XIII. Mathematics, Grade 7

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 nine multiple-choice questions, one short-answer question, and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 Line *g* intersects line *h* in the figure below.
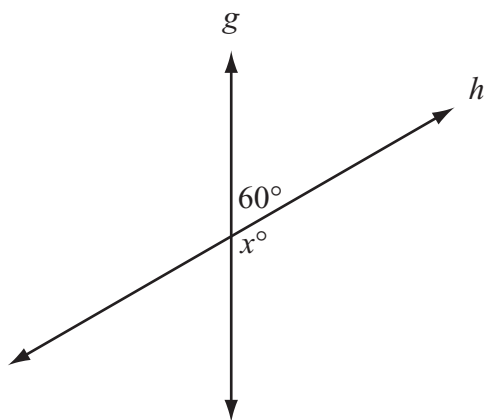
Based on the angle measure given in the figure, what is the value of *x*?

A. 30

B. 60

C. 100

D. 120

2 Which statement **best** describes a situation in which opposite quantities combine to make zero?

A. Shawna made 8 cups of soup and divided the soup into 8 containers.

B. Melanie deposited $10 in her savings account and then withdrew $10 from the account.

C. Peter scored 2 goals in the first period of a hockey game and 2 goals in the second period.

D. Marcos missed 4 questions on a test in which each question was worth 4 points.

3 Dan's Sporting Goods received a shipment of 120 sweatshirts.

- Half of the sweatshirts were size large.
- One-fourth of the **large** sweatshirts were red.

What was the total number of sweatshirts in the shipment that were both size large and red?

A. 15

B. 20

C. 30

D. 75

4 What is the value of the expression below?

$$-13 - (-9)$$

A.   22

B.   4

C. −4

D. −22

5   Helena bought 4 packages of cat food at a store. The weight of the food in each package was 1.25 pounds. Helena opened all 4 packages of cat food and put $\frac{2}{3}$ of the total amount of food into a container. The expression below represents the weight of the cat food Helena put into the container.

$$(4)(1.25)\left(\tfrac{2}{3}\right)$$

What is the total weight, in pounds, of the cat food that Helena put into the container?

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

B. $3\frac{11}{12}$

C. $5\frac{2}{3}$

D. $5\frac{11}{12}$

Question 6 is a short-answer question. Write your answer to question 6 in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

6   What value of n makes the equation below true?

$$28 + n = 0$$

Question 7 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 7 in the space provided in your Student Answer Booklet.

7   Gerald wants to purchase a tennis racket and some cans of tennis balls. The table below shows the total prices he would pay at a discount store to buy one tennis racket and 1 to 4 cans of tennis balls.

**Total Prices for Tennis Racket
and Cans of Tennis Balls**

Number of Cans of Tennis Balls	Total Price with Racket
1	$43
2	$46
3	$49
4	$52

a. Based on the prices in the table, what is the total price for one tennis racket and 6 cans of tennis balls? Show or explain how you got your answer.

b. Based on the prices in the table, what is the price for one tennis racket? Show or explain how you got your answer.

c. Write an expression that can be used to find the total price for one tennis racket and *b* cans of tennis balls. Explain your reasoning.

d. Gerald purchased one tennis racket and *b* cans of tennis balls. The total price of his purchase was $70. How many cans of tennis balls did Gerald purchase? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 8 through 11 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.

8 An airline requires that each piece of luggage carried onto a plane must meet the following requirement.

> When the length, the width, and the height, in inches, of a piece of luggage are added together, the total must not be greater than 45 inches.

If a piece of luggage has a height of 20.5 inches and a length of 14.75 inches, what is the maximum width allowed for that piece of luggage?
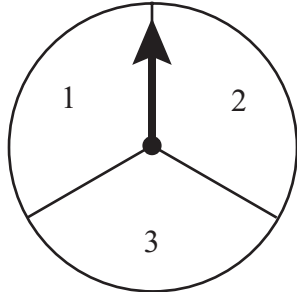
A. 9.75 inches

B. 10.2 inches

C. 10.25 inches

D. 11.8 inches

9 What is the value of the expression below?

$$|-25| + |20|$$

A. -45

B. -5

C. 5

D. 45

10   Brian has a fair spinner divided into three congruent sections numbered 1 through 3, as shown below.

Brian spins the arrow two times. The list in the box below shows all of the possible combinations that can be made by spinning the arrow twice.

