

Grade 7 - SBA Claim 1 Example Stems

This document takes publicly available information about the Smarter Balanced Assessment (SBA) in Mathematics, namely the Claim 1 Item Specifications, and combines and edits them down to hopefully be more useful for teachers and others. The SBA Consortium is not involved in producing this document, so editing choices do not reflect any guidance from the SBA Consortium.

The SBA uses evidence based design, viewing the assessment as eliciting evidence of student proficiency. That evidence is meant to support Claims, which in math are (to paraphrase):

1. A student understands **concepts** and can perform **procedures**.
2. A student can **solve problems**.
3. A student can **reason** (and critique the reasoning of others).
4. A student can analyze and **model real-world contexts** using mathematics.

These claims will be assessed in a roughly 40%-20%-20%-20% split. Given that previous assessments would heavily focus on procedures, while in this framework they constitute 20% as a focus (though of course are needed for items across all claims), this represents a significant shift in assessment.

This document only looks at Claim 1 about concepts and procedures. Items written for Claim can look much like the Example Stems below. At other Claims items can vary more widely, as one would expect for multistep problems and authentic reasoning or modeling contexts.

Claim 1 is divided into various Targets which correspond roughly to the Clusters within the Common Core State Standards in Mathematics. The items from different targets will be taken based on emphasis with [m] being major, [a] additional and [s] supporting.

Finally, in an era of anxiety about end-of-year assessment (which constitutes only part of the Smarter Balanced system), it should be said that these are offered primarily to promote teacher professional understanding. Practices such as using the Example Stems exclusively as learning targets are discouraged. SBA is designed as much as possible to assess authentic learning of mathematics as outlined in the Standards, so that authentic learning should guide instruction.

Ratios and Proportional Relationships

Target A [m]: Analyze proportional relationships and use them to solve real-world and mathematical problems. (DOK Level 2)

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

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

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

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

Response Type: Equation/Numeric

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

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

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

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

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

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

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

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

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

Example Stem 2: This diagram shows how much apple juice is mixed with carrot juice for a recipe.

Apple Juice:	1 cup	1 cup	$\frac{1}{2}$ cup
Carrot Juice:	1 cup	$\frac{1}{2}$ cup	

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

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

Stimulus: The student is presented with an equation of a proportional relationship.

Example Stem 1: For a drink recipe, the amount of papaya juice is proportional to the amount of carrot juice. This equation represents the proportional relationship between the number of quarts of papaya juice (p) and carrot juice (c) in a recipe.

$$2p = 8c$$

Enter the number of quarts of papaya juice used for 1 quart of carrot juice.

Rubric: (1 point) The student enters the correct number (e.g., 4; $\frac{5}{2}$).

Response Type: Equation/Numeric

Example Stem 1: Select **all** tables that represent a proportional relationship between x and y .

A.

x	0	1	2	3
y	0	2	4	6

B.

x	0	2	4	6
y	0	4	16	36

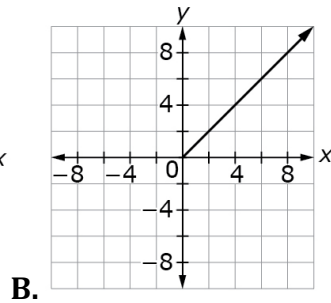
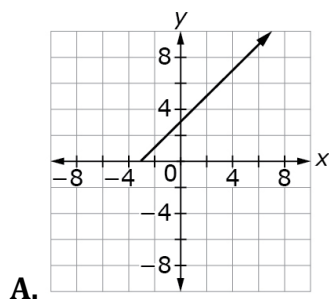
C.

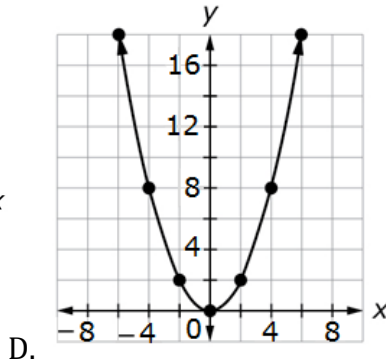
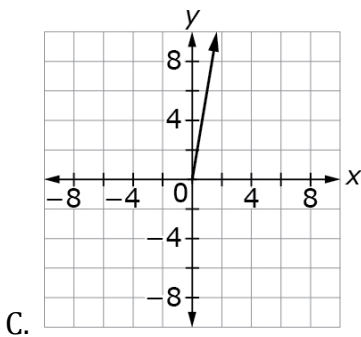
x	0	3	6	9
y	0	15	30	45

D.

