# Grade 4 - 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.

## Number and Operations in Base Ten

Target C [m]: Understand the place value system.

**Example Stem 1:** Enter 1000 as a power of 10.

**Example Stem 2:** Enter the power of 10 that makes an expression equivalent to 5000.

5 x 🗆

**Rubric:** (1 point) The student enters the correct value (e.g., 10<sup>3</sup>; 10<sup>3</sup>). **Response Type:** Equation/Numeric

Example Stem: Which expression is equal to 473.923?

A.  $(4 \times 100) + (7 \times 10) + (3 \times 1) + (9 \times \frac{1}{1}) + (2 \times \frac{1}{10}) + (3 \times \frac{1}{100})$ B.  $(4 \times 100) + (7 \times 10) + (3 \times 1) + (9 \times 10) + (2 \times 100) + (3 \times 1,000)$ C.  $(4 \times 100) + (7 \times 10) + (3 \times 1) + (9 \times \frac{1}{10}) + (2 \times \frac{1}{100}) + (3 \times \frac{1}{1000})$ D.  $(4 \times 100,000) + (7 \times 10,000) + (3 \times 1,000) + (9 \times 100) + (2 \times 10) + (3 \times 1)$ 

**Example Stem 2:** Enter a number equal to the value of the expression.  $(4 \times 100) + (3 \times 1) + (2 \times \frac{1}{100}) + (7 \times 10) + (9 \times \frac{1}{10}) + (3 \times \frac{1}{1000})$ **Response Type:** Equation/Numeric

**Example Stem:** Determine whether each expression is equivalent to 638.4. Select Yes or No for each expression.

	Yes	No
63 tens + 8 ones + 4 tenths		
63 hundreds + 8 ones + 4 tenths		
6 hundreds + 3 tens + 84 tenths		
6 hundreds + 38 ones + 4 tenths		

**Example Stem 2:** Enter the symbol (>, <, or =) that correctly completes this comparison.  $0.03 \square 0.3$ 

**Example Stem:** Select the symbol (>, <, or =) that correctly completes each comparison. Click in the table to respond.

	^	<	Π
187.36 <u>?</u> 187.350			
0.03 <u>?</u> 0.3			
20.7 <u>?</u> 20.700			
80.742 <u>?</u> 807.2			

**Example Stem:** Round 45.643 to the nearest hundredth. Enter your answer in the response box.

**Target D: [m]** Perform operations with multi-digit whole numbers and with decimals to hundredths. (DOK 1, 2)

Stimulus: The student is presented with a horizontal multiplication problem.

**Example Stem:** Enter the product.  $4 \times 39$ 

**Example Stem:** Enter the product.

**Example Stem:** Enter the quotient.  $25\overline{)3375}$ **Response Type:** Equation/Numeric

Example Stem: Which equation has the same unknown value as

- A. 228 × □ = 12
- B. 12 × □ = 228
- C. □ ÷ 12 = 228
- D. 🗌 ÷ 228 = 12

**Example Stem:** Enter the unknown value in the equation.

345 ÷ □ = 69

**Example Stem 1:** Enter the number that makes the equation true.

 $\frac{48}{4} = \frac{12}{4} + \frac{\Box}{4}$ 

**Example Stem 3:** Enter the number that makes the equation true.

 $\frac{3245}{15} = \frac{3000}{15} + \frac{\Box}{15} + \frac{90}{15} + \frac{5}{15}$ 

**Example Stem:** Enter the sum. 16 + 5.67 + 8.3

**Example Stem:** Enter the difference. 20.50 - 3.65

**Example Stem:** Enter the product. 7.86 × 3

**Example Stem:** Enter the quotient. 8.40 ÷ 5

**Example Stem:** Which equation has the same unknown value as

33.74 - 18.9 = □? A.  $18.9 + \Box = 33.74$ В.  $33.74 + \Box = 18.9$ C.  $\Box - 33.74 = 18.9$ D.  $\Box - 18.9 = 33.74$ 

**Example Stem 2:** Enter the unknown value in the equation.

 $\Box - 18.9 = 33.74$ 

**Example Stem:** Which expression is equal to  $0.47 \times 0.08$ ?

Α.	$\frac{47}{10}$ ×	$\frac{8}{10}$
В.	$\frac{47}{10}$ ×	8
C.	$\frac{\frac{10}{47}}{100}$ >	$< \frac{8}{10}$
D.	$\frac{\frac{47}{47}}{100}$	$< \frac{\frac{10}{8}}{100}$

