

## Grade 6 Mathematics Achievement Test:

### Part B

Content Domain of Test (Strand)	Part B: Percentage of Questions	Cognitive Domain of Test (Complexity Level)	Part B: Percentage of Questions
Number	25 – 35%	Low	30 – 40%
Patterns and Relations	20 – 30%	Moderate	40 – 50%
Shape and Space	20 – 30%	High	15 – 25%
Statistics and Probability	10 – 20%		

A bag contains 300 marbles of which 24% are green.

1. Which of the following equations can be used to find the total number,  $n$ , of green marbles?

A.  $\frac{24}{100} = \frac{n}{300}$

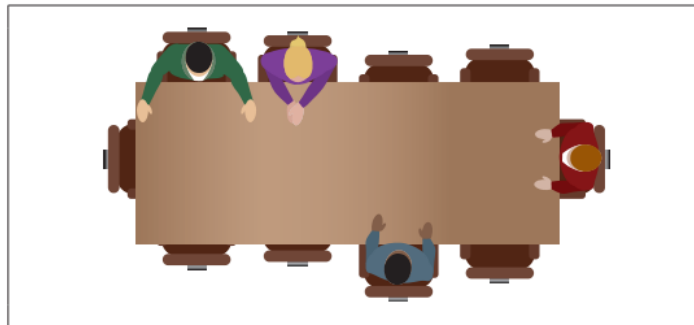
B.  $\frac{300}{n} = \frac{24}{100}$

C.  $\frac{24}{100} = \frac{200}{n}$

D.  $\frac{100}{200} = \frac{n}{24}$

2. The number 1 100 010 101.001 can be written as





- A. one million ten thousand one hundred one and one thousandth  
B. one million one hundred thousand one hundred one and one hundredth  
C. one billion ten million one thousand one hundred one and one hundredth  
D. one billion one hundred million ten thousand one hundred one and one thousandth



3. What is the ratio of chairs to people?

- A. 2:5      B. 4:5      C. 5:2      D. 5:4

The menu below shows the items sold at a concession and the cost of each item.

Menu		
Can of juice		\$1.25
Slice of pizza		\$2.25
Bag of peanuts		\$1.00
Chocolate bar		\$1.25

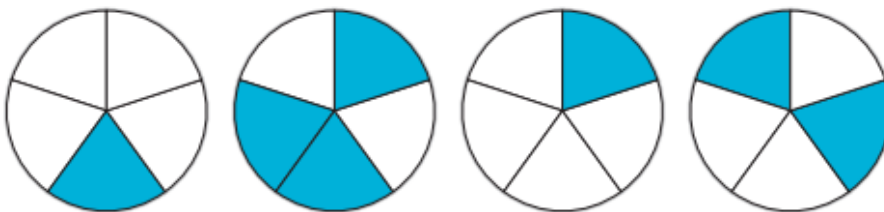
4. If a student purchased 1 can of juice, 2 slices of pizza, 1 bag of peanuts, and 2 chocolate bars using a \$20.00 bill, then her change was
- A. \$9.25                      B. \$9.75                      C. \$10.25                      D. \$10.75

Margo uses integers to represent floor levels in a building. Starting at ground level (floor 0), an elevator travels in the following directions:

- down 5 floors
- up 1 floor
- up 7 floors
- down 8 floors

5. If floors that are below ground level are represented by negative integers, then on which floor does the elevator make its last stop?
- A. -5                      B. -4                      C. -3                      D. -2

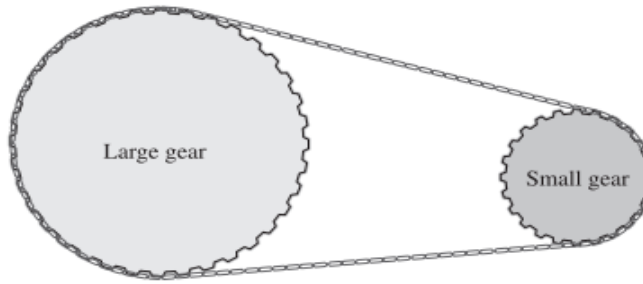
The circles shown below have sections of equal size.



6. How many new circles can be made using only the shaded sections?

- A.  $1\frac{2}{5}$                       B.  $1\frac{5}{2}$                       C.  $1\frac{5}{7}$                       D.  $1\frac{7}{5}$

The following diagram shows two gears that are connected by a chain. The large gear rotates 2 times for every 3 rotations of the small gear.