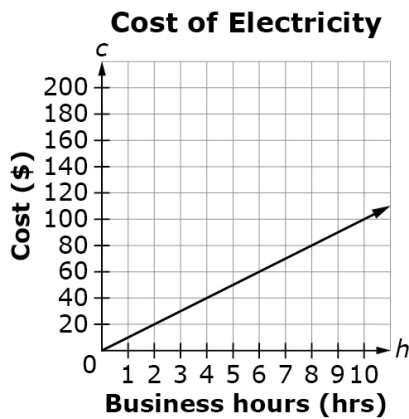
x	0	4	6	8
y	0	16	36	64

Example Stem: Select **all** the graphs that show a proportional relationship.



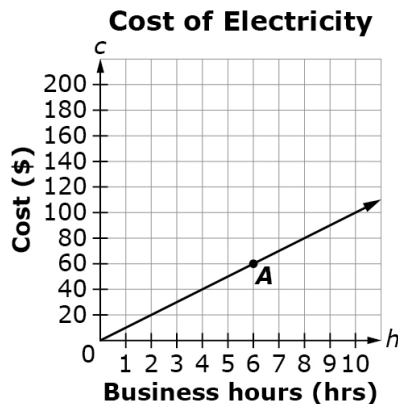


Example Stem 1: This graph shows a proportional relationship between the number of hours (h) a business operates and the total cost of electricity (c).



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

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



Select True or False for each statement about the graph.

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

Example Stem 1: Dave buys a baseball for \$15 plus an 8% tax. Mel buys a football for \$20 plus an 8% tax. Enter the difference in the amount Dave and Mel paid, including tax. Round your answer to the nearest cent.

Rubric: (1 point) Student gives the correct difference in the amount between David and Mel (e.g., 5.40).

Response Type: Equation/Numeric

Example Stem 2: A bicycle is originally priced at \$80. The store owner gives a discount and the bicycle is now priced at \$60. Enter the percentage discount for the cost of the bicycle.

Rubric: (1 point) Student gives the correct percentage discount (e.g., 25).

Response Type: Equation/Numeric

Example Stem 3: Dave has a 32 ounce energy drink. He drinks 10 ounces. Enter the percentage of ounces Dave has left from his energy drink. Round your answer to the nearest hundredth.

The Number System

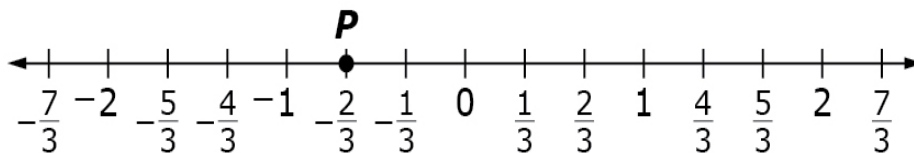
Target B [m]: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. (DOK Levels 1, 2)

TM1a

Stimulus: The student is presented with a scaled number line including a labeled point at a rational number.

Example Stem: What numbers are located exactly $\frac{5}{3}$ units from point P on the number line?

Use the Add Point tool to plot the location of these numbers on the number line.



Interaction: Add Point and Delete tools should be provided for students to plot points on the number line containing snap-to regions at every tic mark.

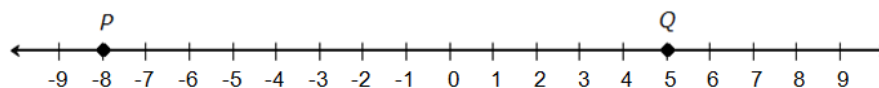
Rubric: (1 point) The student plots the exact location of both points (e.g., $-\frac{7}{3}$ and 1).

Response Type: Graphing

TM1b

Stimulus: The student is presented with a number line with two labeled points at least 3 units apart.

Example Stem: Select **all** expressions that show the distance between P and Q .



- A. $5 - (-8)$
- B. $5 + |-8|$
- C. $|-8 + 5|$
- D. $5 + (-8)$

Answer Choice: Answer choices should involve using absolute value signs, such as $|5+8|$. Distractors should include using a wrong operation, number, or sign(s).

