

Mathematics, Grade 8

Session 1, Multiple-Choice Questions



- 1 (0.5)(0.5)(0.5) is equal to which of the following?
- A. 0.000125
 - B. 0.00125
 - ✓ C. 0.125
 - D. 1.25

Reporting Category for Item 1: Number Sense and Operations (p. 285)

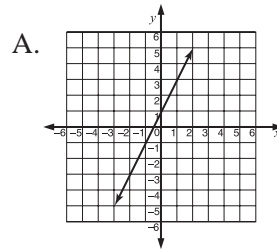
- 2 Which is the **best** approximation of $\sqrt{72}$?
- A. 7.2
 - B. 9.1
 - C. 8.9
 - ✓ D. 8.5

Reporting Category for Item 2: Number Sense and Operations (p. 285)

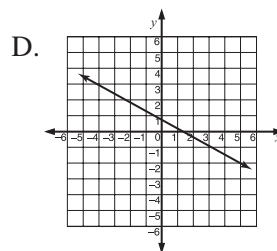
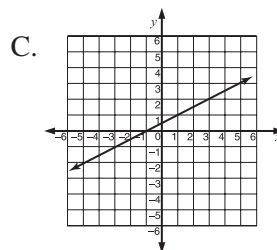
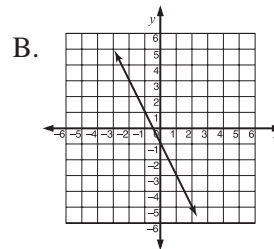
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3 Which graph contains the points given in the table below?

x	y
-2	3
-1	1
1	-3



✓



Reporting Category for Item 3: **Patterns, Relations, and Algebra** (p. 286)

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Use the chart below to answer question 4.

Input	3	4	5	6	...	n
Output	10	13	16	19	...	?

- 4 If the input is n , what will the output be?
- A. $n + 3$
 - B. $n + 7$
 - C. $3(n + 2) + 1$
 - ✓ D. $3n + 1$

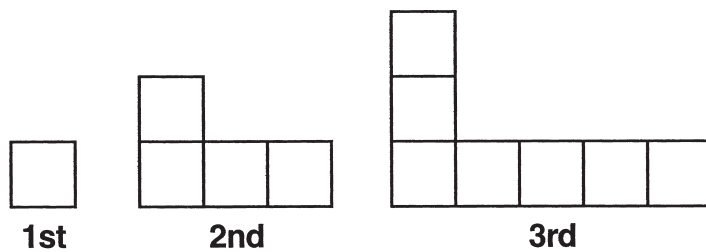
Reporting Category for Item 4: **Patterns, Relations, and Algebra** (p. 286)

- 5 A hole in a piece of metal has a diameter of $3\frac{1}{2}$ inches. Which of the following pipes is the largest that will fit through the hole?
- A. a pipe with a diameter of $3\frac{3}{8}$ inches
 - B. a pipe with a diameter of $3\frac{7}{8}$ inches
 - C. a pipe with a diameter of $3\frac{5}{16}$ inches
 - ✓ D. a pipe with a diameter of $3\frac{7}{16}$ inches

Reporting Category for Item 5: **Number Sense and Operations** (p. 285)

Session 1, Short-Answer Questions

- 6 Each arrangement in this pattern is made up of tiles.



How many tiles will be in the 6th arrangement in the pattern?

Correct Answer:

16

Reporting Category for Item 6: *Patterns, Relations, and Algebra* (p. 286)

- 7 Compute:

$$8 - (-5 + 3 \times 7) =$$

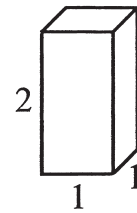
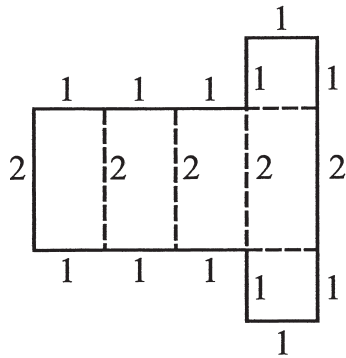
Correct Answer:

-8

Reporting Category for Item 7: *Number Sense and Operations* (p. 285)

Session 1, Open-Response Question

- 8 The pattern shown below is for a square prism. The lengths of the line segments in the pattern were chosen so that the pattern could be folded along the dotted lines into the prism shown.