7. What is the total number of rotations of **both** gears when the large gear rotates 36 times?  
 A. 54 rotations      B. 60 rotations      C. 72 rotations      D. 90 rotations

Ben is thinking about a certain integer that is:

- less than  $-5$
- greater than  $-12$
- closer to  $-12$  than to  $-5$

8. Which of the following integers could Ben be thinking about?  
 A.  $-4$       B.  $-6$       C.  $-10$       D.  $-14$

Shannon makes 6 grilled-cheese sandwiches for her 4 children. Her oldest child eats 3 sandwiches, and her youngest child eats only  $\frac{1}{4}$  of a sandwich.

9. How many sandwiches do Shannon's other 2 children eat if all the sandwiches are eaten?  
 A.  $2\frac{3}{4}$       B.  $2\frac{1}{4}$       C.  $1\frac{3}{4}$       D.  $1\frac{1}{4}$

10. Which of the following word statements represents the value of 0.012?  
 A. Two thousandths    B. Twelve hundredths    C. Twelve thousandths    D. Twelve ten thousandths

**Whole Numbers**

9      10      11      12      13      14      15      16      17

11. How many of the whole numbers shown above are also composite numbers?  
 A. 3      B. 4      C. 5      D. 6

The 4 black squares in the diagram below have the same dimensions. The area of each grey rectangle is equal to  $\frac{1}{2}$  the area of a black square.



12. The percentage of the diagram shown above occupied by the black squares is approximately  
 A. 44%      B. 50%      C. 56%      D. 60%

Below the following figure there is a number line.



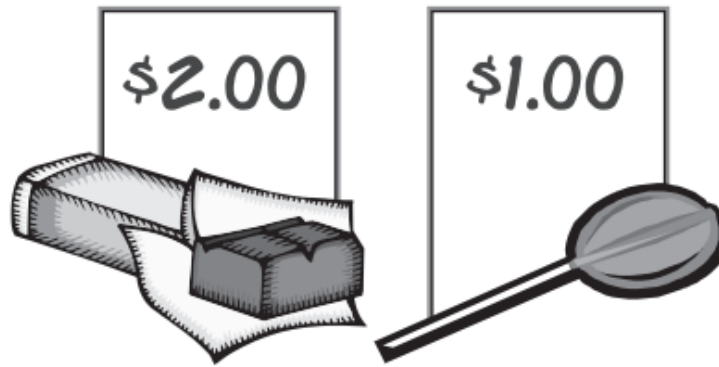
13. Which of the following mixed numbers could represent the length of the figure above?  
 A.  $1\frac{9}{14}$  units      B.  $1\frac{5}{9}$  units      C.  $2\frac{4}{14}$  units      D.  $2\frac{4}{5}$  units

Patrick fills  $3\frac{5}{12}$  of the egg cartons shown below with eggs.



14. How many eggs in **total** does Patrick have?  
 A. 35      B. 36      C. 41      D. 43

A candy store sells chocolate bars and lollipops at the prices shown below. If a customer buys 2 lollipops, then the price of the second lollipop is reduced by 25%.



15. How much would it cost to buy 1 chocolate bar and 2 lollipops?

- A. \$2.75
- B. \$3.25
- C. \$3.75
- D. \$4.25



16. If the pattern in the graph continues, then how much money would be saved in year 8?

- A. \$1 500
- B. \$1 750
- C. \$2 000
- D. \$2 250

Left Side	Right Side
$12 + 6 = 22 - 4$	

17. Which of the following operations would preserve equality in the equation shown above?

- A. Subtract 4 from the left side and add 4 to the right side
- B. Subtract 6 from the left side and add 4 to the right side
- C. Subtract 6 from the left side and subtract 6 from the right side
- D. Subtract 4 from the left side and subtract 6 from the right side

Bobbie uses the following rule to generate a list of numbers:

**Rule:** Multiply the previous number by 2 and then add 3.

18. If the first three numbers that Bobbie generates are 6, 15, and 33, then the next three numbers are
- A. 69, 140, 282                      B. 69, 141, 285                      C. 100, 202, 406                      D. 100, 302, 906

Josh has 30 hockey cards. He keeps 10 cards for himself and gives 5 cards to his sister. Josh then shares the remaining cards equally among 5 friends.

19. How many cards does Josh give to each friend?
- A. 2                      B. 3                      C. 4                      D. 5

Each day Jessie deposits money into her piggy bank according to the pattern shown in the chart below.