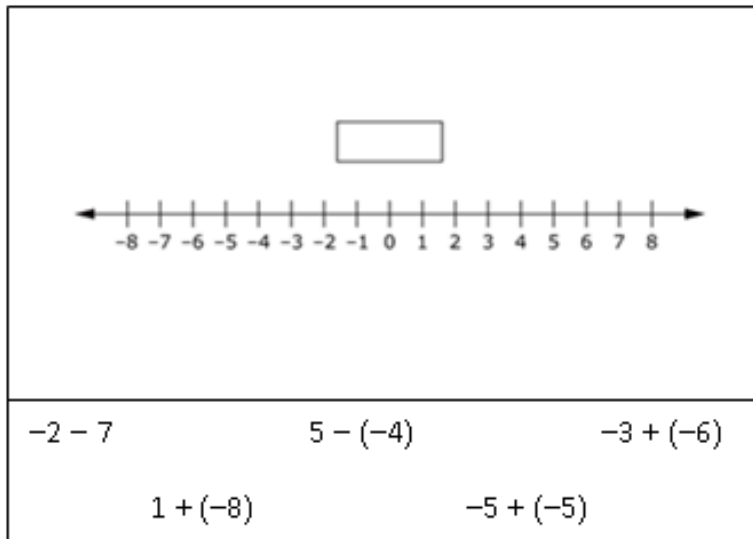
Rubric: (1 point) Student selects all correct expressions and no incorrect expressions (e.g., A and B).

Response Type: Multiple Choice, multiple correct response

TM1c

Stimulus: The student is presented with a scaled number line and an expression involving the sum or difference of two rational numbers in the same form.

Example Stem: Drag the expression into the box that has a sum or difference between -8 and 8 . You may use the number line and Add Arrow tool to model the problem. The number line will not be scored.



$-2 - 7$ $5 - (-4)$ $-3 + (-6)$

$1 + (-8)$ $-5 + (-5)$

Interaction: The student drags an expression to the answer box above the number line and may or may not use the Add Arrow tool and number line.

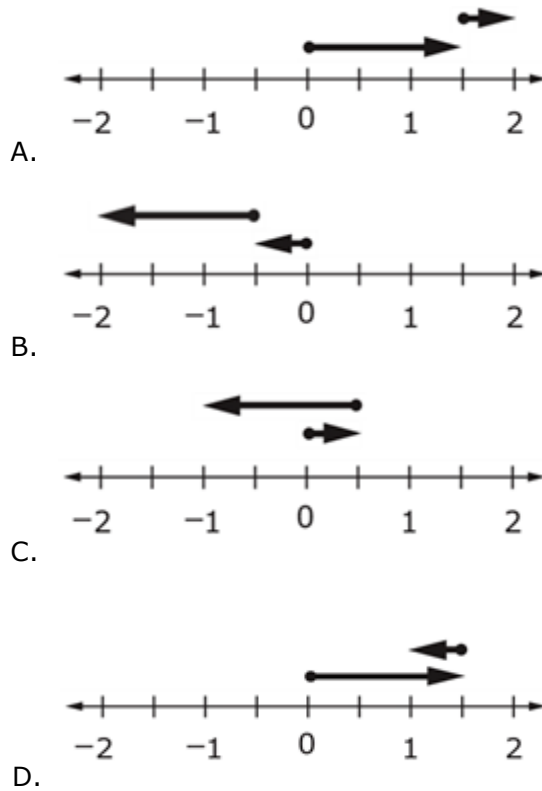
Rubric: (1 point) Student chooses the correct expression [e.g., $1 + (-8)$].

Response Type: Drag and Drop

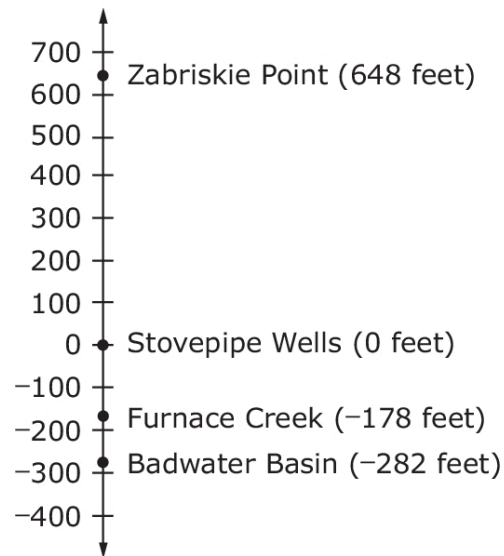
TM1d

Stimulus: The student is presented with a scaled number line and an expression involving the sum or difference of two rational numbers.