**Example Stem:** Which equation shows a correct strategy and product for the expression shown?

 $0.4 \times 0.8$ 

Α.	$\frac{4}{10} \times \frac{8}{10} = \frac{32}{10}$
В.	$\frac{4}{10} \times \frac{8}{10} = \frac{32}{100}$
C.	$\frac{4}{100} \times \frac{8}{100} = \frac{32}{100}$
D.	$\frac{\frac{4}{100}}{\frac{4}{100}} \times \frac{\frac{8}{100}}{\frac{8}{100}} = \frac{\frac{32}{32}}{\frac{10,000}{10,000}}$

**Example Stem:** Which expression is equal to 16.25 ÷ 2.5?

Α.  $1.625 \div 25$ В. 16.25 ÷ 25 C. 162.5 ÷ 25 D. 1625 ÷ 25

## **Number and Operations - Fractions**

**Target E [m]**: Use equivalent fractions as a strategy to add and subtract fractions. (DOK 1, 2)

**Example Stem 1:** Enter the sum.  $\frac{2}{10} + \frac{30}{100}$ 

**Example Stem 2:** Enter the sum.  $\frac{8}{6} + \frac{3}{12}$ 

**Example Stem 3:** Enter the sum.  $\frac{3}{4} + 1\frac{3}{5}$ 

Response Type: Equation/Numeric

**Example Stem 1:** Enter the difference.  $\frac{6}{10} - \frac{20}{100}$ 

**Example Stem 2:** Enter the difference.  $\frac{15}{12} - \frac{3}{4}$ 

**Example Stem 3:** Enter the difference.  $2\frac{7}{9} - \frac{3}{8}$ 

Response Type: Equation/Numeric

**Example Stem:** Which set of steps shows a correct strategy and solution for subtracting  $1\frac{3}{4} - \frac{1}{3}$ ?

A. $\frac{3}{4 \times 3} - \frac{1}{3 \times 4}$	$B.  \frac{7}{4 \times 3} = \frac{1}{3 \times 4}$	C. $\frac{7 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4}$	D. $\frac{7 \times 3}{4 \times 3} - \frac{1 \times 3}{3 \times 4}$
$=\frac{3}{12}-\frac{1}{12}$	$=\frac{7}{12}-\frac{1}{12}$	$=\frac{21}{12}-\frac{4}{12}$	$=\frac{21}{12}-\frac{3}{12}$
$=\frac{2}{12}=\frac{1}{6}$	$=\frac{6}{12}=\frac{1}{2}$	$=\frac{17}{12}=1\frac{5}{12}$	$=\frac{18}{12}=1\frac{6}{12}=1\frac{1}{2}$

**Example Stem:** David used  $2\frac{1}{4}$  feet of cloth to make a shirt. He also used  $3\frac{1}{3}$  feet to make a scarf. Which expression could be used to correctly determine the amount of cloth, in feet, David used altogether?

A.  $5 + \frac{1}{12}$ B.  $5 + \frac{2}{7}$ C.  $2 + 3 + \frac{1}{12} + \frac{1}{12}$ D.  $2 + 3 + \frac{3}{12} + \frac{4}{12}$  **Example Stem:** Sara has  $1\frac{3}{4}$  feet of cloth. She used  $\frac{1}{3}$  foot to make a bow. Which expression could be used to correctly determine the amount of cloth, in feet, that remains?

A.  $1 - \frac{3}{12} - \frac{1}{12}$ B.  $1 - \frac{9}{12} - \frac{4}{12}$ C.  $1 + \frac{3}{12} - \frac{1}{12}$ D.  $1 + \frac{9}{12} - \frac{4}{12}$ 

**Example Stem:** Which expression is equivalent to  $2 - \frac{1}{3} + \frac{2}{5}$ ?

A. 
$$\frac{2}{15} - \frac{1}{15} + \frac{2}{15}$$
 C.  $\frac{17}{15} - \frac{7}{15} + \frac{8}{15}$   
P.  $\frac{2}{15} - \frac{5}{15} + \frac{6}{15}$  D.  $\frac{30}{5} + \frac{6}{15}$ 

