
XIII. Mathematics, Grade 7

Mathematics

SESSION 1

You may use your reference sheet and MCAS ruler during this session.

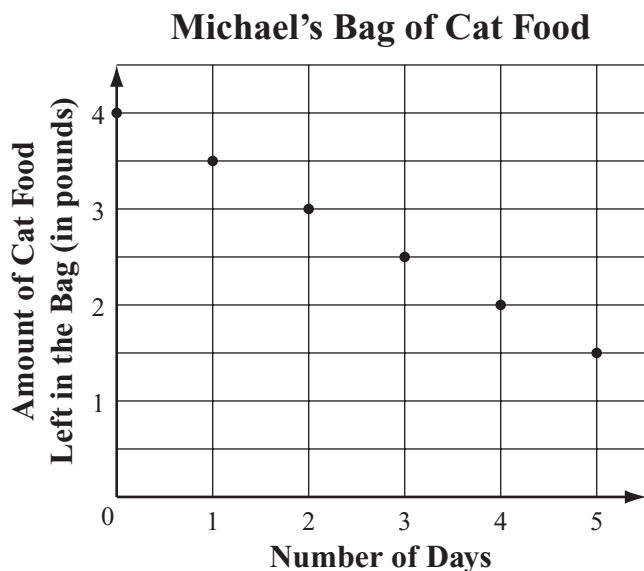
You may **not** use a calculator during this session.



DIRECTIONS

This session contains fifteen multiple-choice questions, five short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 1 Michael bought a 4-pound bag of cat food. He fed his cat the same amount of food from the bag each day, as shown in the graph below.



What amount of food from the bag did Michael feed his cat each day?

- A. $\frac{1}{4}$ pound
- B. $\frac{1}{2}$ pound
- C. 1 pound
- D. 2 pounds

- 2 What is the value of the expression below?

$$3 \cdot 5 + 4^2$$

- A. 23
- B. 31
- C. 39
- D. 63

- 3 Which of the following statements describes a correct method for solving the equation below?

$$20 + 2w = 50$$

- A. Add 20 to both sides of the equation, and then divide both sides by 2.
- B. Subtract 20 from both sides of the equation, and then divide both sides by 2.
- C. Divide both sides of the equation by 2, and then add 20 to both sides.
- D. Divide both sides of the equation by 2, and then subtract 20 from both sides.

4 Chris was looking for information on space exploration. She got approximately 54,800,000 results when she did an Internet search. What is 54,800,000 written in scientific notation?

- A. 5.48×10^5
- B. 5.48×10^6
- C. 5.48×10^7
- D. 5.48×10^8

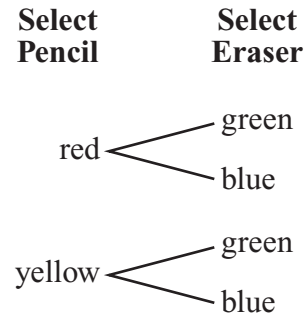
5 Ramon is going to walk, jog, and run a total distance of 30 miles for charity. He plans to walk $\frac{1}{2}$ of the total distance, jog $\frac{1}{3}$ of the total distance, and run the remaining distance. What is the distance that Ramon plans to run?

- A. 5 miles
- B. 10 miles
- C. 12 miles
- D. 18 miles

6 Nick has the following items in a bag:

- one red pencil
- one yellow pencil
- one green eraser
- one blue eraser

Nick will randomly select one pencil and one eraser from the bag. Both pencils are the same size and shape. Both erasers are the same size and shape. The tree diagram below shows all the possible combinations Nick can select.

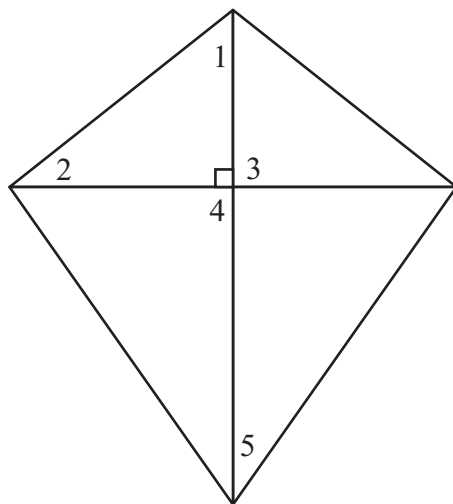


What is the probability that Nick will select a red pencil and a blue eraser?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{3}{4}$

Questions 7 and 8 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 7 Gina drew the kite shown below.