Day	Amount Deposited
1	\$1.00
2	\$2.00
3	\$3.00
4	\$4.00

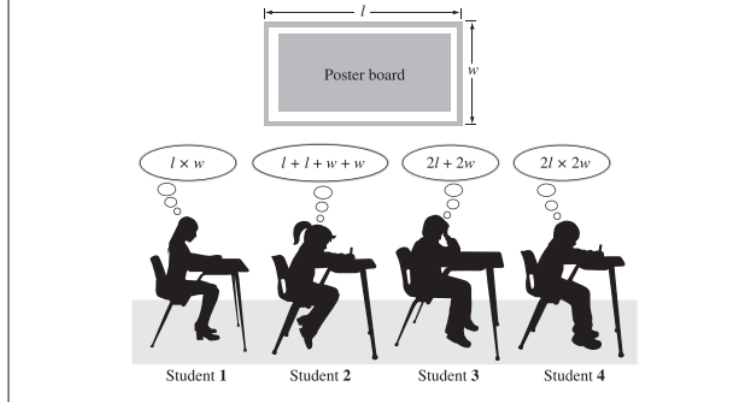
20. Jessie continues to deposit money into her piggy bank according to the pattern shown in the chart above. How many days does it take her to deposit a total of \$21.00?
- A. 4 days                      B. 5 days                      C. 6 days                      D. 7 days

Candice uses the values  $a = 2$  and  $b = 3$  to determine which of the following equations demonstrates the commutative property.

- I**     $a + b = b + a$   
**II**    $a - b = b - a$   
**III**    $a \times b = b \times a$   
**IV**    $a \div b = b \div a$

21. Candice determines that the equations that demonstrate the commutative property are
- A. I and III                      B. I and IV                      C. II and III                      D. II and IV

Four students are thinking about how to decorate a rectangular poster board for a school project.



22. The two students who correctly determined expressions for the perimeter of the poster board are students
- A. 1 and 4                      B. 1 and 3                      C. 2 and 4                      D. 2 and 3

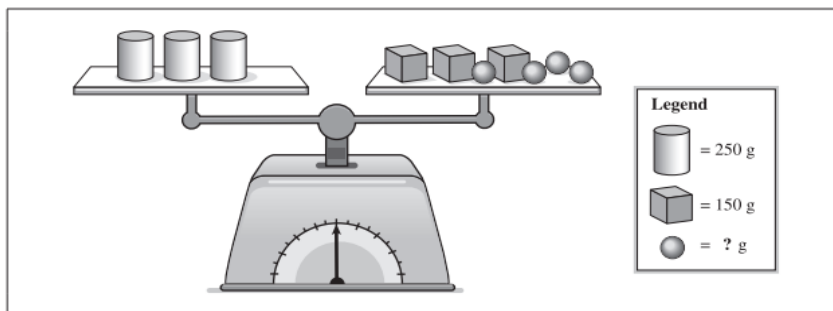
Lily creates the following table to record the number of pages she will read over 5 days.

Day number ( $d$ )	Number of pages read each day ( $2d + 1$ )
1	
2	
3	
4	
5	

23. How many more pages will Lily read on day 5 than on day 2?
- A. 5                      B. 6                      C. 11                      D. 16

Melanie,  $m$ , is four years younger than Brad,  $b$ . Rick,  $r$ , is three years older than Brad.

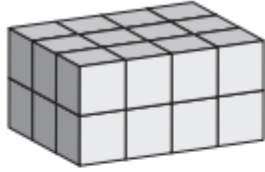
24. Which of the following equations could be used to represent the relationship between Melanie's and Rick's ages?
- A.  $r = m + 7$                       B.  $r = m - 7$                       C.  $m = r - 1$                       D.  $m = r + 1$



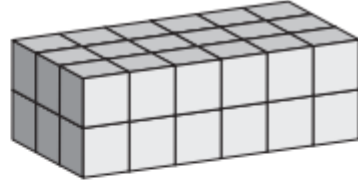
25. What is the mass of one sphere?
- A. 50 g                      B. 75 g                      C. 150 g                      D. 300 g

26. What Which of the following rectangular prisms has the greatest volume?

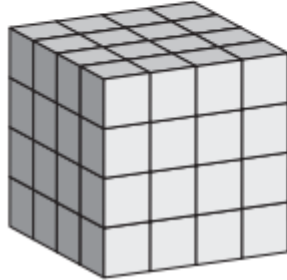
A.