B. 
$$\frac{---++-}{15}$$
 D.  $\frac{---++-}{15}$  D.  $\frac{---++--}{15}$  D.  $\frac{---++---}{15}$ 

**Example Stem 1:** Enter the number that makes the equation true.

 $1\frac{3}{4} + 1\frac{1}{3} = 1\frac{1}{12} + 1\frac{4}{12}$ 

**Example Stem 2:** Enter the number that makes the equation true.

 $1\frac{3}{4} + 1\frac{1}{3} = 1 + 1 + \frac{1}{12} + \frac{4}{12}$ 

**Target F [m]:** Apply and extend previous understandings of multiplication and division to multiply and divide fractions. (DOK 1, 2)

**Example Stem:** Which expression is equal to  $\frac{3}{4}$ ?

- A. 3 × 4
- B. 4 × 3
- C. 4 ÷ 3
- D. 3 ÷ 4

**Example Stem:** An art teacher divided 22 ounces of beads equally among 6 groups of students.

How many ounces of beads did each group receive?

A. 
$$\frac{1}{16}$$
 ounce  
B.  $\frac{1}{28}$  ounce  
C.  $\frac{6}{22}$  ounce  
D.  $\frac{22}{6}$  ounces

**Example Stem:** John has 25 ounces of juice. He pours an equal amount of juice into 7 cups.

Enter the number of ounces of juice in each cup.

Example Stem: Which fraction model best represents

 $4 \times \frac{2}{3}?$ 



**Example Stem:** Cherrytown Park is in the shape of a rectangle.

- The width of the park is  $\frac{1}{2}$  mile. The length of the park is  $\frac{5}{6}$  mile.



**Example Stem:** Enter a positive value for b that makes this statement true:  $5 \times b$  is less than 5 but greater than 0.

**Example Stem:** Enter a positive value for b that makes this statement true:  $5 \times b$  is greater than 5 but less than 10.

**Rubric:** (1 point) The student enters a correct value in the given range (e.g.,  $\frac{1}{2}$ ;  $1\frac{1}{2}$ ).

**Example Stem:** Julie bikes  $6\frac{2}{3}$  miles along the river trail on Saturday. Greg swims  $\frac{3}{4}$ of that distance. Enter the distance, in miles, that Greg swims.

**Example Stem:** Lisa is painting her kitchen and bathroom.

- She uses 4 gallons of paint in the kitchen.
- She uses  $\frac{2}{3}$  of that amount in the bathroom.
- The shaded portions in this model represent the amount of paint she uses in the bathroom.

Enter the amount of paint, in gallons, Lisa uses to paint the bathroom.

**Example Stem:** Ryan has  $\frac{1}{2}$  pound of chocolate. He divides it into 4 equal portions.

Enter the amount of chocolate, in pounds, in each portion.

## **Measurement and Data**

**Target G [s]:** Convert like measurement units within a given measurement system. (DOK 1)

**Example Stem:** Enter the number of **inches** equal to 7 yards.

**Example Stem:** Enter the number of **millimeters** equal to 7 centimeters.

**Example Stem:** Enter the number of **ounces** equal to  $7\frac{1}{2}$  pounds.

**Example Stem:** Enter the number of **grams** equal to 24.7 kilograms.

**Example Stem:** Enter the number of **cups** equal to  $2\frac{1}{2}$  gallons.

**Example Stem:** Enter the number of **milliliters** equal to 4.6 liters.

**Example Stem:** Enter the number of **minutes** equal to  $\frac{3}{4}$  hour.

**Rubric:** (1 point) The student correctly converts from one measurement to another measurement.

**Response Type:** Equation/Numeric

#### Target H [s]: Represent and interpret data. (DOK 2)

**Example Stem:** Ten students in a class recorded the distances they ran, in miles, yesterday.

 $\frac{7}{8}$ ,  $\frac{3}{4}$ , 1,  $\frac{3}{4}$ , 1, 1,  $\frac{1}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\frac{1}{8}$ Click above the tick marks to complete the line plot that displays the data.



**Rubric:** (1 point) The student correctly completes a line plot that displays all 10 data points (e.g., shown below). **Response Type:** Hot Spot



**Example Stem:** Ten students in a class recorded the distances they ran, in miles, yesterday.

$$\frac{7}{8}$$
,  $\frac{3}{4}$ , 1,  $\frac{3}{4}$ , 1, 1,  $\frac{1}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\frac{1}{8}$ 

Select the line plot that correctly displays this data.



