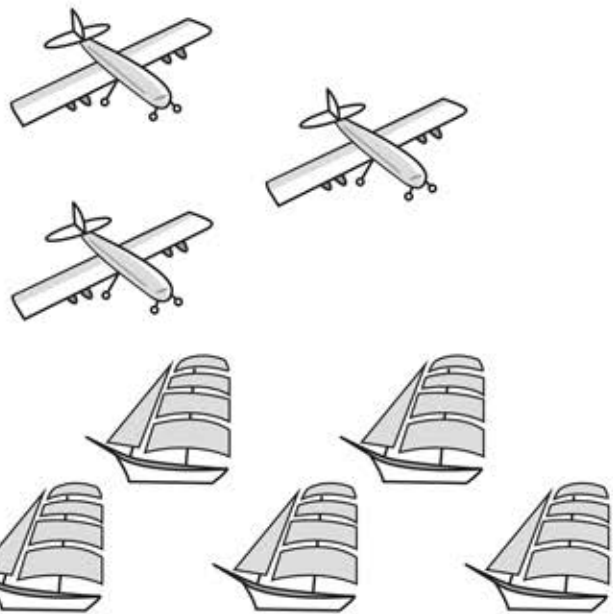# Grade 6 Mathematics
SESSION 1

DIRECTIONS

This session contains eight multiple-choice questions, two short-answer questions, and two open-response questions.
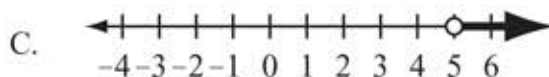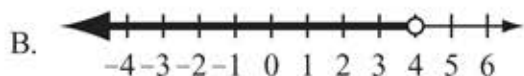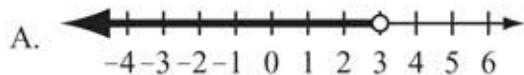
1 The diagram below shows some model airplanes and some model ships.

What is the ratio of the number of model airplanes to the number of model ships?

A. 8:3

B. 5:3

C. 3:8

D. 3:5

2 Which of the following number lines best represents all the solutions of the inequality $x < 4$?

A.

B.

C.

D.
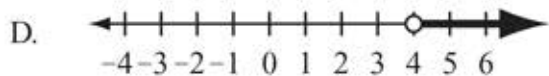
3 Bianca read 5 books last month. The number of pages in each book that Bianca read is listed in the box below.

| 120, 106, 94, 100, 180 |

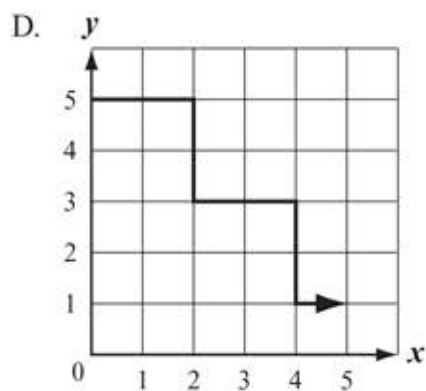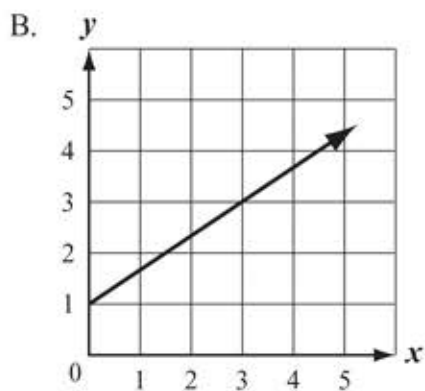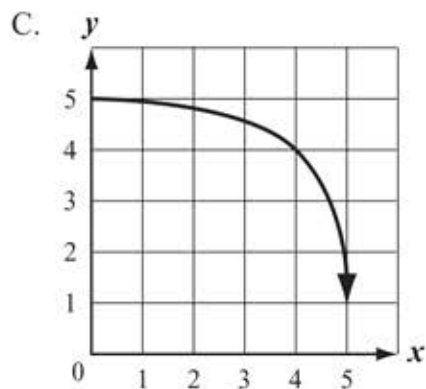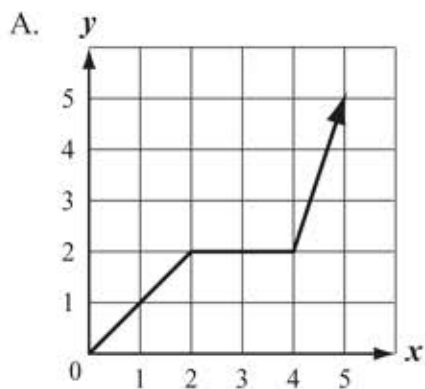What is the mean absolute deviation of the number of pages in the 5 books Bianca read?