Example Stem: Which number line model represents the sum of $1\frac{1}{2} + (-\frac{1}{2})$?



Example Stem: The number line shows four elevations in Death Valley National Park.



Enter the difference, in feet, between the elevation at Zabriskie Point and Furnace Creek.

Example Stem: Enter the value of $\frac{3}{4} + \frac{7}{12} - (-4)$.

Example Stem: Enter the value of $\frac{3}{8}(-1.7)$.

Example Stem: Enter the decimal equivalent of $\frac{5}{8}$.

Example Stem: Enter the value of $\frac{3}{8}[-8 + 16 - (-2\frac{1}{2})]$.

Example Stem: Mark buys a wooden board that is $7\frac{1}{2}$ feet long. The cost of the board is \$0.50 per foot, including tax. What is the total cost, in dollars, of Mark's board?

Example Stem: Is the given expression equal to $-3(4 + 2b)$? Select Yes or No for each expression.

Expression	Yes	No
$-6b - 12$		
$6b - 12$		
$-12 + 2b$		

Example Stem: Select **all** values equal to $-\frac{4}{5}$.

- A. $\frac{-4}{-5}$
- B. $-\frac{-4}{-5}$
- C. $\frac{-4}{5}$
- D. $-\frac{-4}{5}$
- E. $\frac{4}{-5}$

Expressions and Equations

Target C [m]: Use properties of operations to generate equivalent expressions. (DOK Levels 1, 2)

Example Stem 2: Select the expression equivalent to $(2.1x + 4.3) - (-3x - 7)$.

- A. $-0.9x - 2.7$
- B. $-0.9x + 11.3$
- C. $5.1x - 2.7$
- D. $5.1x + 11.3$

Example Stem 2: Enter the value of n so that the expression $(-y + 5.3) + (7.2y - 9)$ is equivalent to $6.2y + n$.

Example Stem: Select **all** expressions equivalent to $-72x + 60$.

- A. $-12(6x - 5)$
- B. $-12(-6x - 5)$
- C. $6(-12x + 10)$
- D. $-6(-12x - 10)$

Example Stem 2: Enter the value of p so that the expression

$$\frac{5}{6} - \frac{1}{3}n \text{ is equivalent to } p(5 - 2n).$$

Example Stem 2: Which expression is equivalent to $-0.8(10.8x - 20 + 3.2x)$?

- A. $-11.2x + 16$
- B. $-11.2x - 16$
- C. $-8.64x - 16.8$
- D. $-8.64x + 16.8$

Example Stem: Enter the value of b when the expression $14.1x + b$ is equivalent to $4.7(3x - 3.5)$.

Example Stem 1: Select **all** expressions that are equivalent to $3x + 5(-4x + 12) - (x - 3)$.

- A. $-18x + 63$
- B. $18x - 63$
- C. $3x - 20x + 60 - x + 3$
- D. $3x + 20x + 60 - x - 3$

Target D [m]: Solve real-life and mathematical problems using numerical and algebraic expressions and equations. (DOK Levels 1, 2)

Example Stem: Place each numeric expression into one of the empty cells to make true equations.

$3.125 + \frac{15}{20}$	$=$	
$\frac{1.25 + 1.75}{0.75}$	$=$	
$(4)\left(\frac{1}{2}\right) + \frac{1}{4}$	$=$	
$\frac{(1.5) 7.5}{2.5}$	$=$	
$\frac{2.5}{5} + 6.75 - \frac{25}{5}$ $2.5 + \frac{4}{2}$ $3\frac{1}{8} + \frac{3}{4}$ $3.15 + \frac{21.25}{25}$		

Interaction: Students drag and drop expressions into the table. One column of the table has expressions in it already. Each expression may only be used once.

Rubric: (1 point) The student makes true equations by dragging all four expressions into the cells

$$\left(\text{e.g., } 3\frac{1}{8} + \frac{3}{4}, 3.15 + \frac{21.25}{25},$$

$$\frac{2.5}{5} + 6.75 - \frac{25}{5}, 1.5 + 1 + \frac{4}{2}\right).$$

Example Stem 1: A coach buys a uniform (u) and a basketball for each of the 15 players on the team. Each basketball costs \$9.00. The coach spends a total of \$420 for uniforms (u) and basketballs.