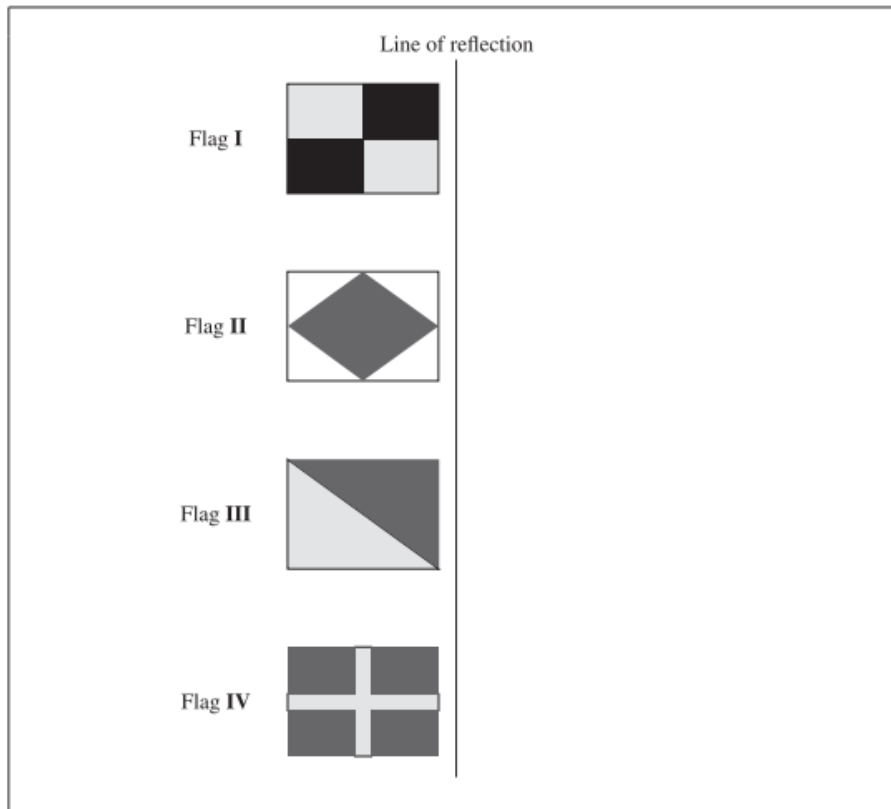
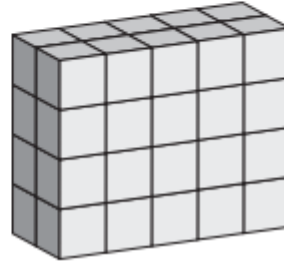
B.



C.



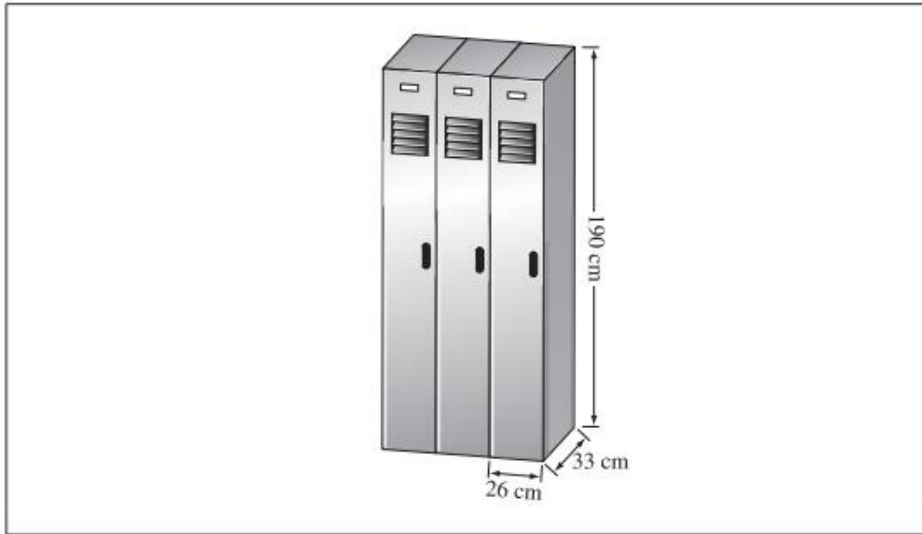
D.



