2021-2022 Item and Scoring Samplers (Same as 2107 - see below)

(**Due to the cancellation of standardized testing in 2019–2020, the 2021 Item and Scoring Samplers are revised and enhanced versions of the previously released 2017 Item and Scoring Samplers.**)

General Description of Scoring Guidelines for Mathematics Open-Ended Questions

4—The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. Response may contain a minor "blemish" or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

3—The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.

The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a *general* understanding.

2—The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1—The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.

0—The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.
Response may show only information copied from the question.

Special Categories within zero reported separately:

BLK (blank).....Is blank, is entirely erased, or gives a written refusal to respond

OT.....Is off-task

LOE.....Is in a language other than English

IL.....Is illegible

Grade 5 Formula Sheet

Formulas and conversions that you may need on this test are found below.
You may refer back to this page at any time during the mathematics test.

2021
Grade 5

Standard Conversions

1 mile (mi) = 1,760 yards (yd)
1 mile = 5,280 feet (ft)
1 yard (yd) = 3 feet (ft)
1 foot = 12 inches (in.)

1 ton (T) = 2,000 pounds (lb)
1 pound = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)
1 quart = 2 pints (pt)
1 pint = 2 cups (c)
1 cup = 8 fluid ounces (fl oz.)

Metric Conversions

1 kilometer (km) = 1,000 meters (m)
1 meter = 100 centimeters (cm)
1 centimeter = 10 millimeters (mm)

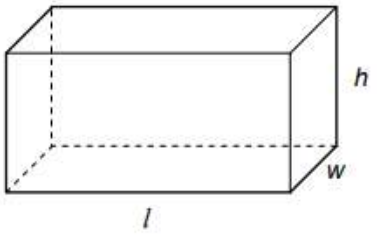
1 kilogram (kg) = 1,000 grams (g)

1 liter (L) = 1,000 milliliters (mL)

Time Conversions

1 century = 10 decades
1 decade = 10 years (yr)
1 year (yr) = 12 months (mo)
1 year = 52 weeks (wk)
1 year = 365 days
1 week = 7 days
1 day = 24 hours (hr)
1 hour = 60 minutes (min)
1 minute = 60 seconds (sec)

Rectangular Prism



Volume = length × width × height
$V = l \times w \times h$

Volume = area of the base × height
$V = B \times h$

Volume = area of the base × width
$V = B \times w$

Volume = area of the base × length
$V = B \times l$

Question 1 in this sampler is to be solved without the use of a calculator.

MULTIPLE-CHOICE ITEMS

1. Multiply: 640×390

A. 249,600
B. 293,600
C. 540,000
D. 768,000

A calculator is permitted for use in solving questions 2–17 in this sampler.

2. Darren is told that the weight of an old coin is 37.2 grams. However, when he weighs the coin he finds that the digit in the hundredths place has a value that is $\frac{1}{10}$ of the value of the digit in the tenths place. Which expression, in expanded form, shows the weight, in grams, Darren finds?

A. $30 + 2 + 0.2$
B. $30 + 7 + 0.2 + 0.01$
C. $30 + 7 + 0.2 + 0.02$
D. $30 + 7 + 0.2 + 0.10$

3. The table below shows four mineral samples and the mass of each sample.

Mineral Masses

Mineral	Mass (grams)
albite	3.012
graphite	3.07
magnetite	3.061
quartz	3.05

Which number sentence correctly compares the masses, in grams, of two of the mineral samples?

A. $3.05 < 3.061$

B. $3.05 < 3.012$

C. $3.012 > 3.07$

D. $3.012 > 3.061$

4. Jake measured the amount of salt in two liters of seawater. His results are listed below.

first liter: 33.165 grams

second liter: 35.787 grams

He rounds both values to the nearest hundredth and adds them. What is the sum of the rounded amounts of salt Jake found in the seawater?

A. 68.95 grams

B. 68.952 grams

C. 68.957 grams

D. 68.96 grams

5. Students are weighing two types of rubber balls during science class.

- Each yellow rubber ball weighs 1.28 pounds.
- Each red rubber ball weighs 0.96 pound.

What is the total weight of 25 yellow rubber balls and 50 red rubber balls?

A. 56 pounds
B. 80 pounds
C. 88 pounds
D. 168 pounds

6. A gardening shop receives a shipment of 12 crates of plants. Each crate contains 18 plants. A worker displays all the plants on 24 shelves with the same number of plants on each shelf. How many plants are displayed on each shelf?

A. 6
B. 9
C. 16
D. 36

7. An after-school program has 24 sports video games students can play after they finish their homework. There are three types of sports games.

football: $\frac{1}{6}$ of $\frac{1}{2}$ of the video games

basketball: $\frac{1}{4}$ of $\frac{2}{3}$ of the video games

soccer: the remaining video games

How many video games are soccer games?

A. 2
B. 4
C. 18
D. 20

8. A space heater warms the temperature of a room by $\frac{2}{3}$ of a degree Fahrenheit each minute. By how many degrees Fahrenheit will the space heater warm the room in $6\frac{1}{2}$ minutes?

A. $4\frac{1}{3}$

B. $5\frac{5}{6}$

C. $7\frac{1}{6}$

D. $9\frac{3}{4}$

9. Sophie had 60 flashlights for sale at her store. She sold $\frac{4}{5}$ of the flashlights. Which statement about the number of flashlights sold must be true?