- Make a sketch of a pattern for a triangular prism. Label **each** line segment with a length that will make it possible to fold the pattern into the triangular prism.
- Make a sketch of a pattern for a cylinder. Label **each** line segment and diameter in your pattern with a length that will make it possible to create the cylinder from the pattern.

Reporting Category for Item 8: **Geometry** (p. 287)

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Session 1, Short-Answer Questions

- 9 25% of what number is 100?

Correct Answer:

400

Reporting Category for Item 9: Number Sense and Operations (p. 285)

- 10 Compute:

$$(-4)^3 =$$

Correct Answer:

-64

Reporting Category for Item 10: Number Sense and Operations (p. 285)

- 11 What does x equal in the equation below?

$$\frac{3x}{4} - 2 = 7$$

Correct Answer:

12 or $x = 12$

Reporting Category for Item 11: Patterns, Relations, and Algebra (p. 286)

Session 1, Open-Response Question

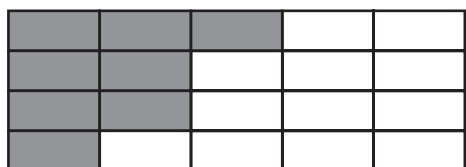
- 12 An eighth-grade class will perform the first **four** acts in the annual talent show. Every student is in exactly one of the four acts. The order in which the acts will be presented is to be decided by a drawing so that each act has an equal chance of being drawn.
- Chantal is a member of the eighth-grade class. What is the probability that her act will be presented first?
 - Chantal's act was chosen to be presented first. Make a tree diagram, chart, or list showing all the possible orders in which the **other three acts** could be presented. Use the letters A, B, and C to represent these three acts.
 - Rory, Jesse, and Chantal are all members of the eighth-grade class who will each perform an act. What is the probability that Rory's act will immediately follow Jesse's? Explain how you found your answer.

Reporting Category for Item 12: Data Analysis, Statistics, and Probability (p. 288)

Session 2, Multiple-Choice Questions

Use the diagram below to answer question 13.

Parking Lot



= one parking space

- 13** The shaded parts of the diagram represent the spaces that are reserved. What percent of the spaces is reserved?
- A. 20%
 - B. 30%
 - ✓ C. 40%
 - D. 50%

Reporting Category for Item 13: Number Sense and Operations (p. 285)

- 14** The formula for the volume (V) of a cube is

$$V = e^3$$

where e is the length of an edge.

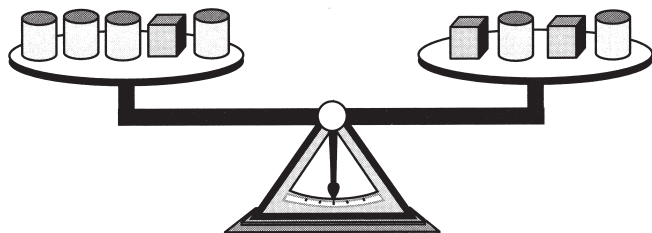
An edge of a silver cube is twice as long as an edge of a gold cube. How many times greater is the volume of a silver cube than that of a gold cube?

- A. 2 times greater
- B. 9 times greater
- ✓ C. 8 times greater
- D. 6 times greater

Reporting Category for Item 14: Patterns, Relations, and Algebra (p. 286)

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Use the balance scale below to answer question 15.