Enter an equation that models the situation with u , the cost of 1 uniform.

Rubric: (1 point) Student enters a correct equation (e.g., $15u + 135 = 420$).

Example Stem 2: A coach buys a uniform and a basketball for each of the 15 players on the team. Each basketball costs \$9. The coach spends a total of \$420 for uniforms and basketballs.

Enter the cost of 1 uniform. Round to the nearest cent.

Example Stem 1: Linda has \$26. She earns \$6 for 1 hour (h) of babysitting. She wants to buy a ski pass for \$80.

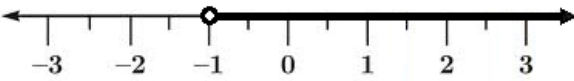
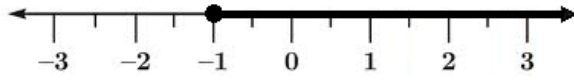
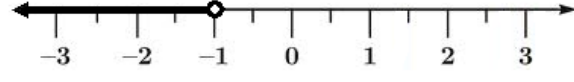
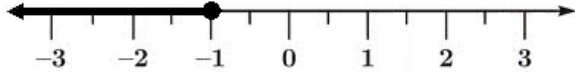
Enter an inequality that shows the number of hours (h) Linda could babysit to be able to buy the ski pass.

Rubric: (1 point) The student enters a correct inequality (e.g., $6h + 26 \geq 80$).

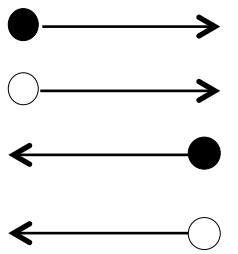
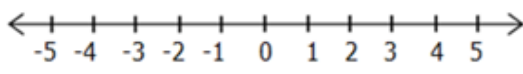
Example Stem 2: Linda has \$26. She earns \$6 for 1 hour of babysitting. She wants to buy a ski pass for \$80.

Enter the minimum number of hours Linda must babysit to be able to buy the ski pass.

Example Stem: Which number line shows the solution to the inequality $-3x - 5 < -2$?

- A. 
- B. 
- C. 
- D. 

Example Stem: Drag the correct arrow to the number line to represent the solution of the inequality $3x + 7 > 13$.

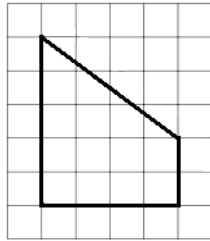
	
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Geometry

Target E [a]: Draw, construct, and describe geometrical figures and describe the relationships between them. (DOK Levels 1, 2)

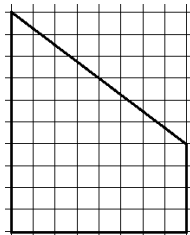
Stimulus: The student is presented with a simple polygon on a grid and a scale factor.

Example Stem: A scale factor of 2 is applied to this figure. Use the Connect Line tool to draw the resulting figure.



Interaction: The student is given the Connect Line, Add Point, and Delete tools to draw the polygon on a grid.

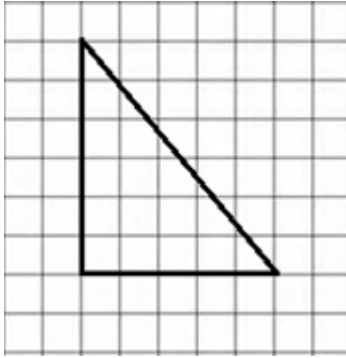
Rubric: (1 point) Student draws the correct figure with correct dimensions. Allow for correct scoring regardless of orientation of the figure (see one example of a correct response below).



Response Types: Graphing

Stimulus: The student is presented with a polygon (square, rectangle, parallelogram, or right triangle) on a grid and the scale factor at which it was created.

Example Stem: The scale drawing of the right triangle shown was drawn using a scale factor of $\frac{1}{20}$.



Each square on the grid is 3 units in length. What is the area of the actual figure, in square units, on which this scale drawing is based?

Rubric: (1 point) Student enters the correct area (e.g., 2700).

Response Type: Equation/Numeric

Example Stem: Figure A is a scale image of Figure B, as shown.