A. Sophie sold 48 flashlights because $60 \times \frac{4}{5} = 48$.

B. Sophie sold 75 flashlights because $60 \div \frac{4}{5} = 75$.

C. Sophie sold 52 flashlights because $\frac{4}{5} = 0.8$ and $60 - 8 = 52$.

D. Sophie sold 40 flashlights because both the numerator and the denominator of $\frac{4}{5}$ are factors of both 40 and 60.

10. Emma and Bella collect bugs for a science project.

- On Monday, Emma collects 15 bugs, and Bella collects 3 times as many bugs as Emma collects.
- On Tuesday, Emma collects 6 bugs, and Bella collects 8 times as many bugs as Emma collects.

Which expression can be used to find the total number of bugs the girls collect on both days?

A. $(15 + 6) \times (3 + 8)$

B. $(15 + 3) \times (6 + 8)$

C. $[15 + (3 \times 15)] + [6 + (8 \times 6)]$

D. $[15 \times (3 + 15)] + [6 \times (8 + 6)]$

11. The number of marbles in a jar is 4 times the difference between 17 and 12. Which expression can be used to find the number of marbles in the jar?

A. $4 \times (17 - 12)$

B. $(17 - 12) + 4$

C. $4 \times 17 - 12$

D. $17 \times 12 - 4$

12. The numbers shown below are used at the beginning of two different patterns.

2, 6, ___, ___, ___, . . .

One pattern's rule is to add the same number each time. The other pattern's rule is to multiply by the same number each time. What is the **smallest** number greater than 6 that appears in both patterns?

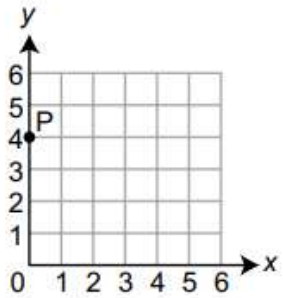
A. 10

B. 12

C. 16

D. 18

13. Point P is shown on the coordinate grid below.



Which statement about point P is true?

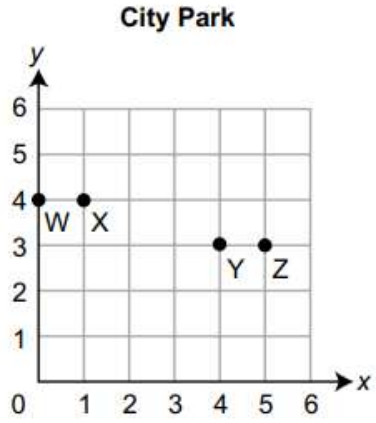
A. Point P is on the *x*-axis and has an *x*-coordinate of 0.

B. Point P is on the *x*-axis and has a *y*-coordinate of 0.

C. Point P is on the *y*-axis and has an *x*-coordinate of 0.

D. Point P is on the *y*-axis and has a *y*-coordinate of 0.

14. Clayton mapped out the city park on the coordinate grid shown.



A drinking fountain is located at the point (1, 3). A statue in the park is located 4 units away from the drinking fountain. Which point could be the location of the statue?

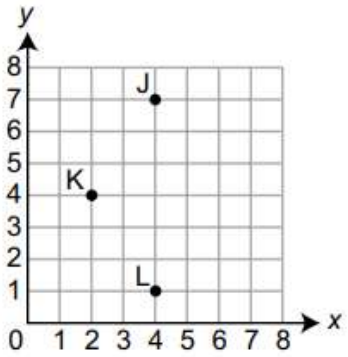
A. point W

B. point X

C. point Y

D. point Z

15. Points J, K, and L are shown on the coordinate grid below.



Point M will be plotted at (6, 4). The four points form the vertices of a shape. Which statement describes the shape that is formed?

A. The shape is a rhombus, but not a square.

B. The shape is a square, but not a rectangle.

C. The shape is a parallelogram, but not a rhombus.

D. The shape is a parallelogram, but not a quadrilateral.

16. A rock weighs $6\frac{1}{2}$ **tons**. How many **pounds** does the rock weigh?

A. 12,000 pounds

B. 13,000 pounds

C. 192,000 pounds

D. 208,000 pounds

OPEN-ENDED QUESTION

17. Luke works in the shipping department of a toy company. He sends toys in boxes that are each in the shape of a rectangular prism. The lengths, widths, and heights of all the boxes are whole numbers of inches.

Luke needs to find a box that has a total volume of 24 cubic inches.

A. Find a possible combination of length, width, and height, all in whole numbers of inches, of a box Luke could use.

Luke is shipping another toy that has a volume of 34 cubic feet. The box he will use has a base of 15 square feet and a height of 3 feet. The rest of the box will be filled with packing material.

B. What is the volume, in cubic feet, of the packing material Luke will need? Show or explain all your work.

17. ***Continued.*** Please refer to the previous page for task explanation.

Luke has a toy, shaped like a rectangular prism, that needs to be sent in a box. The measurements of the toy are 8 inches long, 5 inches wide, and 6 inches high. To make sure there is enough room for the packing material, the measurements of the box need to be at least 1 inch greater than the length, width, and height of the toy. The box's volume must be less than 400 cubic inches.

C. Explain why there is only one possible combination of length, width, and height of the box.