



Teacher Guide

Directions for Test Administration

Mathematics

Grades 8 & High School

Mathematics Table of Contents

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Purpose

The Directions for Test Administration (DTA) is required for administration.

The DTA provides the exact wording of the items to be used by the TA during administration, the materials needed in preparation of the test, and guidelines for how to present the items to the student.

Guidance on Printed Materials

Reference Sheets include required graphics that are to be printed and presented to the student during the administration of selected response items. Mathematics Reference Sheets for Sample Items are located in the front of this DTA.

Constructed response (CR) items include cutouts that are to be printed and presented to the student during the administration of constructed-response items. The CR cutouts for Sample Items are also located in the front of this DTA. The TA may print additional Reference Sheets or CR cutouts as needed.

Directions

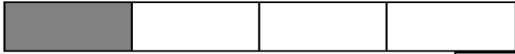
Know and follow all directions for test administration. The grey, italicized text directs the TA to point to specific parts of the item. If the item includes alternative text, grey italicized text inside brackets directs the TA to read the alternative text that describes the graphic to the student. All language referring to students with a visual impairment is inclusive of students who are blind or visually impaired.

Please see example below:

Mathematics Item Example

This item is about fractions. TA reads item directions to the student.


This fraction bar is divided into 4 equal parts.
Point to each part. Directions for TA to point to each part.



There is 1 part that is shaded. TA reads item text to the student.
Point to the shaded part. Directions for TA to point to shaded part.

This fraction shows that 1 of the 4 parts is shaded. TA reads item text to the student.
Point to the fraction. Directions for TA to point to the fraction.

$\frac{1}{4}$



There is 1 part shaded.
Point to the shaded part.

What part of the fraction is shaded?
Point to and read each option to the student.

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{1}{8}$

TA reads answer choices to the student.

Procedures for Constructed-Response (CR) Items

The CR tasks require students to construct an answer rather than select an answer from predetermined multiple-choice options. Constructed-response items are presented as novel tasks using materials and content presented in a test format that allows the TA to print out interactive materials and manipulatives for the student. Each item is presented to the student in a standardized, scripted sequence of steps, culminating in a TA's scoring of the student performance against the Mathematics Scoring Rubrics. The Mathematics Scoring Rubrics are included with the appropriate constructed-response items in the DTA and provide scoring standards that must be used to evaluate student responses.

Guidance on Administering the CR Items

- Become familiar with the specific test items and administration requirements.
- Rehearse administering each task before administering it to a student by reading the script for each task.
- Become familiar with the scoring rubric and directions for scoring the student response.
- Prepare the test setting.
 - Assemble any needed materials (pencils, markers, etc.).
 - Provide any allowable manipulatives (e.g., counters).
 - Have a calculator available, if allowed and/or if needed.
 - Provide materials required for student accommodations.
 - Locate the appropriate stimulus material.
 - Enlarge any stimulus materials, using the enlarge feature on a printer or copier, as needed.
 - Print all materials that the student will need (e.g., reference sheets, CR cutouts, etc.).
 - Cut the stimulus materials apart, as needed (e.g., CR tiles).
 - Position the student so that he or she will have the optimal vantage to view and manipulate materials in order to facilitate sustained attention.
 - Eliminate noise and visual distractions that may divert the student's attention.
- For students with a visual impairment/blindness, TAs may use tactile graphics or object replacements as needed.

Mathematics Grade 8

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Mathematics Sample Items Reference Sheets

Manipulatives and Instructional Materials

The following manipulatives and materials can be provided to the student during testing as necessary. The Reference Sheets and CR cutouts, or their adapted equivalents, must be provided as instructed in the DTA. Manipulatives and other materials provided during testing should be regularly used during instruction by the student. Do not introduce any manipulatives or other materials that the student is not familiar with shortly before or during testing.

Grade 8

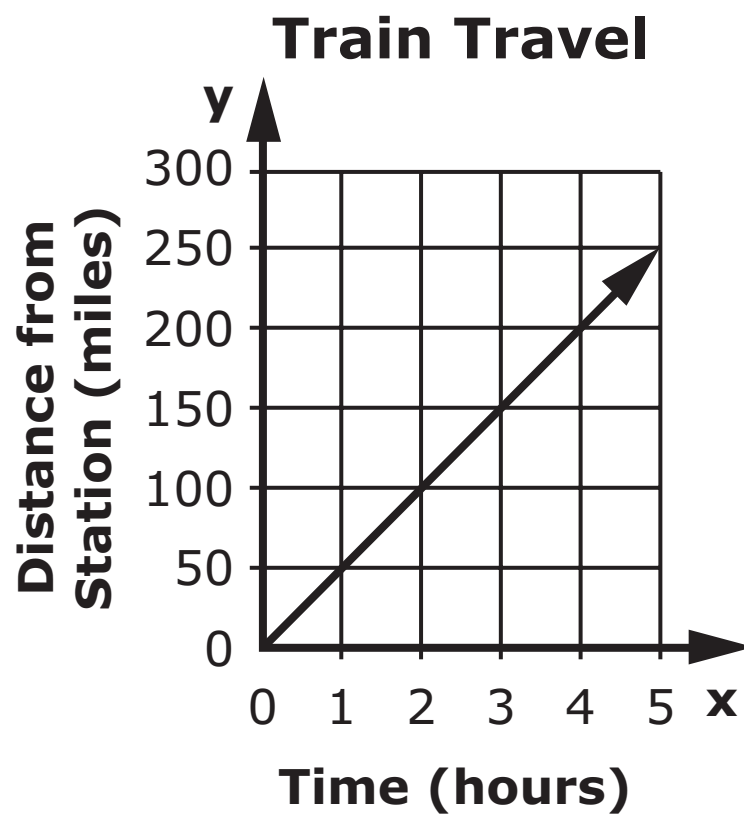
Reference Sheet: Graph 84 (Item 3)