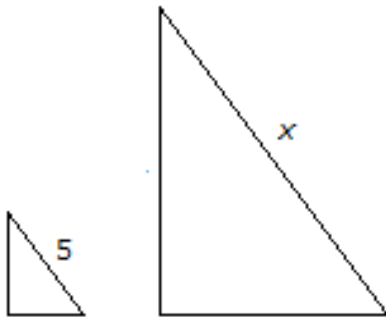


Figure A

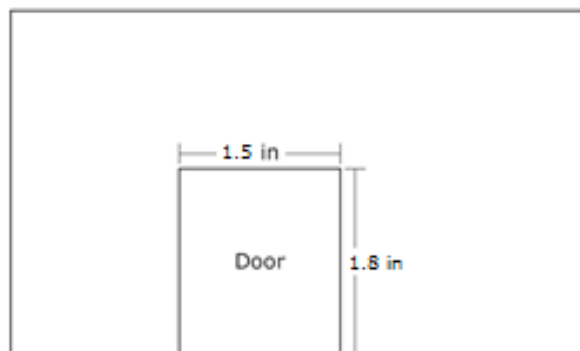
Figure B

The scale that maps Figure A onto Figure B is $1 : 3\frac{1}{2}$. Enter the value of x .

Example Stem: The front side of a playhouse is shown in this scale drawing. The height of the door in the drawing is 1.8 inches.

The scale that maps the drawing to the actual playhouse is 1 inch to 2.5 feet.

Scale Drawing of the Playhouse



Using the scale given, enter the actual height of the playhouse door, in feet.

Example Stem: A triangle has a 45° angle, a 60° angle, and a side 3 centimeters in length.

Select True or False for each statement about this type of triangle.

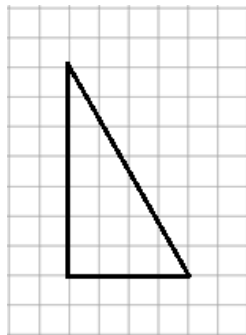
Statement	True	False
The triangle might be an isosceles triangle.		
The triangle must be an acute triangle.		
The triangle must contain an angle measuring 75° .		

Rubric: (1 point) Student selects True or False for each statement (e.g., F, T, T).

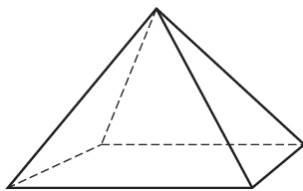
Example Stem: Use the Connect Line tool to draw a triangle with a 90° angle, a side with a length of 7 units, and a side with a length of 4 units. Each square on the grid is 1 unit in length.

Interaction: The student is given the Connect Line, Add Point, and Delete tools to generate line segments on a grid.

Rubric: (1 point) The student correctly constructs the figure described.



Example Stem: This figure is a square pyramid.



Select **all** figures that can be formed by a vertical slice perpendicular to the base of the square pyramid.

- A. Isosceles Trapezoid
- B. Line segment
- C. Square
- D. Triangle

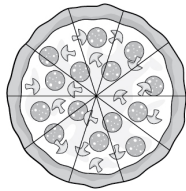
Answer Choices: Answer choices will be names of polygons and can also include line segment as a choice.

Rubric: (1 point) Student selects the correct figures (e.g., A, B, and D).

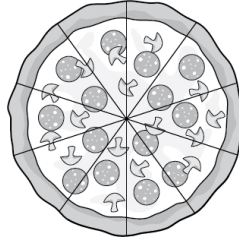
Target F [a]: Solve real-life and mathematical problems involving angle measure, area, surface area, and volume. (DOK Levels 1, 2)

Example Stem 2: Jill buys two circular pizzas.

The small pizza has an 8-inch diameter.



The medium pizza has a 12-inch diameter.



How much greater, in square inches, is the area of the medium pizza than the small pizza? Round your answer to the nearest hundredth.

Rubric: (1 point) The student enters the correct area, within a range of correct values (e.g., 62.80 – 62.90).

Example Stem: The circumference of a circle is 31.4 inches.

Enter the radius of the circle, in inches. Round your answer to the nearest whole number.

Rubric: (1 point) The student enters the correct radius (e.g., 5).

Stimulus: The student is presented with the radius or diameter of a circle in a real-life or mathematical context.

Example Stem: The radius of a circle is 7 centimeters.

Enter the circumference of the circle, in centimeters. Round your answer to the nearest hundredth.

Rubric: (1 point) The student enters the correct circumference in a range of correct values (e.g., 43.96 - 44.03).