Name two of the numbered angles that **must** be congruent to each other.

- 8 The total cost for 80 students on a class trip to stay at a motel for 1 night was \$1600. What was the cost, in dollars, for 1 student to stay at the motel for 1 night?

Question 9 is an open-response question.

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

Write your answer to question 9 in the space provided in your Student Answer Booklet.

- 9 The label on the can of paint that Chang bought stated that 1 gallon of paint will cover 300 square feet.
- a. In your Student Answer Booklet, copy the table below. (Do not use the grid for the table.) Based on the information on the label, complete the table for the numbers of gallons listed. Show or explain how you got each answer.

Paint Coverage

Number of Gallons	Area Covered (in square feet)
1	300
2	
3	
4	

- b. Write an expression that represents the number of square feet that g gallons will cover.
- c. On the grid in your Student Answer Booklet, graph the relationship between the number of gallons of paint used and the area covered by the paint using the data from your table in part (a). Be sure to title your graph and label your axes.

Mark your answers to multiple-choice questions 10 through 18 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 10 What is the value of the expression below when $x = 0$ and $y = 4$?

$$5x + y^2$$

- A. 8
- B. 16
- C. 21
- D. 66

- 11 Which of the following measures could be 432 square inches?

- A. the width of a car
- B. the area of a doormat
- C. the volume of a suitcase
- D. the perimeter of a classroom

- 12 The table below shows how many scoops of hot chocolate mix are needed in order to make different numbers of cups of hot chocolate.

Hot Chocolate Mix Recipe

Number of Cups of Hot Chocolate (c)	Number of Scoops of Mix Needed (s)
2	4
4	8
6	12
8	16

For the data in the table, which of the following equations can be used to calculate s , the number of scoops of hot chocolate mix needed to make c cups of hot chocolate?

- A. $s = 2 + c$
- B. $s = 2c$
- C. $s = \frac{c}{2}$
- D. $s = \frac{2}{c}$

- 13 The top ten scores in a bowling tournament are listed below.

285	300	279	288	259
288	250	298	255	288

Which stem-and-leaf plot correctly represents these scores?

A. **Bowling Scores**

25	5 9
26	
27	9
28	5 8 8 8
29	8
30	

Key
25 9 represents 259

C. **Bowling Scores**

25	0 5 9
26	
27	9
28	5 8
29	8
30	0

Key
25 9 represents 259

B. **Bowling Scores**

25	0 5 9
26	0
27	9
28	5 8 8 8
29	8
30	0

Key
25 9 represents 259

D. **Bowling Scores**

25	0 5 9
26	
27	9
28	5 8 8 8
29	8
30	0

Key
25 9 represents 259

- 14 Ms. Robbins gave rulers to $\frac{1}{4}$ of the 24 students in her class. Which of the following expressions can be used to find $\frac{1}{4}$ of 24?
- A. $4 \div 24$
 - B. $24 \div 4$
 - C. $\frac{1}{4} \div 24$
 - D. $24 \div \frac{1}{4}$

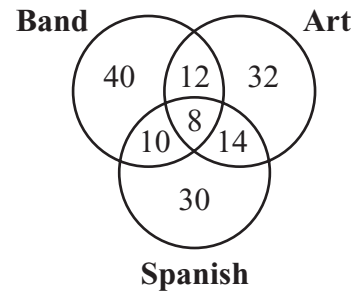
- 15 The cost of using Expert Internet Service is a one-time fee of \$25 plus a monthly fee of \$10. The expression below represents the total cost of using this Internet service for m months.

$$25 + 10m$$

What is the total cost of using Expert Internet Service for 8 months?

- A. \$105
- B. \$133
- C. \$250
- D. \$280

- 16 The Venn diagram below shows the number of seventh-grade students at Berkshire Middle School enrolled in Band, Art, Spanish, or any combination of the three elective classes.