27. Which two flags create identical images when reflected across the line of reflection shown above?

- A. Flag I and Flag III    B. Flag I and Flag IV    C. Flag II and Flag III    D. Flag II and Flag IV





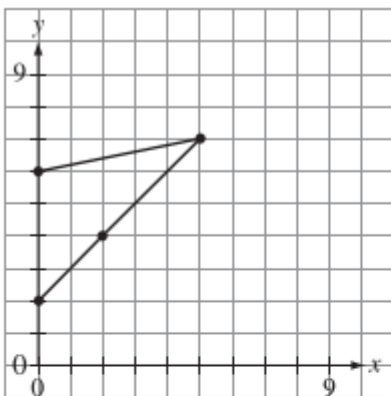
28. Which of the following expressions can be used to find the total volume of the 3 lockers?

- A.  $(26 \text{ cm} \times 33 \text{ cm} \times 190 \text{ cm}) \times 3$
- B.  $(26 \text{ cm} + 33 \text{ cm} + 190 \text{ cm}) \times 3$
- C.  $(26 \text{ cm} \times 33 \text{ cm} \times 190 \text{ cm}) \div 3$
- D.  $(26 \text{ cm} + 33 \text{ cm} + 190 \text{ cm}) \div 3$

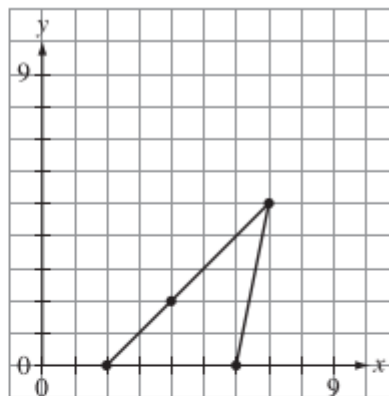
Sebastian created a 2-D shape in the first quadrant of the Cartesian plane by plotting the points  $(2, 0)$ ,  $(2, 4)$ ,  $(5, 7)$ , and  $(6, 0)$  and connecting the points in this order.

29. Which of the following 2-D shapes matches the shape that Sebastian creates?

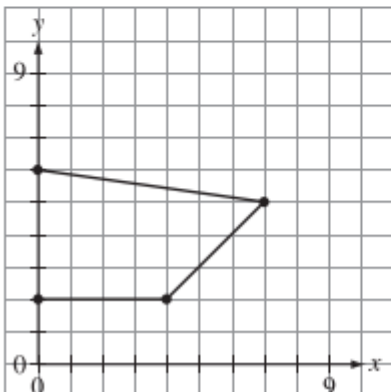
A.



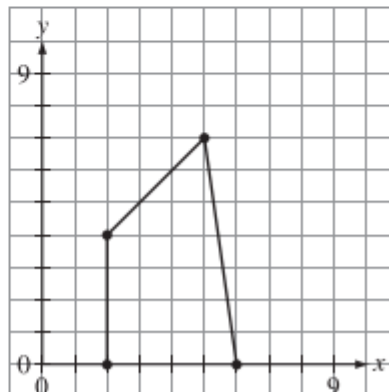
B.



C.



D.



Seats are evenly spaced around the amusement ride shown below.



30. The measure of angle  $y$  shown above is

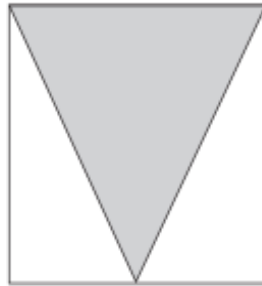
A.  $101.25^\circ$

B.  $112.50^\circ$

C.  $118.50^\circ$

D.  $123.75^\circ$

The area of the shaded isosceles triangle shown below is  $24 \text{ cm}^2$ .



31. What is the area of the entire square shown above?

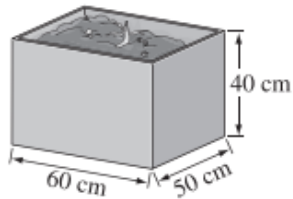
A.  $30 \text{ cm}^2$

B.  $36 \text{ cm}^2$

C.  $42 \text{ cm}^2$

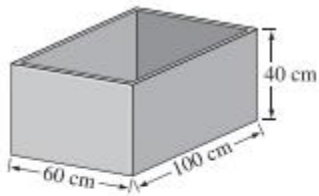
D.  $48 \text{ cm}^2$

Ginette has a compost bin with the dimensions shown below.