A. 24

B. 30

C. 106

D. 120

4 Roya paid $48 for 12 cartons of orange juice. What is the unit rate per carton of orange juice that Roya paid?

A. $3

B. $4

C. $6

D. $12

5   Which of the following graphs shows a constant rate of change between the variables x and y?

A. y

C. y

B. y

D. y

Questions 6 and 7 are short-answer questions.

6   An expression is shown below.

$$g + 3f + f + g + g$$

Write an equivalent expression that uses each variable only **once**.

7   Marvin surveyed his classmates to find out their favorite sports. Each classmate chose only one sport. The results of his survey are represented in the circle graph below.

Classmates' Favorite Sports
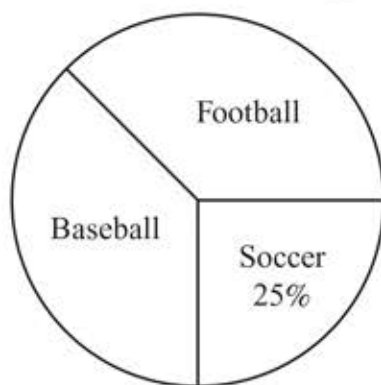
In all, Marvin surveyed 48 of his classmates. An equal number of Marvin's classmates chose baseball and football. Based on the circle graph, what is the total number of classmates who chose baseball as their favorite sport?

Question 8 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations)**
- **If you do the work in your head, explain in writing how you did the work.**

8   The table below shows the amount, in pounds, of snow that Andy can remove over time using a shovel.

Snow Removal Using a Shovel

Time (in minutes)	1	2	3	4	5	6
Snow Removed (in pounds)	80	160	240	320		480

a. Based on the table, what is the amount, in pounds, of snow that Andy can remove in 5 minutes using a shovel? Show or explain how you got your answer.

On the grid in your Student Answer Booklet, copy the x-axis, the y-axis, and the labels exactly as shown below.
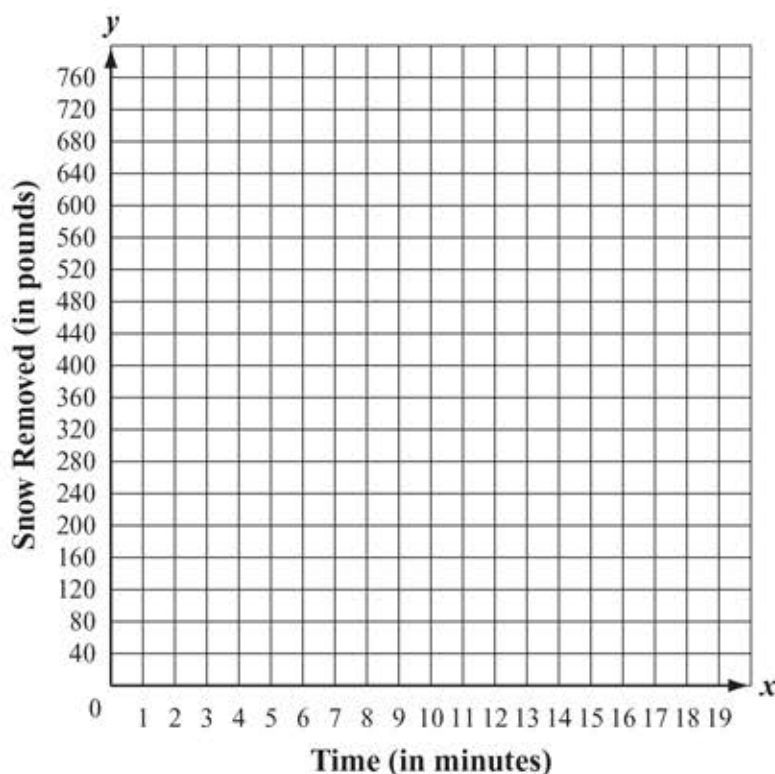
b. On your grid, plot the data from the table to show the amount of snow that Andy can remove over time.

c. Based on your graph, what is the amount, in pounds, of snow that Andy can remove in 10 minutes? Show or explain how you got your answer.