What is the total number of seventh-grade students at Berkshire Middle School who are enrolled in both Art and Spanish, but not in Band?

- A. 106
- B. 76
- C. 22
- D. 14

- 17 What is the value of the expression below?

$$|7| + |-3|$$

- A. -10
- B. -4
- C. 4
- D. 10

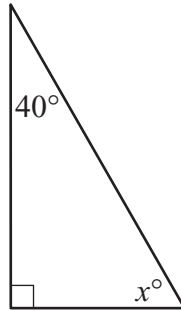
- 18 There were 48 questions on Zach's last mathematics test. He answered 5 of the 48 questions incorrectly.

Which of the following is closest to the percent of questions Zach answered **correctly** on that test?

- A. 50%
- B. 55%
- C. 90%
- D. 95%

Questions 19, 20, and 21 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 19 A right triangle and some of its angle measures are shown below.



What is the value of x ?

- 20 Friday's basketball game was attended by 160 Adams Middle School students, which was $\frac{1}{3}$ of the total student population. This relationship is represented in the equation below, where p stands for the total student population.

$$\frac{1}{3}p = 160$$

What is the total student population of Adams Middle School?

Write your answer to question 21 in the box provided in your Student Answer Booklet.

- 21 The table below lists the typical heights, in inches, of five types of herons found in Florida.

Florida Herons

Type	Height (in inches)
black-crowned night-heron	26
great blue heron	50
little blue heron	27
tricolored heron	26
yellow-crowned night-heron	26

What is the range, in inches, of the heights of these herons?

Question 22 is an open-response question.

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

Write your answer to question 22 in the space provided in your Student Answer Booklet.

- 22** Drew's goal was to earn \$150 during a four-week period in the summer.
- The first week, Drew earned 50% of his goal amount. What was the total amount of money that Drew earned the first week? Show or explain how you got your answer.
 - The second week, Drew earned 50% of the part of his goal amount that he had left to earn after the first week. What was the total amount of money that Drew earned the second week? Show or explain how you got your answer.
 - The third week, Drew earned 50% of the part of his goal amount that he had left to earn after the second week. What was the total amount of money that Drew earned the third week? Show or explain how you got your answer.
 - The fourth week, Drew earned exactly enough money to reach his goal amount. What **percent** of Drew's original goal amount did he earn in the fourth week? Show or explain how you got your answer.

Mathematics

SESSION 2

You may use your reference sheet and MCAS ruler during this session.

You may use a calculator during this session.



DIRECTIONS

This session contains fourteen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 23 Miguel's book has 208 pages. Tamar's book has n fewer pages than Miguel's book.

Which of the following expressions represents the number of pages in Tamar's book?

- A. $208 - n$
- B. $208 + n$
- C. $n - 208$
- D. $n \div 208$

- 24 The base of a juice glass is in the shape of a circle with a diameter of 5 centimeters. Which of the following is closest to the circumference of the base of the juice glass? (Use 3.14 for π .)

- A. 15.7 centimeters
- B. 19.6 centimeters
- C. 31.4 centimeters
- D. 78.5 centimeters

- 25 The table below shows the unit prices of one brand of graham crackers at four different stores. A unit is equal to 1 ounce.

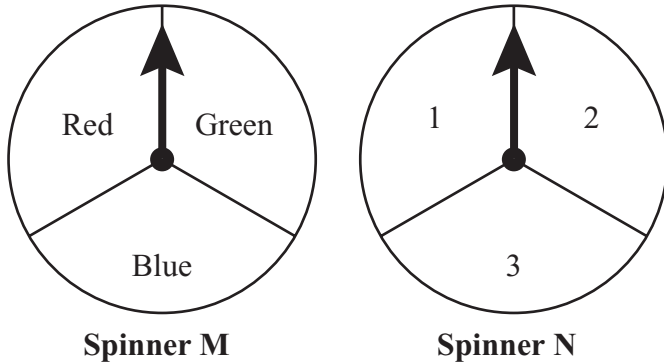
**Unit Prices of
Graham Crackers**

Store	Unit Price
Store A	\$0.215
Store B	\$0.204
Store C	\$0.24
Store D	\$0.2026

Which store sold this brand of graham crackers at the lowest unit price?