**Example Stem:** The line plot shows the distance, in miles, that five students ran in a race.



Enter the total distance, in miles, these students ran in the race.

**Target I [m]:** Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition. (DOK 1, 2)

**Example Stem:** The layers of a rectangular prism are shown to the right of the prism.



Enter the volume, in cubic centimeters, of the rectangular prism.

**Example Stem:** Elias is building a rectangular prism. The bottom layer of the rectangular prism is shown.





He builds a prism that has 4 layers. Enter the volume, in cubic centimeters, of the **completed** rectangular prism.

**Example Stem:** The rectangular prism shown is solid.



Enter the volume, in cubic centimeters, of the rectangular prism

**Example Stem:** Taryn will finish stacking cubes to create a solid rectangular prism. The completed prism will be 4 centimeters high, 3 centimeters wide, and 5 centimeters long.



Enter the volume, in cubic centimeters, of the **completed** rectangular prism.

**Example Stem:** Sam has a small box in the shape of a right rectangular prism.

- The area of the base of the box is 18 square centimeters.
- The height of the box is 4 centimeters.





Enter the volume, in cubic centimeters, of Sam's box.

**Example Stem:** Danny has a fish tank, in the shape of a right rectangular prism. The edge lengths of the prism, in inches, are 8, 13, and 20.



Enter the volume, in cubic inches, of the fish tank.

**Example Stem:** Right rectangular prisms A and B are combined to create this model.

- The dimensions of Prism A are 4 by 3 by 20 millimeters.
- The dimensions of Prism B are 6 by 9 by 4 millimeters.



Enter the combined volume, in cubic millimeters, of Prisms A and B.

**Example Stem:** The right rectangular prism shown has a length 6 centimeters, width 3 centimeters, and height 4 centimeters.



Determine whether each equation can be used to find the volume (V) of this prism. Select Yes or No for each equation.

	Yes	No
$V = 18 \times 4$		
$V = (6 + 3) \times 4$		
$V = 6 \times 3 \times 4$		
$V = 9 \times 4$		
$V = 6 \times (3 \times 4)$		

## Geometry

**Target J [a]:** Graph points on the coordinate plane to solve real-world and mathematical problems. (DOK 1)

**Example Stem:** Use the graph to answer the question.



Which point is located at (5, 2)?

**A**. Point *A* **B**. Point *B* **C**. Point *C* **D**. Point *D* 

**Example Stem:** Use the graph to answer the question.







**Example Stem:** Use the graph to answer the question.



Which set of ordered pairs shows the coordinates of points A, B, and C?

A. (7, 2), (6, 5), (3, 4) B. (7, 2), (5, 6), (3, 3) C. (2, 7), (5, 6), (4, 3) D. (2, 7), (6, 5), (4, 3)

**Example Stem:** A student plots the following points:



**Example Stem:** The graph shows the locations of Nina's home, the park, her school, and the post office.



Select the numbers to create the coordinate pair that represents the location of the post office.



**Rubric:** (1 point) The student selects the correct numbers for the coordinate pair indicated [e.g., (4, 6)]. **Response Type:** Hot Spot

Example Stem: Use the graph to complete the problem.



Drag numbers from the palette to show the coordinates of points *A*, *B*, and *C*. Point *A*:  $(\Box, \Box)$  Point *B*:  $(\Box, \Box)$  Point *C*:  $(\Box, \Box)$ 

**Rubric:** (1 point) The student correctly creates all three coordinate pairs [e.g., Point *A*: (2, 7), Point *B*: (5, 6), Point *C*: (4, 3)]. **Response Type:** Drag and Drop

**Example Stem 3:** Use the Add Point tool to plot each point on the coordinate plane. Part A: Plot the point  $(1\frac{1}{4}, \frac{3}{4})$ . Part B: Plot the point  $(1\frac{1}{2}, 1\frac{1}{4})$ . Part C: Plot the point  $(\frac{3}{4}, \frac{1}{2})$ .

Rubric: (1 point) The student correctly plots all points on the coordinate grid.

# **Target K [a]:** Classify two-dimensional figures into categories based on their properties. (DOK 2)

**Example Stem:** All parallelograms have two pairs of opposite, parallel, equal-length sides.

Determine whether each polygon shown is also a parallelogram. Select Yes or No for each polygon.



