.
	Tier 3 Given a model, students will calculate the difference between two measurements.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 2	Joe records the weather for his town.  How many sunny days were there? A. 1 B. 6 **C. 8**

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.5:** Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students identify relevant external mathematical resources, such as digital content, and use them to pose or solve problems. They use technological tools to explore and deepen their understanding of concepts and to support the development of learning mathematics. They use technology to contribute to concept development, simulation, representation, reasoning, communication, and problem solving.
Content Limits	Tier 2: Length, weight, angle, or temperature measurements. Scale may contain only a single set of numbers (for example, inches but no centimeters). Tier 3: May include volume measurements from reading measuring cups, etc. No calculations required. Tier 3: Scale may include two values that the student must choose from (for example, both cups and ounces), but the numbers for both scales must be presented in those cases.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	ruler, protractor, scale, thermometer
Cognitive Complexity	3

Evidence Statements	
Evidence Statements	**Tier 1** Student will pick an appropriate tool for a given problem.
	Tier 2 Student will be familiar with appropriate external mathematical resources.
	Tier 3 Student will use technology to deepen their understanding of a given problem.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 1	Which tool should Max use to measure the length of his shoe lace? **A.**  **(Audio: a ruler) KEY** B.  (Audio: a scale) C.  (Audio: a thermometer)

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.6:** Attend to precision. Mathematically proficient students communicate precisely to others. They use clear definitions, including correct mathematical language, in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They express solutions clearly and logically by using the appropriate mathematical terms and notation. They specify units of measure and label axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and check the validity of their results in the context of the problem. They express numerical answers with a degree of precision appropriate for the problem context.
Content Limits	Content limits cannot exceed any other limit in grade.
Allowable Stimulus Material	N/A
Context	Context allowable
Recommended Response Mechanisms	Multiple Choice (MC) Table Match (TM)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	3
Evidence Statements	
Evidence Statements	**Tier 1** Student will be able to use mathematical language.
	Tier 2 Student will be able to explain the meanings of symbols chosen to solve a problem.
	Tier 3 Student will be able to use mathematical language and symbols to express solutions.

Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A
Sample Item	
Tier 2	Here is an expression. x^2 What does the expression mean? **A. to multiply a number by itself** B. to add a number to a number C. to divide 2 by a number

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.7:** Look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality. They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects.
Content Limits	No more than three types of objects in Tier 2.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	5
Evidence Statements	
Evidence Statements	**Tier 1** Student will be able to identify simple patterns.
	Tier 2 Student will be able to continue a pattern of 3D shapes, figures, and (multiplication) numeric patterns.
	Tier 3 Student will be able to continue a pattern of 3D shapes, figures, and (geometric) numeric patterns.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Here is a pattern. 2, 4, 8, 16, … What is the next term in the pattern? A. 24 **B. 32** C. 40

Reporting Category	Process Standards (aggregate reporting only)
Content Connector / IAS Standard	**PS.8:** Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated and look for general methods and shortcuts. They notice regularity in mathematical problems and their work to create a rule or formula. Mathematically proficient students maintain oversight of the process, while attending to the details as they solve a problem. They continually evaluate the reasonableness of their intermediate results.
Content Limits	Content limited to rest of grade.
Allowable Stimulus Material	N/A
Context	No context
Recommended Response Mechanisms	Multiple Choice (MC)
Construct-Relevant Vocabulary	N/A
Cognitive Complexity	6
Evidence Statements	
Evidence Statements	**Tier 1** Given a skip counting by fives sequence (e.g., 5, 10, 15), students will identify the rule used.
	Tier 2 Given a skip counting by twos sequence (e.g., 2, 4, 6, 8), students will identify the rule used.
	Tier 3 Given a geometric sequence, students will identify the rule used.
Accessibility and Accommodation Considerations	
Stimulus Graphic Limitations	Stimulus graphics will be limited to clear photos, illustrations, diagrams, tables, and charts that directly relate to the passage topic. Information contained within stimulus graphics is ineligible for assessment unless specifically prescribed by Content Connector and/or evidence statements.
Linguistic Complexity	To be determined after IDOE review
Reference Tools	N/A

Sample Item	
Tier 2	Here is a pattern. 2, 4, 6, 8, 10 What is the rule for the pattern? a. Add 1 **b. Add 2** c. Add 4