Reference Sheet: Volume Formula for Cylinders (Item 4)

Printed scatter plot found in Mathematics Constructed-Response Cutouts section (Item 5)

TA may print additional reference sheets, as needed.

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Graph 84

$$\text{Volume} = \pi \times \mathbf{r} \times \mathbf{r} \times \mathbf{h}$$

Volume Formula for Cylinders

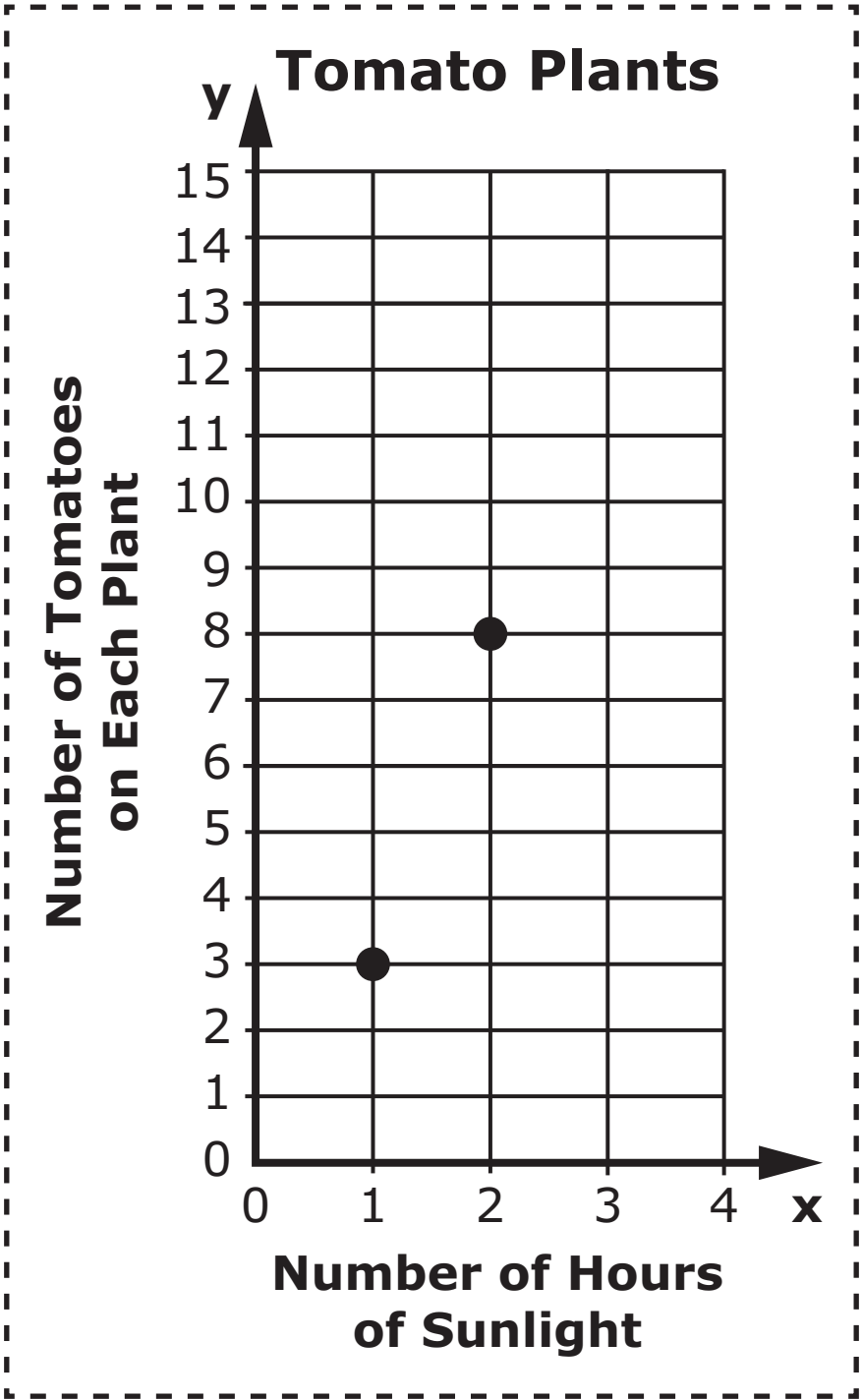
Mathematics Sample Items Constructed-Response Cutouts

TA may print additional CR cutouts, as needed.