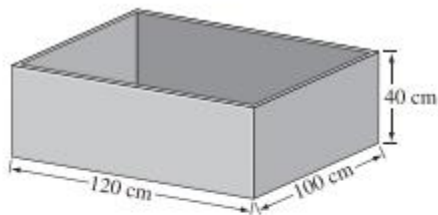


32. Which of the following bins has a volume that is **twice** the volume of Ginette's bin?

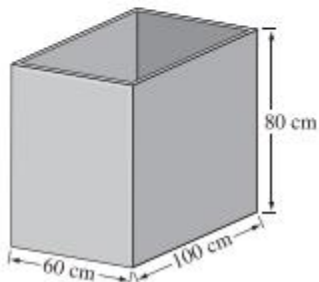
A.



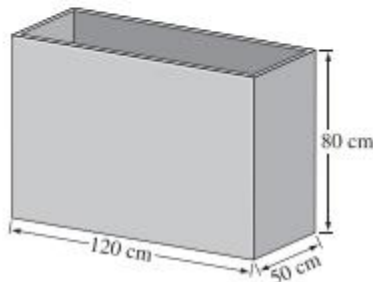
B.



C.

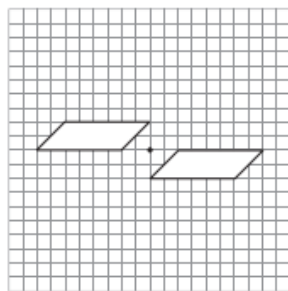


D.

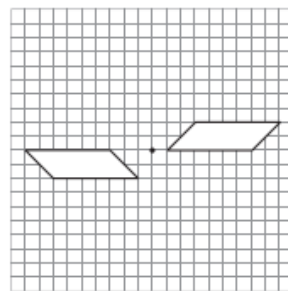


33. Which of the following diagrams shows an image resulting from a  $180^\circ$  rotation about the black dot?

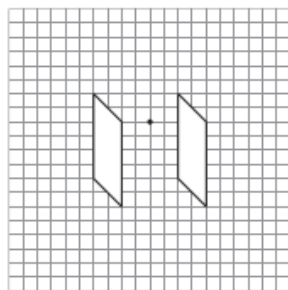
A.



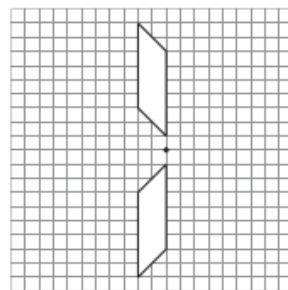
B.



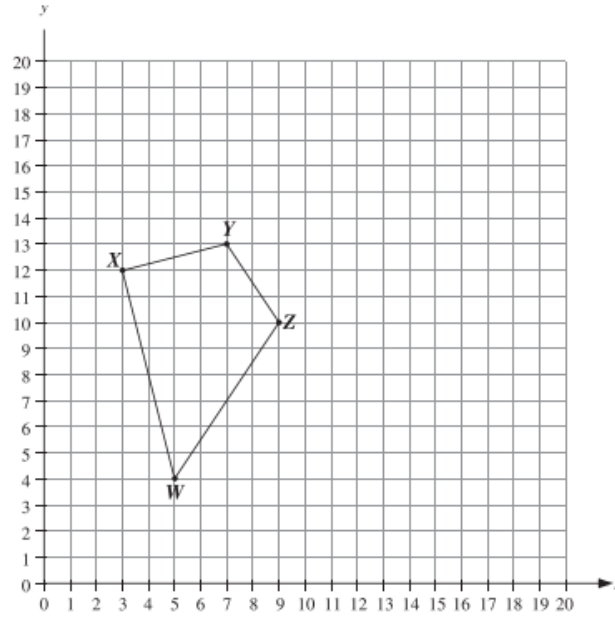
C.



D.