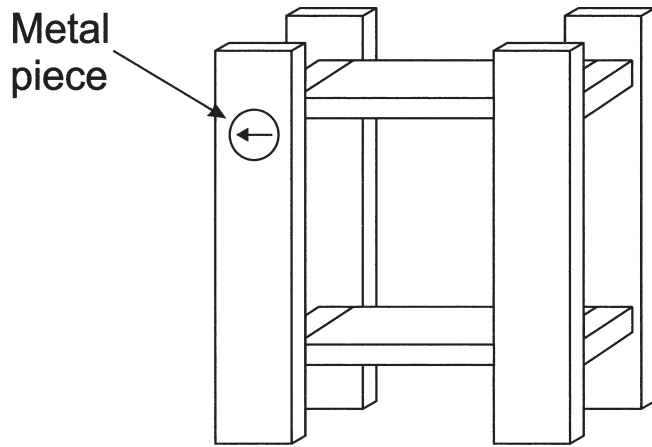






- 15** Which of the following shows the relationship between the weights of one cylinder and one cube?
- ✓ A. One cube weighs the same as two cylinders.
 - B. One cube weighs the same as four cylinders.
 - C. One cylinder weighs the same as two cubes.
 - D. One cylinder weighs the same as four cubes.

Reporting Category for Item 15: Patterns, Relations, and Algebra (p. 286)

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- 16 Kayla is assembling a bookcase. She has put a metal piece into a hole in a shelf as shown below. The instructions say to rotate the piece 90° **counterclockwise**. How will the piece look **after** the rotation?



- A. 
- B. 
- ✓ C. 
- D. 

Reporting Category for Item 16: *Geometry* (p. 287)

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- 17 Corrine and her brother Jerome have the same birthday.

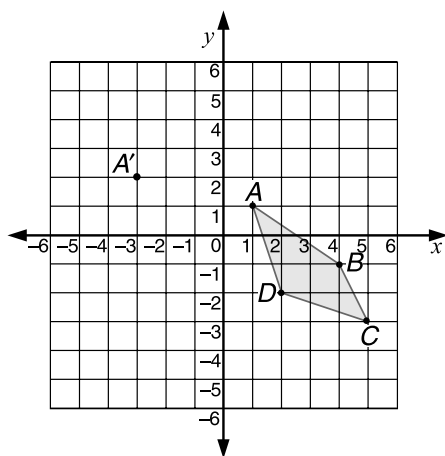
When Corrine was 8 years old, Jerome was 2.

Which equation shows the relationship between Corrine's age, C , and Jerome's age, J , at all times during their lives?

- A. $C = 4J$
B. $J = 4C$
C. $J = 6 + C$
✓ D. $C = 6 + J$

Reporting Category for Item 17: *Patterns, Relations, and Algebra* (p. 286)

Use the graph below to answer question 18.



- 18 If Figure $ABCD$ is translated so that the image of A is A' at $(-3, 2)$, then the coordinates of the image of point B will be

- ✓ A. $(0, 0)$.
B. $(-1, 4)$.
C. $(-2, -1)$.
D. $(-3, 1)$.

Reporting Category for Item 18: *Geometry* (p. 287)

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- 19 In John's homeroom, $\frac{1}{3}$ of the students walk to school and $\frac{1}{4}$ come by car. The remaining 15 come by school bus. How many students are in his homeroom?
- A. 48
 - B. 24
 - ✓ C. 36
 - D. 21

Reporting Category for Item 19: Patterns, Relations, and Algebra (p. 286)

- 20 The first eight positions in a pattern are shown below.

N, S, E, W, N, S, E, W, . . .

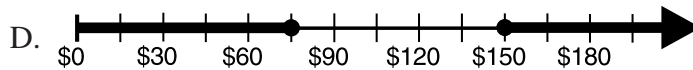
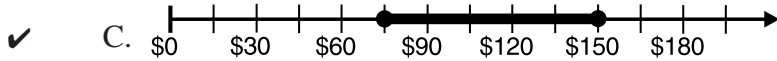
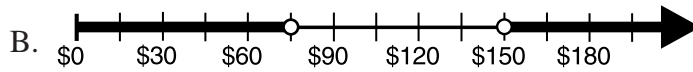
If this pattern continues, which letter would be found at the 103rd position?

- ✓ A. E
- B. S
- C. N
- D. W

Reporting Category for Item 20: Patterns, Relations, and Algebra (p. 286)

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- 21 Imelda will work 10 to 20 hours per week at her new job and will be paid \$7.50 per hour. Which of the following shows how much she can earn per week?



Reporting Category for Item 21: *Patterns, Relations, and Algebra* (p. 286)

- 22 Eva has four sets of straws. The measurements of the straws are given below. Which set of straws could **not** be used to form a triangle?