- A. Store A
- B. Store B
- C. Store C
- D. Store D

- 26 Tai plays a game using two spinners. Each spinner is divided into three sections of equal size, as shown below.



Tai will spin the arrow on each spinner one time.

The organized list below shows all possible combinations of sections on which the arrows can land.

- | | | |
|-------|--------|---------|
| Red 1 | Blue 1 | Green 1 |
| Red 2 | Blue 2 | Green 2 |
| Red 3 | Blue 3 | Green 3 |

What is the probability that the arrow on Spinner M will land on the green section and the arrow on Spinner N will land on a section with an odd number?

- A. $\frac{1}{9}$
- B. $\frac{2}{9}$
- C. $\frac{1}{3}$
- D. $\frac{2}{3}$

- 27 The amounts of money that a local library collected for fines during the first eight months of last year are shown in the table below.

Library Fines Collected

Month	Amount of Money	Month	Amount of Money
January	\$45.00	May	\$23.50
February	\$21.50	June	\$28.00
March	\$48.00	July	\$20.00
April	\$40.50	August	\$21.50

What is the median of the amounts of money listed in the table?

- A. \$18.00
- B. \$21.50
- C. \$25.75
- D. \$31.00

Questions 28 and 29 are open-response questions.

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

Write your answer to question 28 in the space provided in your Student Answer Booklet.

28

A park near Jon's house has a jogging trail that is 2640 yards long.

- a. What is the length, in **feet**, of the jogging trail? Show or explain how you got your answer.
- b. Using your answer from part (a), determine the length, in **miles**, of the jogging trail. Show or explain how you got your answer. (1 mile = 5280 feet)
- c. The jogging trail starts at the entrance to the park and ends at a pond. The trail starts with a sign, ends with a sign, and has a sign posted along the trail every $\frac{1}{4}$ mile. What is the total number of signs along the trail from the beginning to the end? Show or explain how you got your answer.

Write your answer to question 29 in the space provided in your Student Answer Booklet.

- 29 The table below shows the state sales tax rates on purchased goods in the year 2005 for the six New England states.

**2005 Sales Tax Rates
in New England States**

State	Sales Tax Rate
Connecticut	6%
Maine	5%
Massachusetts	5%
New Hampshire	0%
Rhode Island	7%
Vermont	6%

- What was the range of 2005 sales tax rates for the New England states? Show or explain how you got your answer.
- What was the mean sales tax rate in 2005 for the New England states? Show or explain how you got your answer.
- What was the median sales tax rate in 2005 for the New England states? Show or explain how you got your answer.
- A newspaper reporter stated that the mode of the 2005 sales tax rates for the New England states was 5%. Was the reporter correct? Explain your reasoning.

Mark your answers to multiple-choice questions 30 through 38 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 30 Alecia surveyed some elementary school students about the methods they use to get to school each morning. Her results are shown in the table below.

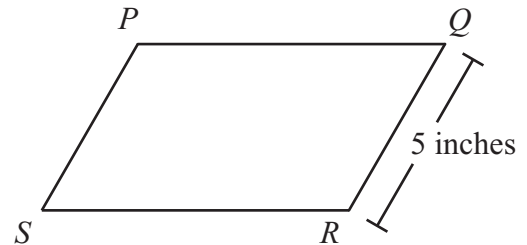
Transportation to School

Method	Boys	Girls
bus	24	28
car	18	30
walk	10	16
bicycle	8	6

Based on Alecia’s results, what fractional part of the **girls** surveyed ride the bus?

- A. $\frac{7}{13}$
- B. $\frac{2}{5}$
- C. $\frac{7}{20}$
- D. $\frac{1}{5}$

- 31 The perimeter of the parallelogram shown below is 24 inches.