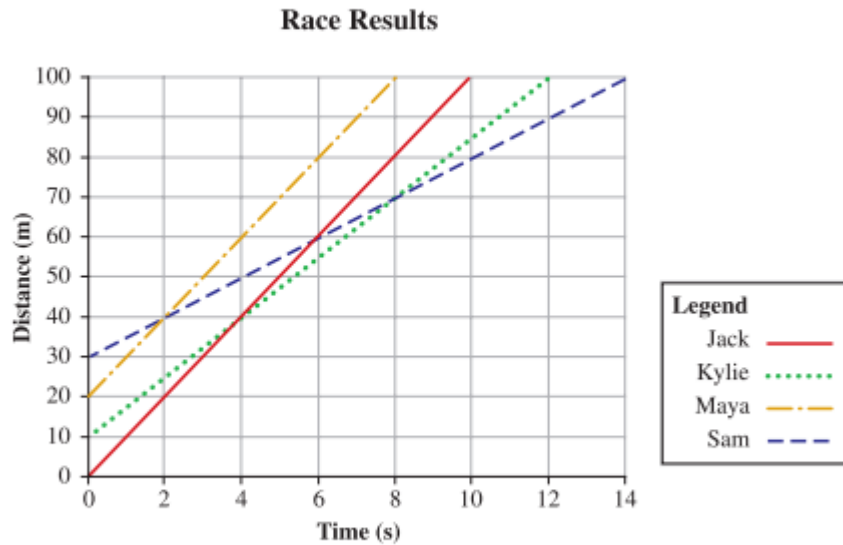


Translate quadrilateral  $WXYZ$  shown below 2 units left and 1 unit down, followed by a  $90^\circ$  counter-clockwise rotation about point  $Y'$ .



34. After the transformations of quadrilateral  $WXYZ$  described above, the coordinates of  $Z''$  will be  
 A. (8, 9)      B. (3, 10)      C. (8, 14)      D. (11, 15)

The results of a race are shown on the graph below.



**Note:** Each person had a different starting point.

35. Which two people each ran 40 metres in 4 seconds?  
 A. Sam and Kylie      B. Kylie and Jack      C. Jack and Maya      D. Maya and Sam

Hannah wants to know if Grade 6 students in her school prefer skiing to snowboarding.

36. Which of the following groups of students should Hannah survey?

- A. Students on the Grade 6 ski team
- B. All Grade 6 students in her school
- C. Students on the Grade 6 snowboard team
- D. Grade 6 students from the school's ski and snowboard club

A teacher puts the following names in a bag to randomly select teams.

Boys' Names	Girls' Names
Ivan	Jane
Mo	Sarah
Carl	Nicole
Ken	Janet
Bob	Ashley
Sal	Stacey
Paul	
Frank	

37. The first 3 names that the teacher picks at random are Mo, Janet, and Ashley. If these 3 names are **not** put back in the bag, then what is the probability that the next name drawn will be a boy's?

- A.  $\frac{8}{14}$
- B.  $\frac{7}{14}$
- C.  $\frac{7}{11}$
- D.  $\frac{1}{6}$

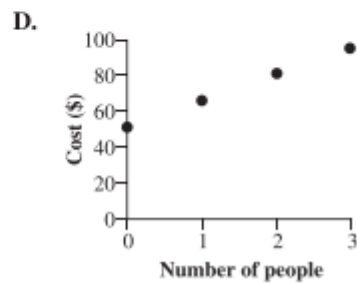
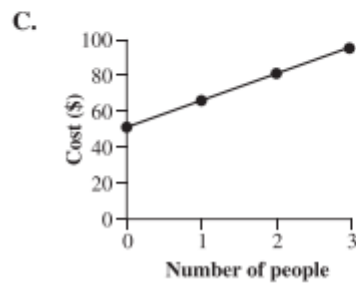
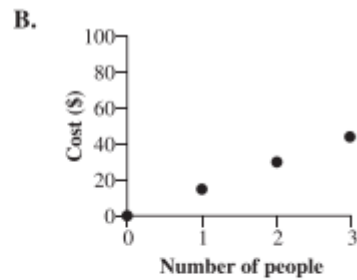
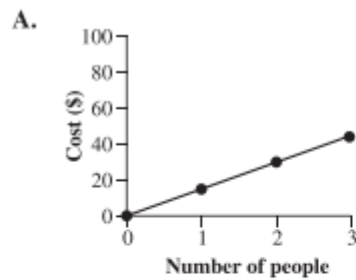
Sydney wants to determine which pizza company has the most restaurants in Alberta.

38. Which method of collecting data is **most** appropriate for answering Sydney's question?

- A. Sydney counts the number of restaurants for each pizza company in her town.
- B. Sydney looks up last year's reported sales for each pizza company on the Internet.
- C. Sydney asks people from across the province to identify their favourite restaurant.
- D. Sydney visits each pizza company's website to find the number of restaurant locations.

A catering company charges \$50 and an additional fee of \$15 for every person who attends a dinner party.