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Sample Items - Constructed-Response Item 5

Please print this page prior to test administration for student completion of constructed-response item.



Mathematics

Beginning Grade 8

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Calculator may be used on this item.

Item 1

The number 2.7 is an example of a number that is between two whole numbers.

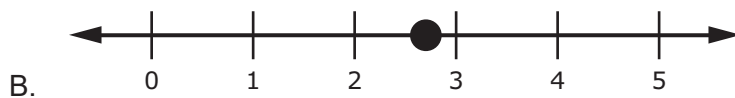
Which number line has a point marked at 2.7?

Point to each answer option.

[For students with a visual impairment, read "A. This is a number line beginning at the number zero on the left, followed by five equally spaced numbered marks, ending on the right at five. There is a point between the marks labeled four and five."]



[For students with a visual impairment, read "B. This is a number line beginning at the number zero on the left, followed by five equally spaced numbered marks, ending on the right at five. There is a point between the marks labeled two and three."]



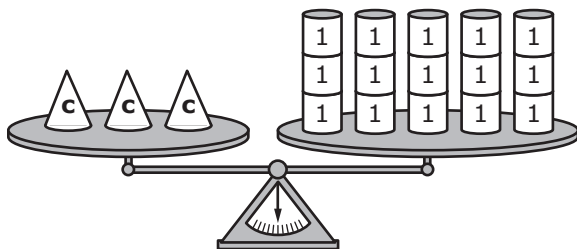
Calculator may be used on this item.

Item 2

This is a picture of a balance scale.

Point to the balance scale.

[For all students, read “The left side contains three cones of unknown mass. The right side contains fifteen cylinders with a mass of one unit each.”]



The total mass of the cones on the left side is equal to the total mass of the cylinders on the right side.

Use this equation to find the mass of one cone. In this equation, the variable **c** stands for the mass of one cone.

Point to the equation.

[For all students, read “Three cones equals fifteen one-unit cylinders. Three times c equals fifteen cylinders.”]

$$\begin{array}{c} \triangle c \quad \triangle c \quad \triangle c \\ 3c \end{array} = \begin{array}{c} \begin{array}{|c|} \hline 1 \\ \hline 1 \\ \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline 1 \\ \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline 1 \\ \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline 1 \\ \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline 1 \\ \hline 1 \\ \hline \end{array} \\ 15 \text{ cylinders} \end{array}$$

Divide each side of the equation by 3 to find the mass of one cone, **c**.

Point to the equations.

[For all students, read “Three times c equals fifteen. Three times c over three equals fifteen over three. c equals five.”]

$$3c = 15$$

$$\frac{3c}{3} = \frac{15}{3}$$

$$c = 5$$

One cone has the same mass as 5 cylinders.

Point to the equation.

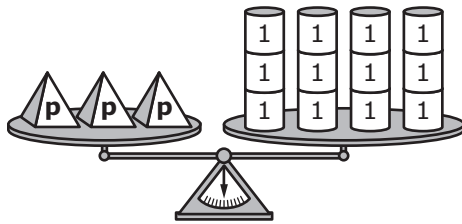
[For all students, read “One cone equals five one-unit cylinders. c equals five cylinders.”]

$$\begin{array}{c} \triangle c \\ c \end{array} = \begin{array}{c} \boxed{1} \quad \boxed{1} \quad \boxed{1} \quad \boxed{1} \quad \boxed{1} \\ 5 \text{ cylinders} \end{array}$$

This is a picture of a different balance scale. The total mass of the pyramids on the left side is equal to the total mass of the cylinders on the right side.

Point to the balance scale.

[For all students, read “The left side contains three pyramids of unknown mass. The right side contains twelve cylinders with a mass of one unit each.”]



Use this equation to answer the question.

In this equation, the variable **p** stands for the mass of one pyramid.

Point to the equation.

[For all students, read “Three times p equals twelve cylinders.”]

$$3p = 12 \text{ cylinders}$$

How many cylinders have the same mass as one pyramid?

Point to and read each answer option.

- A. 3 cylinders
- B. 4 cylinders
- C. 10 cylinders

Calculator may be used on this item.