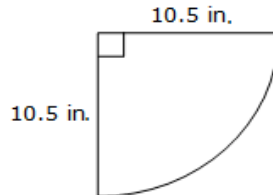
Stimulus: The student is presented with the circumference of a circle in a real-world or mathematical context.

Example Stem: The circumference of a circle is 31.4 inches.

Enter the radius of the circle, in inches. Round your answer to the nearest whole number.

Stimulus: The student is presented with the radius, diameter or circumference of a circle in a real-life or mathematical context.

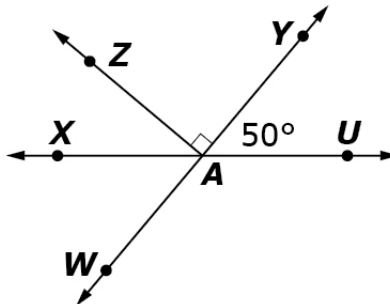
Example Stem 1: A corner shelf has a radius of 10.5 inches and represents $\frac{1}{4}$ of a circle, as shown.



Enter the area of the shelf, in square inches. Round your answer to the nearest hundredth.

Stimulus: The student is given a figure involving supplementary, complementary, vertical, and/or adjacent angles that contains a missing angle measure.

Example Stem: Lines XU and WY intersect at point A .

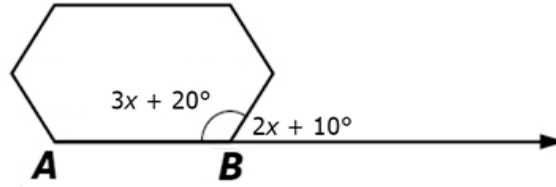


Based on the diagram, determine whether each statement is true. Select True or False for each statement.

Statement	True	False
An angle supplementary to $\angle WAU$ measures 50° .		
An angle complementary to $\angle WAX$ measures 40° .		
The angle vertical to $\angle YAU$ measures 50° .		

Stimulus: The student is provided a figure showing supplementary, complementary, vertical, and/or adjacent angles.

Example Stem: The base of a hexagon lies on ray AB as shown.

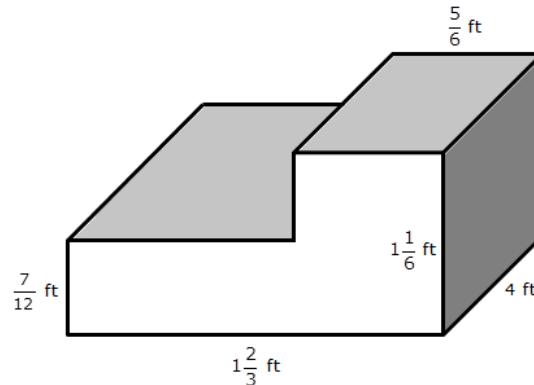


Based on the diagram, determine whether each equation is true. Select True or False for each statement.

Statement	True	False
$3x + 20^\circ = 110^\circ$		
$2x + 10^\circ = 70^\circ$		
$5x + 30^\circ = 90^\circ$		

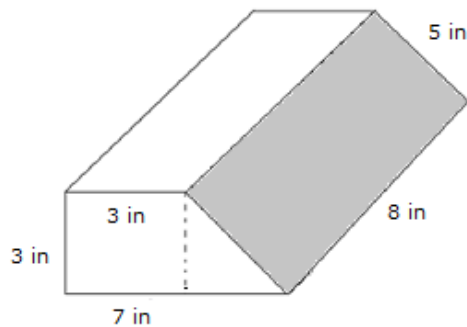
Stimulus: The student is presented with three-dimensional objects composed of cubes and/or right prisms.

Example Stem 1: The figure shows a set of concrete stairs to be built.



Enter the amount of concrete, in cubic feet, needed to build the stairs. Round your answer to the nearest hundredth.

Example Stem 3: The figure shows the dimensions for a package to be shipped.



Enter the minimum amount of wrapping paper, in square inches, needed to cover the package. Round your answer to the nearest whole inch.

Statistics and Probability

Target G [s]: Use random sampling to draw inferences about a population. (DOK Levels 1, 2)

Stimulus: The student is presented with a context where a sample is taken from a population.

Example Stem: David wants to estimate the number of students from his seventh grade class whose favorite subject is math. He needs to create a random sample of students. How should David collect his sample data?