9 The histogram below represents the number of minutes some students studied for a geography quiz.

Minutes Spent Studying

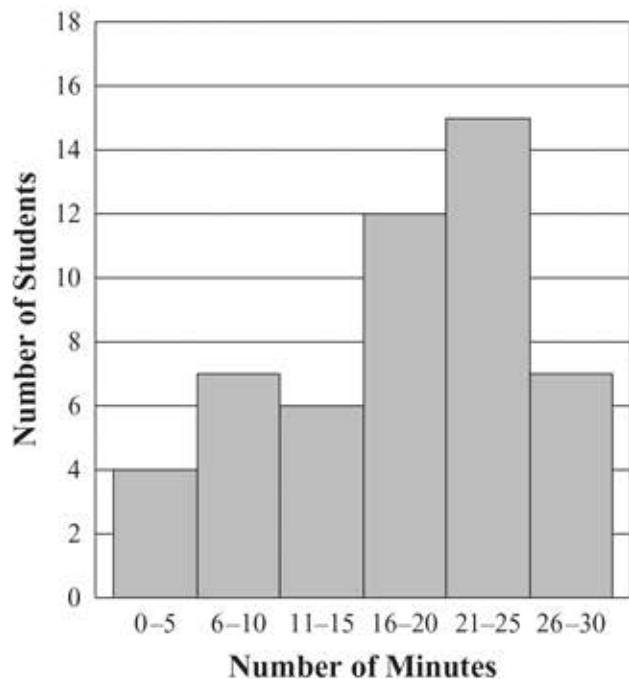Based on the histogram, what is the total number of students who studied between 11 and 25 minutes for the geography quiz?

A. 6

B. 14

C. 21

D. 33

10 Which of the following expressions represents "subtract 17 from x"?

A. $17 - x$

B. $x - 17$

C. $-17x$

D. $-x - 17$

11 A radio station manager has $1000 in prize money to give away. She will give away $50 in prize money each hour.

Which of the following expressions represents the amount of prize money the radio station manager will have left to give away after h hours, where h is any number of hours?

A. $1000 + 50h$

B. $1000h + 50$

C. $1000 - 50h$

D. $1000h - 50$

Question 12 is an open-response question.

12 A circular pool is located in the center of a square park. The park, the pool, and some of their dimensions are shown in the diagram below.

Park
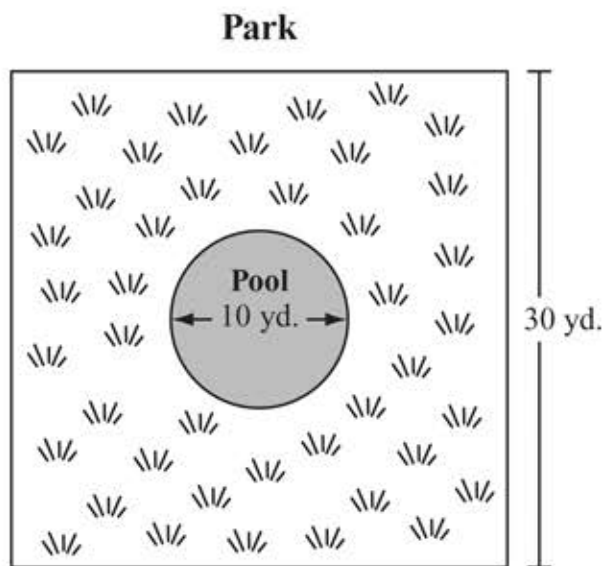
a. What is the radius, in yards, of the pool? Show or explain how you got your answer.

b. What is the circumference, in yards, of the pool? Show or explain how you got your answer. (Use 3.14 for π.)

c. What is the area, in square yards, of the pool? Show or explain how you got your answer. (Use 3.14 for π.)

The ground in the park surrounding the pool is covered with grass.

d. What is the total area, in square yards, of the ground in the park that is covered with grass? Show or explain how you got your answer.

DIRECTIONS

This session contains eight multiple-choice questions and one short-answer question.

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13 Points A, B, C, and D are shown on the number line below.

$$A \quad B \qquad C \quad D$$
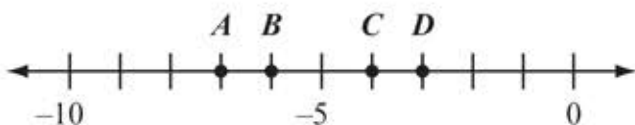
Which point is located at -7?

A. point A

B. point B

C. point C

D. point D

---

14 What is the value of the expression below when $n = 6$?

$$2n + 3n$$

A. 12

B. 18

C. 30

D. 62

15 Guthrie made the input-output table shown below.

Input (x)	Output (y)
1	4
2	7
3	10
4	13

Which of the following equations is true for all values in Guthrie's input-output table?