- A. Set 1: 4 cm, 4 cm, 7 cm
✓ B. Set 2: 2 cm, 3 cm, 8 cm
C. Set 3: 3 cm, 4 cm, 5 cm
D. Set 4: 5 cm, 12 cm, 13 cm

Reporting Category for Item 22: *Geometry* (p. 287)

Session 2, Open-Response Question

- 23 An eighth-grade class took a survey and found that the most popular types of music in their school were alternative rock, rap, and classic rock. They took a second survey to find out the students' preference among these three types of music. These are the results for 120 students.

Favorite Types of Music		
Alternative Rock	Rap	Classic Rock
60	40	20

- a. Make a rough sketch of a circle graph displaying these data. Tell how many degrees should be in each sector of the graph.
- b. Explain how you found the number of degrees for each sector.

Reporting Category for Item 23: Data Analysis, Statistics, and Probability (p. 288)

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Session 3, Multiple-Choice Questions

- 24 Lee correctly answered 11 out of 13 questions on the math test. To the nearest percent, what percent of the questions did Lee get correct?
- A. 90%
 - B. 75%
 - C. 80%
 - ✓ D. 85%

Reporting Category for Item 24: *Number Sense and Operations* (p. 285)

- 25 What is the product of a non-zero number n and its reciprocal?
- ✓ A. 1
 - B. 0
 - C. -1
 - D. n^2

Reporting Category for Item 25: *Number Sense and Operations* (p. 285)

Use the table below to answer question 35.

Term	1st	2nd	3rd	4th	5th	6th
Value	?		24	35	48	63

- 26 The 3rd, 4th, 5th, and 6th terms of the sequence are given in the table. What number belongs in the first position in the sequence above?
- ✓ A. 7
 - B. 8
 - C. 9
 - D. 10

Reporting Category for Item 26: *Patterns, Relations, and Algebra* (p. 286)

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- 27 In the figure below:

distance yz equals distance zw and
distance xy equals distance yw .



Distance yz equals 4. Distance xw equals

- A. 4.
- B. 8.
- ✓ C. 16.
- D. 12.

Reporting Category for Item 27: Geometry (p. 287)

- 28 The four finalists in the talent search will present their acts in the school talent show. Ms. King must decide which will be the first, second, third, and fourth acts in the show. In how many different ways can she arrange the four acts?

- A. 6 ways
- B. 16 ways
- C. 18 ways
- ✓ D. 24 ways

Reporting Category for Item 28: Data Analysis, Statistics, and Probability (p. 288)

- 29 The largest natural lake in Massachusetts is Assawompsett Pond which has an area of 2,656 acres. What is the approximate area in square miles?

- ✓ A. 4 sq. mi.
- B. 7 sq. mi.
- C. 17 sq. mi.
- D. 40 sq. mi.

Reporting Category for Item 29: Measurement (p. 287)

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Use the advertisement below to answer question 30.



Outdoor Rental

Weekend Canoe Rentals
Friday to Sunday—\$60
All day Saturday or Sunday — \$35
Hourly Rate — \$8.00 per hour or part of hour

- 30 Marco wants to rent a canoe from 9:00 A.M. to 1:30 P.M. on Saturday. Which of the following correctly compares the cost of renting the canoe for the entire day to the cost of renting the canoe by the hour?
- A. It will cost \$5 less if he rents by the hour.
 - ✓ B. It will cost \$5 less if he rents by the day.
 - C. It will cost \$3 less if he rents by the hour.
 - D. It will cost \$3 less if he rents by the day.

*Reporting Category for Item 30: **Number Sense and Operations** (p. 285)*

- 31 So far this term, Calvin has these scores on quizzes:

81, 86, 96, 93, 84

There are two remaining quizzes. What is the lowest mean score he can get on these **two** quizzes to have an overall mean score of 90?