- A. David should ask 20 students in a math class.
- B. David should ask 20 students on a school bus.
- C. David should ask 20 students in seventh grade.
- D. David should ask 20 students from the entire school.

Answer Choices: Answer choices should be statements relating to samples that represent the population. Distractors should include statements where the sample does not represent the population such as biased samples, or samples that are too general.

Example Stem: A representative sample of 50 students from a high school is surveyed. Each student is asked what science class he or she is taking. The table shows the responses.

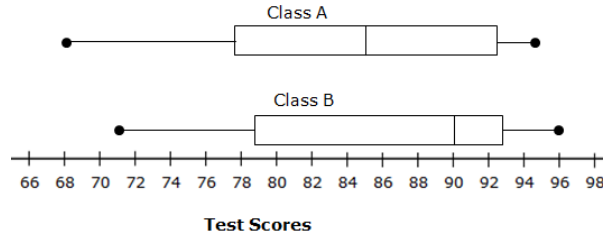
Science Class	Number of Students
Physics	6
Chemistry	10
Biology	18
Earth Science	4
Health Science	12

Select **all** the statements about the students at the high school that are valid based on the survey results.

- A. Twice as many students are taking Health Science than are taking Physics.
- B. 20% of students are taking Chemistry.
- C. In a group of 25 students, it is expected that 4 of the students are taking Earth Science.
- D. In a group of 150 students, it is expected that 18 of the students are taking Physics.

Target H [a]: Draw informal comparative inferences about two populations. (DOK Level 2)

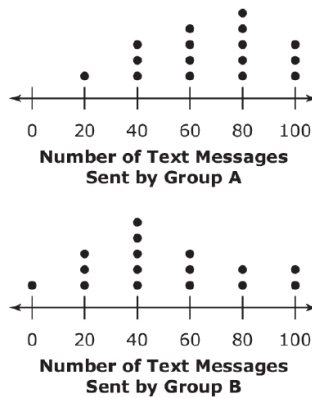
Example Stem: The box plot shows a summary of test scores for Class A and Class B on the same exam. Both classes have the same number of students.



Determine whether each statement is true based on these box plots. Select True or False for each statement.

Statement	True	False
In each class, at least 25% of students scored below 80 on the test.		
The median test score of Class B is 5 points less than the median test score of Class A.		
In each class, more than 25% of students have test scores greater than 90.		

Example Stem: These dot plots show the number of daily text messages sent by two different groups of students.



Example Stem 1: How many students in Group B sent **fewer** text messages than the mean number of text messages sent by Group A?

Example Stem 3: How much **greater** is the median number of text messages sent by Group A than the median number of text messages sent by Group B?

Example Stem 4: What is the difference between the mean absolute deviation of the number of text messages sent by the two groups?

Rubric: (1 point) Student enters the correct value (e.g., 12; 17.5; 30; 3.75).

Target I [s]: Investigate chance processes and develop, use, and evaluate probability models. (DOK Levels 1, 2)

Example Stem: This table shows outcomes of a spinner with 3 equal sections colored orange, blue, and white.

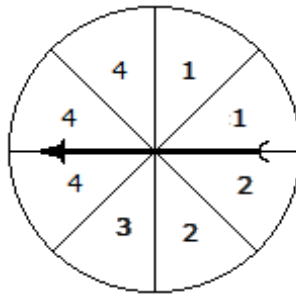
Section	Outcomes
Orange	30
Blue	34
White	36

Based on the outcomes, enter the number of times the arrow is expected to land on the orange section if it is spun 20 times.

Rubric: (1 point) Student enters the correct prediction (e.g., 6).

Stimulus: The student is presented with a problem situation that can be modeled by a uniform probability model.

Example Stem: This spinner is divided into 8 equal-sized sections.



Enter the probability of the arrow landing on a section labeled 2 on the first spin.

Rubric: (1 point) Student enters the correct probability, which is a rational number within 0–1 (e.g., 0.25 or equivalent numbers).

Example Stem: This table shows the results of randomly selecting colored marbles from a bag 20 times.

	Red	Yellow	Blue	Orange	Purple	Green
Number of Times Selected	7	4	3	1	0	5

Based on these results, enter the expected probability of selecting a red marble from the bag in one attempt.

Example Stem 2: Two number cubes, each with faces labeled 1 through 6, are rolled at the same time.

Enter the probability that both number cubes have the same number facing up in one roll.