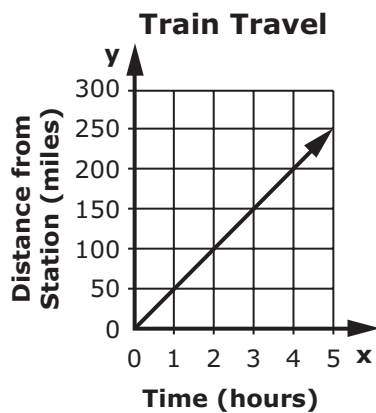
Please hand student Grade 8 Math Reference Sheet. Use Graph 84.

Item 3

This graph shows the relationship between the distance a train was from the station and time.

Point to the graph.

[For all students, read “This is a graph titled Train Travel. The x-axis starts at zero and has five equally spaced marks increasing by ones moving to the right. It is labeled Time in hours. The y-axis starts at zero and has six equally spaced marks increasing by fifties and moving upward. It is labeled Distance from Station in miles. There is a line that begins at the point zero, zero, and passes through the point four, two hundred.”]



Which sentence describes the relationship between time and the distance the train was from the station?

Point to and read each answer option.

- A. As the time **increased**, the distance the train was from the station **increased**.
- B. As the time **increased**, the distance the train was from the station **decreased**.
- C. As the time **decreased**, the distance the train was from the station **increased**.

Calculator may be used on this item.

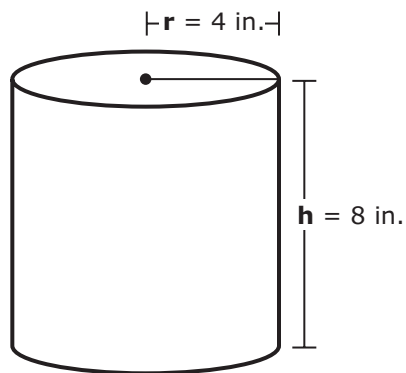
Please hand student Grade 8 Math Reference Sheet. Use Volume Formula for Cylinders.

Item 4

The volume of a cylinder is the amount of space inside it.

This is a picture of a cylinder.

Point to the cylinder.



This is the formula to find the volume of a cylinder.

Point to the formula.

[For all students, read "Volume equals pi times r times r times h."]

$$\text{Volume} = \pi \times r \times r \times h$$

The radius, r , of the cylinder is 4 inches.

Point to the radius and its label.

The height, h , of the cylinder is 8 inches.

Point to the height and its label.

Use the formula to find the volume of the cylinder.

Point to the formula.

[For all students, read "Volume equals pi times r times r times h."]

$$\text{Volume} = \pi \times r \times r \times h$$

What is the volume of the cylinder in cubic inches?

Point to each answer option.

[For all students, read "A. sixteen pi cubic inches."]

A. 16π cubic inches

[For all students, read "B. one hundred twenty-eight pi cubic inches."]

B. 128π cubic inches

[For all students, read "C. four hundred forty-eight pi cubic inches."]

C. 448π cubic inches

Calculator may be used on this item.

Provide student with printed cutout of scatter plot and small object.

Item 5

This data table shows the number of tomatoes on four tomato plants exposed to different amounts of sunlight each day.

Point to the data table.

[For all students, read “The title of this table is Tomato Plants. There are two columns and four rows. The first column is labeled Number of hours of sunlight. The second column is labeled Number of tomatoes on each plant. First row, one hour, three tomatoes. Second row, two hours, eight tomatoes. Third row, three hours, eleven tomatoes. Fourth row, four hours, thirteen tomatoes.”]

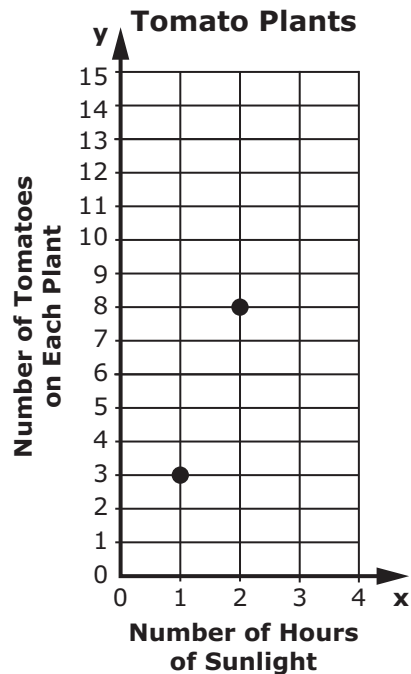
Tomato Plants

Number of hours of sunlight	Number of tomatoes on each plant
1	3
2	8
3	11
4	13

This incomplete scatter plot can be used to show the same information as the data table.

Point to the scatter plot.

[For all students, read “This is a graph titled Tomato Plants. The x-axis starts at zero and has four equally spaced marks increasing by ones moving to the right. It is labeled Number of Hours of Sunlight. The y-axis starts at zero and has fifteen equally spaced marks increasing by ones moving upward. It is labeled Number of Tomatoes on Each Plant. There are two points on the graph.”]