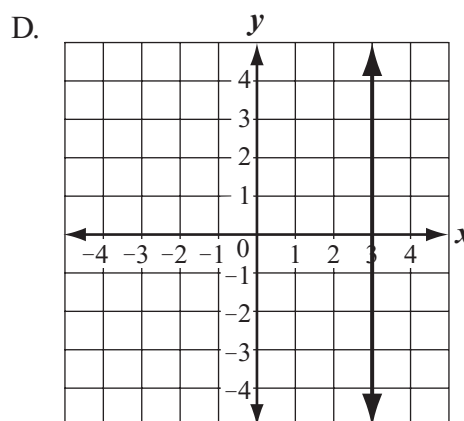
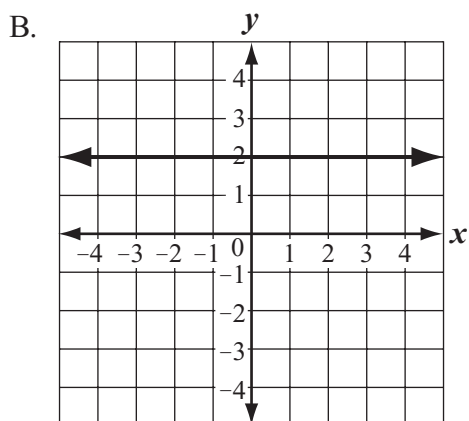
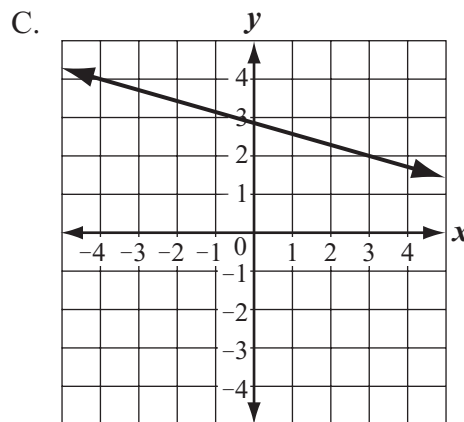
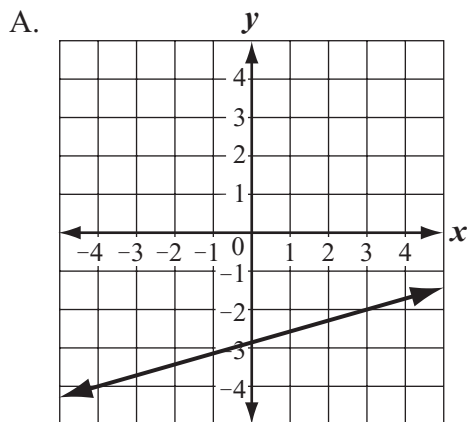
Based on the given dimensions of the parallelogram, what is the length of side *SR*?

- A. 4.8 inches
- B. 7 inches
- C. 9 inches
- D. 9.5 inches

- 32 Ashley studied one hour less than twice as many hours as Melissa studied. Let *m* stand for the number of hours Melissa studied. Which of the following expressions represents the number of hours Ashley studied?

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

33 Which of the following graphs best represents a line with a positive rate of change?



- 34 The list below shows the number of miles Sophie hiked on each of 7 days.

1.6, 3.1, 1.5, 2.0, 1.1, 1.8, 1.5

What was the mean number of miles she hiked each day?

- A. 1.5 miles
- B. 1.6 miles
- C. 1.8 miles
- D. 2.0 miles

- 35 In Sheena’s homeroom, 3 of every 5 students have a dog for a pet. There are 30 students in Sheena’s homeroom.

Which of the following proportions can be used to determine x , the number of students in Sheena’s homeroom who have a dog for a pet?

- A. $\frac{3}{5} = \frac{x}{30}$
- B. $\frac{3}{5} = \frac{30}{x}$
- C. $\frac{2}{5} = \frac{x}{30}$
- D. $\frac{2}{5} = \frac{30}{x}$

- 36 Ahmad bought 5 ounces of salad greens for \$4.00. What was the unit price per **pound** of the salad greens? (1 pound = 16 ounces)

- A. \$7.20
- B. \$8.00
- C. \$12.80
- D. \$20.00

- 37 A solid three-dimensional figure has the following faces:

- two parallel bases that are congruent triangles
- three lateral faces that are rectangles

Which of the following is a correct name for this figure?