1 1	2 1	3 1
1 2	2 2	3 2
1 3	2 3	3 3

What is the probability that the arrow will land on a section containing an odd number both times?

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

B. $\frac{4}{9}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

11   The temperature at 6 p.m. was 16°F, which was 9°F lower than the temperature at noon. What was the temperature at noon?

A.   25°F

B.   7°F

C.   −7°F

D.   −25°F

Grade 7 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 seven multiple-choice questions, two short-answer questions, and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

12 Three friends played a target game at a carnival.

- Elsie hit the target 5 out of every 8 times.

- Anjani hit the target 60% of the time.

- Derek hit the target $\frac{5}{6}$ of the time.

Which list shows the friends in order from the person who hit the target the least percent of the time to the person who hit the target the greatest percent of the time?

A. Elsie, Derek, Anjani

B. Elsie, Anjani, Derek

C. Anjani, Derek, Elsie

D. Anjani, Elsie, Derek

13 Olive has 3 fair coins. She will toss each coin one time. Which of the following best describes the probability that all 3 coins will land with "heads" facing up?

A. likely

B. certain

C. unlikely

D. impossible

14 A block of cheese is in the shape of a rectangular prism. The block of cheese and its dimensions are shown below.
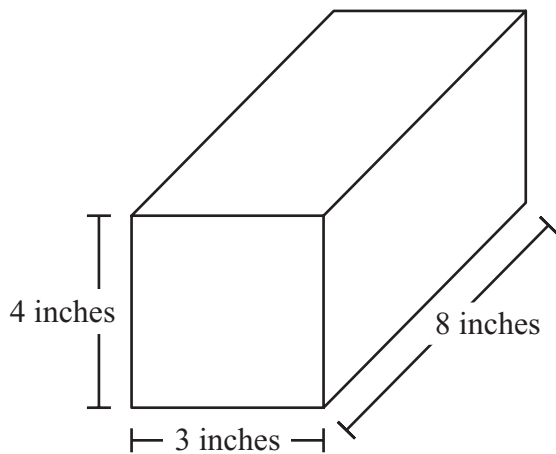

What is the total surface area of the block of cheese?

A. 68 square inches
B. 96 square inches
C. 136 square inches
D. 192 square inches

Question 15 is a short-answer question. Write your answer to question 15 in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

15   In the diagram below, perpendicular lines *e* and *g* are intersected by line *f*.
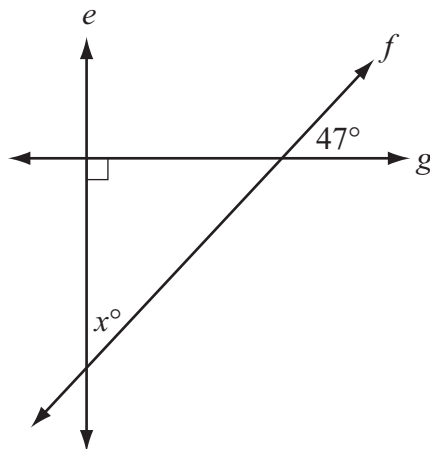
Based on the angle measures in the diagram, what is the value of x?

Mark your answers to multiple-choice questions 16 and 17 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.

16 Which of the following is equivalent to the expression below?

$$(-3m + 5) + (m - 11)$$

A. $4m - 16$

B. $-4m - 6$

C. $2m - 16$

D. $-2m - 6$

17 A sign is in the shape of a triangle. It has a base of 12 inches and an area of 120 square inches. What is the height of the sign?

A. 5 inches

B. 10 inches

C. 12 inches

D. 20 inches

Question 18 is a short-answer question. Write your answer to question 18 in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

18 Shen has a number cube with faces numbered 1 through 6. He will roll the number cube one time. What is the probability that the number cube will land with a number greater than 2 on the top face? Write your answer as a fraction.

Mark your answers to multiple-choice questions 19 and 20 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.

19 The base of a lampshade is in the shape of a circle and has a diameter of 13 inches. What is the circumference, to the nearest tenth of an inch, of the base of the lampshade? (Use 3.14 for π.)