- ✓ A. 95
- B. 89
- C. 92
- D. 97

*Reporting Category for Item 31: **Data Analysis, Statistics, and Probability** (p. 288)*

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- 32 Al got an estimate for repairs on his bike. The parts will cost \$17.50, and the parts and labor together will not be more than \$40. Which inequality shows the possible labor costs, L ?
- A. $40 + 17.50 \geq L$
 - B. $40 + L \geq 17.50$
 - ✓ C. $17.50 + L \leq 40$
 - D. $L - 17.50 \leq 40$

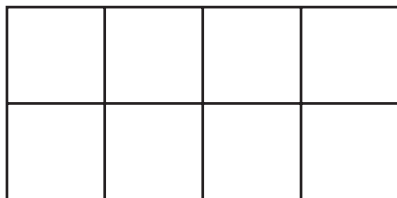
Reporting Category for Item 32: Patterns, Relations, and Algebra (p. 286)

- 33 Of the 12 songs on Ella's new CD, 3 are her favorites. If her CD player chooses one song at random, what is the probability that it will be one of her favorite songs?
- ✓ A. $\frac{1}{4}$
 - B. $\frac{3}{4}$
 - C. $\frac{1}{3}$
 - D. $\frac{2}{3}$

Reporting Category for Item 33: Data Analysis, Statistics, and Probability (p. 288)

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Use the figure below to answer question 34.



- 34 The squares in the figure above are congruent. The **perimeter** of the entire figure is 24 units. What is the **area** of one of the **small** squares?
- A. 2 square units
 - ✓ B. 4 square units
 - C. 6 square units
 - D. 8 square units

Reporting Category for Item 34: *Measurement* (p. 287)

- 35 Which is the best estimate of the angle between the two hands on a clock at 5:10?
- A. 45°
 - B. 30°
 - ✓ C. 90°
 - D. 60°

Reporting Category for Item 35: *Geometry* (p. 287)

Mathematics, Grade 8

- 36 Ricardo drew a rectangle. Which statement **must** be true?
- ✓ A. Ricardo's figure is a parallelogram.
 - B. Ricardo's figure is a regular polygon.
 - C. Ricardo's figure is a square.
 - D. Ricardo's figure is a rhombus.

Reporting Category for Item 36: Geometry (p. 287)

- 37 Which of the following describes one way to solve this equation?

$$12 - 3x = 5$$

- A. Add $3x$ to both sides, then divide both sides by 3.
- B. Subtract $3x$ from both sides, then multiply both sides by 3.
- C. Add 12 to both sides, then multiply both sides by -3 .
- ✓ D. Subtract 12 from both sides, then divide both sides by -3 .

Reporting Category for Item 37: Patterns, Relations, and Algebra (p. 286)

Session 3, Open-Response Questions

- 38** Ms. McCarthy's class is making up number puzzles. These are two of the puzzles.

Manuel's puzzle:

My number is even.
It is a factor of 198 and a multiple of 9.
It is less than 100.
What is my number?

Haan's puzzle:

My number is the product of three different prime numbers.
It is an odd number less than 125.
The sum of its digits is a multiple of 3.
One of its factors is the third prime number.
What is my number?

- What is Manuel's number?
- What is Haan's number? Explain the strategy you used to find your answer to Haan's puzzle.
- Write a number puzzle that
 - has exactly **three** clues,
 - has **one and only one** answer, and
 - includes the following words: **factor** and **prime number**.

Reporting Category for Item 38: Number Sense and Operations (p. 285)

Mathematics, Grade 8

- 39 Some eighth-grade students want to raise at least \$300 for a field trip by selling popcorn and fruit bars. The chart below shows the amount of profit they will make on each sale.

Profit from Sales

Box of popcorn	60¢
Fruit bar	30¢

- If they sell exactly 500 fruit bars, how many boxes of popcorn will they need to sell to make a total of \$300?
- On the grid in your Student Answer Booklet, draw a graph showing the combinations of boxes of popcorn and fruit bars they must sell to make a total of exactly \$300. Let the horizontal axis represent the number of fruit bars. Label that axis to 1,000. Show or describe the calculations you used to find the data points for your graph.
- Based on last year's sales, the students will probably not be able to sell more than 600 fruit bars. **Using your graph**, explain how you can find the number of boxes of popcorn the students must sell to make a total of \$300 if they sell exactly 600 fruit bars. How many boxes of popcorn must they sell?

Reporting Category for Item 39: Patterns, Relations, and Algebra (p. 286)

XI. Mathematics,

Grade 10