**Example Stem:** Determine whether both polygons in each pair have opposite sides that are parallel and equal.

Select Yes or No for each pair of polygons.



**Rubric:** (1 point) The student correctly identifies if the given pair of polygons has opposite sides that are parallel and equal for all answer choices (e.g., Y, Y, Y). **Response Type:** Matching Table

**Example Stem 1:** Determine if each polygon is also a rhombus.

Select Yes for each polygon that is a rhombus and No for each polygon that is **not** a rhombus.

	Yes	No
Rectangle		
Trapezoid		
Square		
Pentagon		
Parallelogram		

**Example Stem 2:** Determine whether each polygon is a rhombus and/or a quadrilateral. Select all boxes that apply next to each polygon. If the polygon is **not** a rhombus or a quadrilateral, select Neither.

	Rhombus	Quadrilateral	Neither
Rectangle			
Square			
Parallelogram			

### **Operations and Algebraic Thinking**

**Target A [a]:** Write and interpret numerical expressions. (DOK 1, 2)

**Example Stem:** Enter "add 5 and 12" as an expression.

**Example Stem:** Enter "add 5 and 7 and then multiply by 12" as an expression.

**Rubric:** (1 point) The student enters the correct numerical expression (e.g., 5 + 12 OR 12 + 5;  $(5 + 7) \times 12$  OR  $12 \times (5 + 7)$ ). **Response Type:** Equation/Numeric

**Example Stem:** Which expression correctly shows the difference between the product of 7 and 9 and the sum of 12 and 5?

A.  $7 \times (9 - 12) + 5$ B.  $7 \times (9 + 12) + 5$ C.  $(7 \times 9) - (12 + 5)$ D. (7 + 9) + (12 + 5)

**Example Stem:** Which statement describes the value of the expression  $4 \times (18,932 + 921)$ ?

- A. The value is 921 more than the product of 4 and 18,932.
- B. The value is 18,932 more than the product of 4 and 921.
- C. The value is 4 times as large as the sum of 18,932 and 921.
- D. The value is 4 times as large as the product of 18,932 and 921.

**Example Stem 1:** Enter the value of  $7 + (5 \times 12)$ .

**Example Stem 1:** Enter the value of  $(5 \times 12) + (27 \div 9)$ .

**Example Stem 2:** Enter the exact value of  $(6 \times \frac{2}{3}) + (\frac{2}{8} + \frac{3}{8})$ .

**Example Stem 3:** Enter the exact value of  $(2 \div 0.1) - (0.3 \times 0.4)$ .

#### Target B [a]: Analyze patterns and relationships. (DOK 2)

**Example Stem:** Patterns A and B are generated using these rules.

- Pattern A: Start with 10 and add 5.
- Pattern B: Start with 2 and add 1.

Which statement **best** describes the relationship between the corresponding terms of Pattern A and Pattern B?

- A. Each term in Pattern A is  $\frac{1}{5}$  of the value of the corresponding term in Pattern B.
- B. Each term in Pattern A is 4 more than the value of the corresponding term in Pattern B.
- C. Each term in Pattern A is 5 times the value of the corresponding term in Pattern B.
- D. Each term in Pattern A is 8 more than the value of the corresponding term in Pattern B.

**Example Stem:** Patterns P and Q are generated using these rules.

- Pattern P: Start with 0 and add 1.
- Pattern Q: Start with 0 and add  $\frac{1}{4}$ .

Which set of ordered pairs is generated from corresponding terms of Pattern P and Pattern Q?

A.  $(0, 0), (1, \frac{1}{4}), (2, \frac{1}{2}), (3, \frac{3}{4})$ B.  $(1, \frac{1}{4}), (1, \frac{1}{2}), (1, \frac{3}{4}), (1, 1)$ C. (0, 0), (1, 2), (2, 3), (3, 4)D.  $(\frac{1}{4}, \frac{1}{2}), (\frac{1}{2}, \frac{3}{4}), (\frac{3}{4}, 1), (1\frac{1}{4}, 1\frac{1}{2})$ 

**Example Stem:** Patterns X and Y are generated using these rules.

- Pattern X: Start with 5 and add 5.
- Pattern Y: Start with 1 and add 2.

Graph three points to represent the ordered pairs formed by the first three corresponding terms in Pattern X and Pattern Y.