The data table shows that the tomato plant with 1 hour of sunlight each day had 3 tomatoes.

Point to the first row of the data table.

The scatter plot also shows that the tomato plant with 1 hour of sunlight each day had 3 tomatoes because there is a point located at (1, 3).

Point to the point at (1, 3) on the scatter plot.

The data table shows that the tomato plant with 2 hours of sunlight each day had 8 tomatoes.

Point to the second row of the data table.

The scatter plot also shows that the tomato plant with 2 hours of sunlight each day had 8 tomatoes because there is a point located at (2, 8).

Point to the point at (2, 8) on the scatter plot.

The third row of the data table shows that the tomato plant with 3 hours of sunlight each day had 11 tomatoes, so the third data point is (3, 11). This information still needs to be plotted on the scatter plot.

Use a small object to plot a point at (3, 11).

This is a small object.

Place the small object in front of the student.

Use this small object to plot the point for the tomato plant that had 4 hours of sunlight each day.

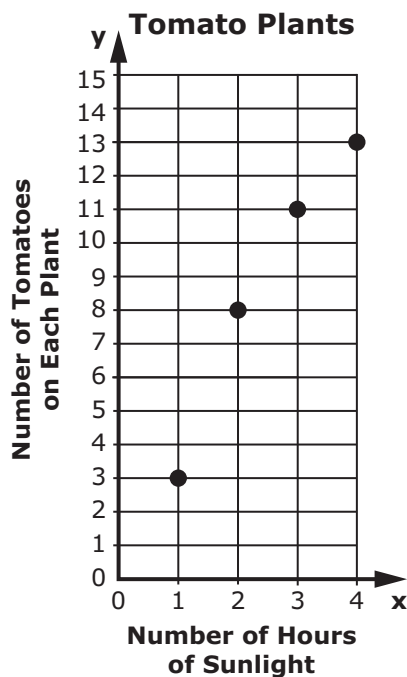
Allow time for the student to respond.

After student completes work: *record on the computer if the student provided the correct answer or did not provide the correct answer.*

- A. The student provided the correct answer.
- B. The student did not provide the correct answer.

Score	Description
1	Student places the small object at the point (4, 13) on the scatter plot.
0	Student does not place the small object at the point (4, 13) on the scatter plot.

Sample Response



Mathematics High School

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Mathematics Sample Items Reference Sheets

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High School

Reference Sheet: Equation 12 (Item 2)

Reference Sheet: Triangle 21 (Item 4)

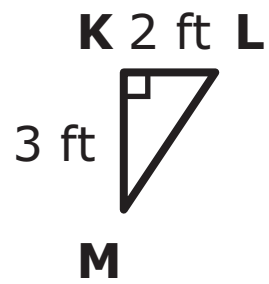
Printed histogram and tile cutouts found in Mathematics Constructed-Response Cutouts section (Item 5)

TA may print additional reference sheets, as needed.

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$$5^3 = \underline{\quad} \times \underline{\quad} \times \underline{\quad}$$