- A. rectangular prism
- B. rectangular pyramid
- C. triangular prism
- D. triangular pyramid

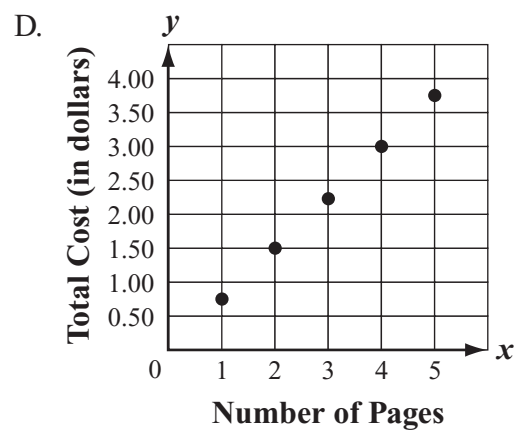
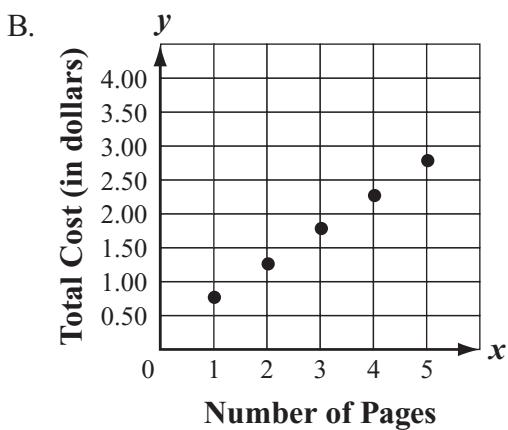
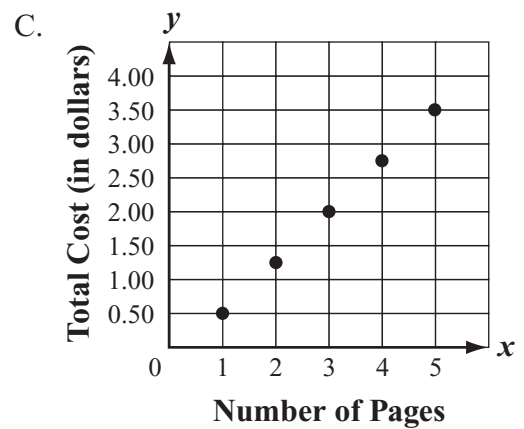
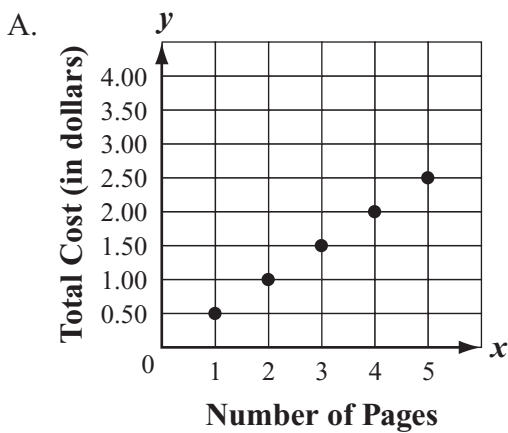
- 38 The cost for sending a fax from the local library is shown on the sign below.

Cost for Sending a Fax

First page:
\$0.75

Each additional page:
\$0.50

Which of the following graphs represents the total cost for sending a fax from the library?

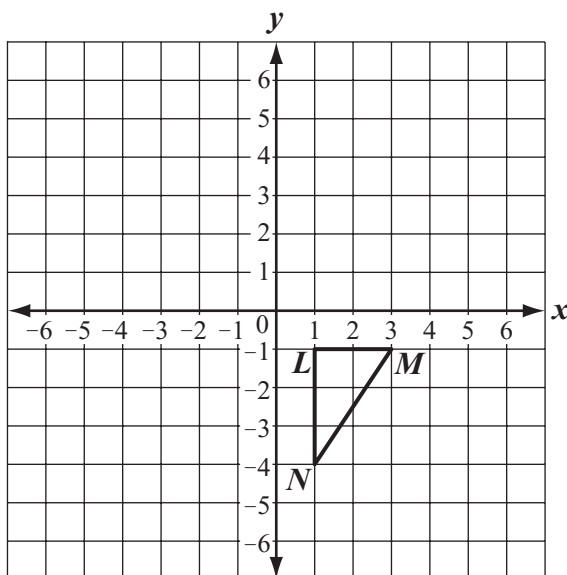


Question 39 is an open-response question.