39. Which of the following graphs correctly represents the cost of a dinner party with this catering company?



40. Which of the following sets of data is best represented by a line graph?

- A. Heights of Grade 6 students
- B. Shoe sizes of Grade 6 students
- C. Temperatures in the playground during the day
- D. Number of students who walk home for lunch

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# Grade 6 Mathematics Achievement Test: **Part B**

## Answer Key

Item	Key	Strand	Specific Outcome	Item Description
MC 1	A	N	6	Determine the ratio that represents the solution to a problem involving percent.
MC 2	D	N	1	Apply understanding of place value to match the symbolic representation of a number to its equivalent representation in word form.
MC 3	C	N	5	Identify the part-to-whole ratio that represents a real-life context.
MC 4	D	N	9	Identify and apply the order of operations to solve a given problem involving money.
MC 5	A	N	7	Apply understanding of integers to represent the position of an object after the object has undergone a series vertical up and down movements.
MC 6	A	N	4	Represent a given context as an improper fraction and express the improper fraction as a mixed number.
MC 7	D	N	5	Determine the ratio that represents a context involving a small and large gear.
MC 8	C	N	7	Determine the integer value that satisfies given conditions (e.g. less than or greater than a certain integer value, etc.)
MC 9	A	N	4	Determine the mixed number that represents a certain quantity that is greater than 1.
MC 10	C	N	1	Identify the word statement that represents a given symbolic value that is less than one thousandth.
MC 11	D	N	3	From a given set of whole numbers, determine which numbers are composite numbers.
MC 12	A	N	6	Use a diagram composed of regular and irregular 2-D shapes to determine the percentage of the diagram that is occupied by a specific 2-D shape (Gr.5, N.9).
MC 13	D	N	4	Determine the mixed number that represents a given number line value (Gr.5, N.7).
MC 14	C	N	4	Translate a given mixed number between pictorial and symbolic representations.
MC 15	C	N	6	Determine the total cost of buying 3 items when the cost of one of the items is reduced by a given percentage (Gr.5, N.9).
MC 16	C	PR	1	Determine the relationship shown on a graph to make a prediction.
MC 17	C	PR	5	Given an equation, identify the operations that would preserve equality.
MC 18	B	PR	3	Use a pattern rule to extend a given pattern.
MC 19	B	PR	4	Identify the unknown in a problem; represent the problem with an equation; and solve the problem concretely, pictorially, or symbolically.
MC 20	C	PR	2	Predict the value of an unknown term using the relationship in a given table of values.
MC 21	A	PR	3	Identify the equations that illustrate the commutative property.
MC 22	D	PR	3	From a set of formulas, identify those that represent the perimeter of a given rectangle (Gr.5, SS.2).
MC 23	B	PR	2	Generate values in one column of a table of values given a pattern rule (Gr.5, PR.1).
MC 24	A	PR	4	Represent a given relationship involving whole numbers with an equation (Gr.5, PR.2).
MC 25	B	PR	5	Apply knowledge of preservation of equality to determine the mass of an object on a balanced scale when the masses of other objects are given.
MC 26	C	SS	3	Compare four different right rectangular prisms to determine the prism that has the greatest volume.
MC 27	D	SS	6	Reflect given 2-D shapes across a line of reflection to determine which shapes are congruent to their images.
MC 28	A	SS	8	Generalize a rule (formula) for determining the volume of given right rectangular prisms.
MC 29	D	SS	8	Identify the 2-D shape whose vertices match given coordinates in the first quadrant of the Cartesian plane.
MC 30	B	SS	1	Measure a given angle using a protractor, and/or estimate the measure of the angle using 90 degrees and 180 degrees as reference angles (Gr.5, SS.1).
MC 31	D	SS	3	Determine the area of a square given the area of an inscribed triangle.
MC 32	A	SS	3	Apply a formula for right rectangular prisms to determine which prism has twice the volume of a given prism (Gr.5, SS.4).
MC 33	A	SS	6	Identify a 2-D shape and its transformation image (Gr.5, SS.8).
MC 34	C	SS	7	Perform a combination of transformations on a 2-D shape and identify the coordinates of one vertex of the image (Gr.5, SS.9).
MC 35	C	SP	1	Read and interpret a multiple-line graph to draw a conclusion.
MC 36	B	SP	2	Determine the survey sample that is most representative of a given population.
MC 37	C	SP	4	Determine the theoretical probability of an outcome occurring for a probability experiment involving random selection.
MC 38	D	SP	2	Identify the most appropriate method for collecting data to answer a given question.
MC 39	D	SP	1	Identify the graph that represents given discrete data (Gr.5, N.7).
MC 40	B	SP	1	Measure a given angle using a protractor, and/or estimate the measure of the angle using 90 degrees and 180 degrees as reference angles (Gr.5, SS.1).