Equation 12



Triangle 21

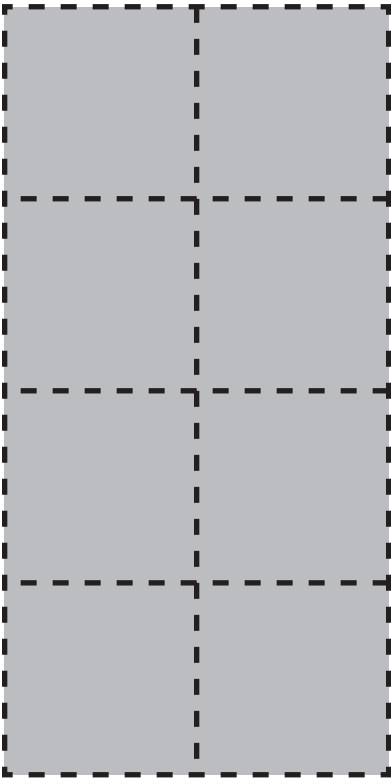
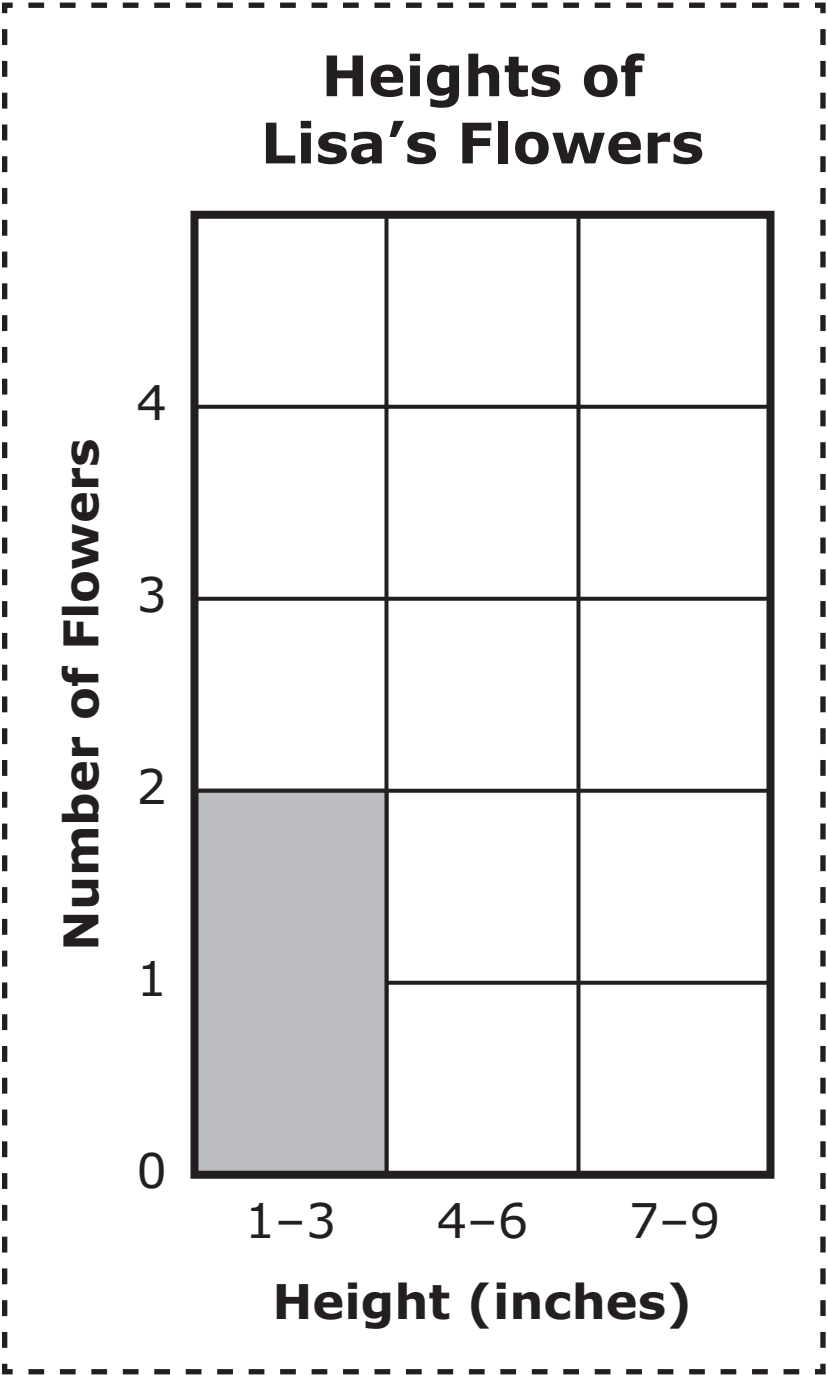
Mathematics Sample Items Constructed-Response Cutouts

TA may print additional CR cutouts, as needed.

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Sample Items - Constructed-Response Item 5

Please print this page prior to test administration for student completion of constructed-response item.



Mathematics

Beginning High School

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Calculator may be used on this item.

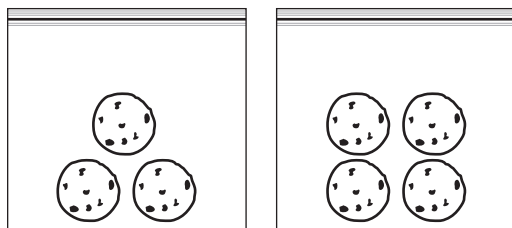
Item 1

Henry had 7 cookies and 2 bags.

First, Henry put 3 cookies into one bag and 4 cookies into another bag.

Point to the bags of cookies.

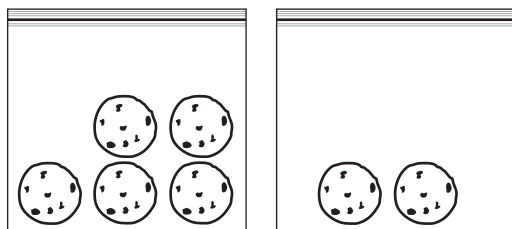
[For students with a visual impairment, read "This is a picture of two bags of cookies. There are three cookies in the first bag. There are four cookies in the second bag."]



Then, Henry decided to divide the 7 cookies differently. He put 5 cookies into one bag and 2 cookies into another bag.

Point to the bags of cookies.

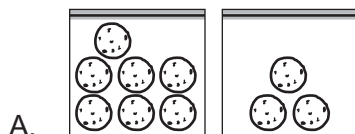
[For students with a visual impairment, read "This is a picture of two bags of cookies. There are five cookies in the first bag. There are two cookies in the second bag."]