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

Write your answer to question 39 in the space provided in your Student Answer Booklet.

- 39 On the grid in your Student Answer Booklet, copy the x -axis, the y -axis, and triangle LMN shown below.



- On your grid, draw the image of triangle LMN after it is translated 4 units to the left. Label the image PQR . List the coordinates for points P , Q , and R .
- On your grid, draw the image of triangle LMN after it is translated 6 units up and 3 units to the right. Label the image TUV . List the coordinates for points T , U , and V .
- On your grid, draw the image of triangle LMN after it is reflected over the x -axis. Label the image XYZ . List the coordinates for points X , Y , and Z .

Grade 7 Mathematics
Spring 2008 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	335	<i>Patterns, Relations, and Algebra</i>	7.P.5	B
2	335	<i>Number Sense and Operations</i>	7.N.5	B
3	335	<i>Patterns, Relations, and Algebra</i>	7.P.4	B
4	336	<i>Number Sense and Operations</i>	7.N.3	C
5	336	<i>Number Sense and Operations</i>	7.N.9	A
6	336	<i>Data Analysis, Statistics, and Probability</i>	7.D.3	A
7	337	<i>Geometry</i>	7.G.3	$\angle 3$ and $\angle 4$
8	337	<i>Number Sense and Operations</i>	7.N.9	\$20 or 20
9	338	<i>Patterns, Relations, and Algebra</i>	7.P.3	
10	339	<i>Patterns, Relations, and Algebra</i>	7.P.2	B
11	339	<i>Measurement</i>	7.M.1	B
12	339	<i>Patterns, Relations, and Algebra</i>	7.P.6	B
13	340	<i>Data Analysis, Statistics, and Probability</i>	7.D.1	D
14	341	<i>Number Sense and Operations</i>	7.N.6	B
15	341	<i>Patterns, Relations, and Algebra</i>	7.P.2	A
16	341	<i>Data Analysis, Statistics, and Probability</i>	7.D.1	D
17	342	<i>Number Sense and Operations</i>	7.N.4	D
18	342	<i>Number Sense and Operations</i>	7.N.7	C
19	343	<i>Geometry</i>	7.G.1	50°
20	343	<i>Patterns, Relations, and Algebra</i>	7.P.4	480
21	344	<i>Data Analysis, Statistics, and Probability</i>	7.D.2	24
22	345	<i>Number Sense and Operations</i>	7.N.9	
23	346	<i>Patterns, Relations, and Algebra</i>	7.P.3	A
24	346	<i>Measurement</i>	7.M.3	A
25	346	<i>Number Sense and Operations</i>	7.N.1	D
26	347	<i>Data Analysis, Statistics, and Probability</i>	7.D.3	B
27	347	<i>Data Analysis, Statistics, and Probability</i>	7.D.2	C
28	348	<i>Measurement</i>	7.M.1	
29	349	<i>Data Analysis, Statistics, and Probability</i>	7.D.2	
30	350	<i>Data Analysis, Statistics, and Probability</i>	7.D.1	C
31	350	<i>Measurement</i>	7.M.3	B
32	350	<i>Patterns, Relations, and Algebra</i>	7.P.3	D
33	351	<i>Patterns, Relations, and Algebra</i>	7.P.5	A
34	352	<i>Data Analysis, Statistics, and Probability</i>	7.D.2	C
35	352	<i>Patterns, Relations, and Algebra</i>	7.P.6	A
36	352	<i>Number Sense and Operations</i>	7.N.2	C
37	352	<i>Geometry</i>	7.G.7	C
38	353	<i>Patterns, Relations, and Algebra</i>	7.P.1	B
39	354	<i>Geometry</i>	7.G.6	

* Answers are provided here for multiple-choice items and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.