A. $x + 3 = y$

B. $x + 7 = y$

C. $3x + 1 = y$

D. $4x - 1 = y$

16 At the beginning of the day, a water tank contained 526.8 gallons of water. During the day, some of the water was used to water a garden. At the end of the day, the water tank contained 318.05 gallons of water.

What was the total amount of water used that day?

A. 202.75 gallons

B. 208.75 gallons

C. 208.85 gallons

D. 210.80 gallons

17 Luke recorded the number of days it rained each month for 12 months. He made a box plot to represent the data, as shown below.

Number of Days of Rain Per Month
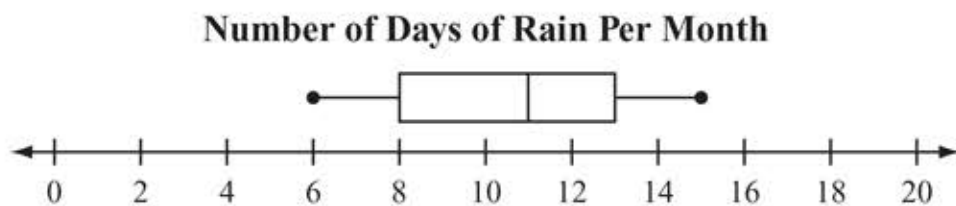
What is the interquartile range of the data in Luke's box plot?

A. 11

B. 9

C. 8

D. 5

Question 18 is a short-answer question.

18   Elijah wrote two numbers that follow the rules in the box below.

> - Both numbers are less than 10.
> - Both numbers are whole numbers.
> - The least common multiple of the numbers is 18.
> - The greatest common factor of the numbers is 3.

What two numbers did Elijah write?

19 A theater has a total of 750 seats.

- There are 30 rows of seats in the theater.
- Each row has the same number of seats.

What is the total number of seats in each row of the theater?

A. 21

B. 23

C. 25

D. 27

20 Which of the following expressions has the greatest value?

A. $2^3 + 2^3$

B. $2^3 + 7^1$

C. $3^2 + 3^2$

D. $3^2 + 7^1$

21 Ethan is hiking in a canyon.

- He is at an elevation that is below sea level.
- His elevation is within 200 feet of sea level.

Which of the following could be Ethan's elevation in feet?

A. -300

B. -150

C. 150

D. 300

PERIMETER FORMULAS

perimeter = distance around

square.......... $P = 4s$

rectangle........ $P = 2b + 2h$
$$\text{OR}$$
$$P = 2l + 2w$$

triangle......... $P = a + b + c$

AREA FORMULAS

square.......... $A = s \times s$

rectangle........ $A = bh$
$$\text{OR}$$
$$A = lw$$

parallelogram..... $A = bh$

triangle......... $A = \frac{1}{2}bh$

circle.......... $A = \pi r^2$

VOLUME FORMULAS

rectangular prism..... $V = lwh$

cube .... $V = s \times s \times s$
$$(s = \text{length of an edge})$$

CIRCLE FORMULAS

$$C = 2\pi r$$
$$\text{OR}$$
$$C = \pi d$$

$$A = \pi r^2$$

Grade 6 Mathematics

Reporting Categories, Standards, and Correct Answers*

Item No.		Reporting Category	Standard	Correct Answer (MC/SA)*
1		*Ratios and Proportional Relationships*	RP.1	D
2		*Expressions and Equations*	EE.8	B
3		*Statistics and Probability*	SP.5	A
4		*Ratios and Proportional Relationships*	RP.2	B
5		*Expressions and Equations*	EE.9	B
6		*Expressions and Equations*	EE.4	$4f + 3g$ or $3g + 4f$
7		*Statistics and Probability*	SP.4	18
8		*Ratios and Proportional Relationships*	RP.3	
9		*Statistics and Probability*	SP.4	D
10		*Expressions and Equations*	EE.2	B
11		*Expressions and Equations*	EE.6	C
12		*Geometry*	G.1	
13		*The Number System*	NS.6	A
14		*Expressions and Equations*	EE.2	C
15		*Expressions and Equations*	EE.9	C
16		*The Number System*	NS.3	B
17		*Statistics and Probability*	SP.5	D
18		*The Number System*	NS.4	6 and 9
19		*The Number System*	NS.2	C
20		*Expressions and Equations*	EE.1	C
21		*The Number System*	NS.5	B

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by the shaded cells,