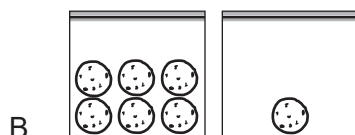
Which picture shows another way Henry could divide the 7 cookies into 2 bags?

Point to each answer option.

[For students with a visual impairment, read "A. This is a picture of two bags of cookies. There are seven cookies in the first bag. There are three cookies in the second bag."]



[For students with a visual impairment, read "B. This is a picture of two bags of cookies. There are six cookies in the first bag. There is one cookie in the second bag."]



Calculator may be used on this item.

Please hand student High School Math Reference Sheet. Use Equation 12.

Item 2

An exponent tells how many times the base number will appear in a multiplication expression.

This is an expression with an exponent.

Point to the expression.

[For all students, read “two to the third power.”]

$$2^3$$

The exponent 3 indicates that the base number 2 will appear three times in the multiplication expression that is used to find the value of

[For all students, read “two to the third power.”]

$$2^3.$$

Point to the equation.

[For all students, read “two to the third power equals two times two times two.”]

$$2^3 = 2 \times 2 \times 2$$

The value of

[For all students, read “two to the third power.”]

$$2^3$$

is 8.

[For all students, read “Two to the third power equals eight.”]

$$2^3 = 8$$

This is another expression with an exponent.

Point to the expression.

[For all students, read “five to the third power.”]

$$5^3$$

This equation is used to find the value of

[For all students, read “five to the third power.”]

$$5^3.$$

Point to the equation.

[For all students, read “Five to the third power equals blank times blank times blank.”]

$$5^3 = _ \times _ \times _$$

What is the value of

[For all students, read “five to the third power.”]

$$5^3?$$

Point to and read each answer option.

- A. 15
- B. 53
- C. 125

Calculator may be used on this item.

Item 3

An art teacher had 15 paintbrushes. Then she bought some boxes of paintbrushes. Each box had 8 paintbrushes in it. Now the art teacher has 71 paintbrushes.

Which equation can be used to find **b**, the number of boxes of paintbrushes the art teacher bought?

Point to and read each answer option.

[For all students, read “A. Eight times b plus seventy-one equals fifteen.”]

A. $8b + 71 = 15$

[For all students, read “B. Fifteen plus eight times b equals seventy-one.”]

B. $15 + 8b = 71$

[For all students, read “C. Fifteen times b plus eight equals seventy-one.”]

C. $15b + 8 = 71$

Calculator may be used on this item.

Please hand student High School Math Reference Sheet. Use Triangle 21.

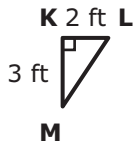
Item 4

Triangles are similar when the ratios of the lengths of their corresponding sides are equal.

This is triangle **KLM**.

Point to the dimensions of triangle KLM.

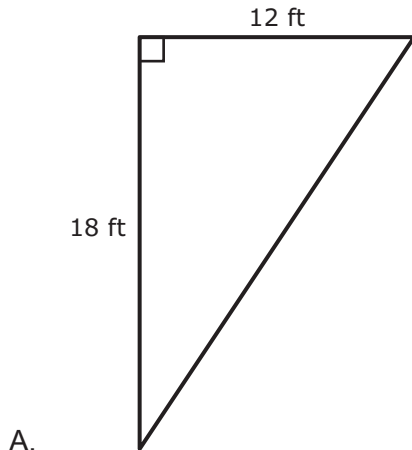
[For all students, read “On triangle KLM, angle K is a right angle. Side KL measures two feet. Side KM measures three feet.”]



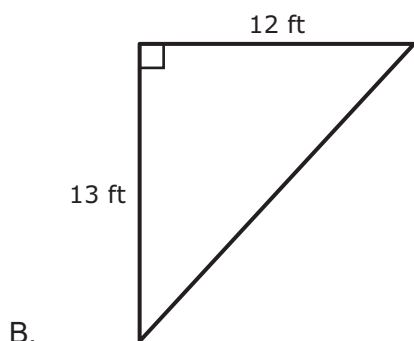
Which triangle is similar to triangle **KLM**?

Point to the dimensions of each answer option.

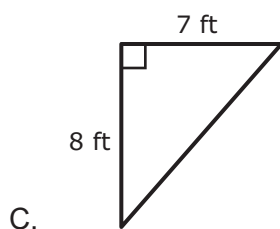
[For all students, read “A. This is a right triangle. The horizontal leg of the triangle is labeled twelve feet. The vertical leg of the triangle is labeled eighteen feet.”]



[For all students, read “B. This is a right triangle. The horizontal leg of the triangle is labeled twelve feet. The vertical leg of the triangle is labeled thirteen feet.”]



[For all students, read “C. This is a right triangle. The horizontal leg of the triangle is labeled seven feet. The vertical leg of the triangle is labeled eight feet.”]



Calculator may be used on this item.

Provide student with printed histogram and tile cutouts.

Item 5

A histogram is a graph that uses bars to display data.

This list of data values shows the heights of the flowers in Paul's garden.

Point to and read the list of data.

[For all students, read "This is a list of data values titled Heights of Paul's Flowers in inches. The data are two, four, five, six, seven, seven, eight, and eight."]

**Heights of Paul's Flowers
(inches)**

2, 4, 5, 6, 7, 7, 8, 8

To make a histogram, divide the data into equal-sized ranges.

The data values are from 2 to 8 inches. The data can be divided into these equal-sized ranges:

1 to 3 inches

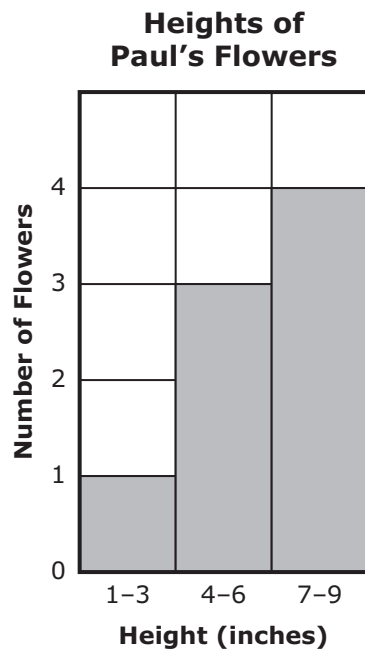
4 to 6 inches

7 to 9 inches

This histogram shows the same information as the list of data. The height of each bar shows the number of flowers in each range.

Point to the histogram.

[For all students, read “The title of the histogram is Heights of Paul’s Flowers. The x-axis label is Height in inches, and it shows three ranges labeled one through three, four through six, and seven through nine. The y-axis label is Number of Flowers. First bar, one through three, one flower. Second bar, four through six, three flowers. Third bar, seven through nine, four flowers.”]



In this histogram, the first bar shows there is one flower in the range of 1 to 3 inches.

Point to the first bar.

The second bar shows there are three flowers in the 4-to-6-inch range.

Point to the second bar.

The third bar shows there are four flowers in the 7-to-9-inch range.

Point to the third bar.

This is a different problem.

This list of data values shows the heights of the flowers in Lisa's garden.

Point to and read the list of data.

[For all students, read "This is a list of data values titled Heights of Lisa's Flowers in inches. The data are one, three, four, six, six, seven, eight, and nine."]

**Heights of Lisa's Flowers
(inches)**

1, 3, 4, 6, 6, 7, 8, 9

The data values are from 1 to 9 inches. The data can be divided into these equal-sized ranges:

1 to 3 inches

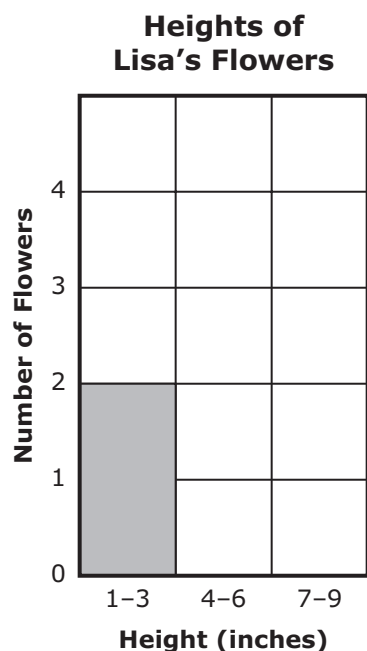
4 to 6 inches

7 to 9 inches

This incomplete histogram shows the heights of Lisa's flowers.

Place the histogram and tiles on the work surface in front of the student. Point to the histogram.

[For all students, read "The title of the incomplete histogram is Heights of Lisa's Flowers. The x-axis label is Height in inches, and it shows three ranges labeled one through three, four through six, and seven through nine. The y-axis label is Number of Flowers. First bar, one through three, two flowers."]



The height of each bar shows the number of flowers in each range.

The first bar in this histogram shows there are 2 flowers with a height of 1 to 3 inches.

Point to the first bar in the histogram.

The list of data shows there are 3 flowers with a height of 4 to 6 inches.

Point to the three values in the list of data.

The second bar in this histogram is completed in this way.

Move three tiles into the four-through-six-inch column in the histogram.

Complete the histogram to show the number of Lisa's flowers with a height of 7 to 9 inches.

Point to the histogram.

These are tiles to use to complete the histogram. You may not need all of the tiles.

Point to the tiles.

Allow time for the student to respond.

After the student completes work: Record on the computer if the student provided the correct answer or did not provide the correct answer.

- A. The student provided the correct answer.
- B. The student did not provide the correct answer.

Score	Description
1	Student places exactly three tiles in the 7-to-9-inches column of the histogram.
0	Student does not place exactly three tiles in the 7-to-9-inches column of the histogram.

Sample Response