A. 13.3 inches

B. 20.4 inches

C. 26.0 inches

D. 40.8 inches

20 Kevin looked at the dates on a random sample of 15 pennies taken from a small jar of pennies. He made the graph shown below to display the data.

Penny Data
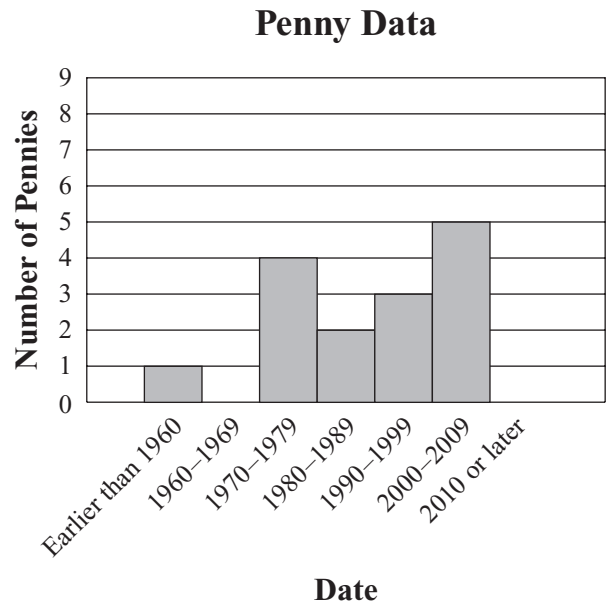
Kevin will take 1 penny from the jar at random. Based on the data in the graph, what is the probability that the date on the penny will be earlier than 1990?

A. $\frac{7}{15}$

B. $\frac{8}{15}$

C. $\frac{2}{3}$

D. $\frac{7}{8}$

Question 21 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 21 in the space provided in your Student Answer Booklet.

21   Billy left home at 9 a.m. and rode his bicycle to the park at an average speed of 10 miles per hour. He arrived at the park at 9:30 a.m.

a. How many miles from the park is Billy's home? Show or explain how you got your answer.

Derrick lives 3 miles from the park. He rode his bicycle to the park at an average speed of 9 miles per hour.

b. How many minutes did it take Derrick to ride his bicycle to the park? Show or explain how you got your answer.

Juan lives 2.5 miles from the park. It took him 12 minutes to ride his bicycle to the park.

c. What was Juan's average speed, in miles per hour, while riding his bicycle to the park? Show or explain how you got your answer.

PERIMETER FORMULAS

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

rectangle. . . . . $P = 2b + 2h$
OR
$P = 2l + 2w$

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

AREA FORMULAS

square. . . . . $A = s^2$

rectangle. . . . . $A = bh$
OR
$A = lw$

parallelogram . . . . . $A = bh$

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

trapezoid. . . . . $A = \frac{1}{2}h(b_1 + b_2)$

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

VOLUME FORMULAS

rectangular prism . . . . . . $V = lwh$
OR
$V = Bh$
(B = area of a base)

cube. . . . . $V = s^3$
(s = length of an edge)

cylinder . . . . $V = \pi r^2 h$

CIRCLE FORMULAS

$C = 2\pi r$
OR
$C = \pi d$

$A = \pi r^2$

TOTAL SURFACE AREA FORMULAS

rectangular prism . . $SA = 2(lw) + 2(hw) + 2(lh)$

cylinder . . . . $SA = 2\pi r^2 + 2\pi rh$

Grade 7 Mathematics
Spring 2013 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	222	*Geometry*	G.5	D
2	222	*The Number System*	NS.1	B
3	223	*The Number System*	NS.3	A
4	223	*The Number System*	NS.1	C
5	224	*The Number System*	NS.2	A
6	225	*The Number System*	NS.1	–28
7	226	*Expressions and Equations*	EE.4	
8	227	*The Number System*	NS.3	A
9	227	*The Number System*	NS.3	D
10	228	*Statistics and Probability*	SP.8	B
11	228	*The Number System*	NS.3	A
12	229	*Expressions and Equations*	EE.3	D
13	229	*Statistics and Probability*	SP.5	C
14	230	*Geometry*	G.6	C
15	231	*Geometry*	G.5	43
16	232	*Expressions and Equations*	EE.1	D
17	232	*Geometry*	G.6	D
18	233	*Statistics and Probability*	SP.5	$\frac{2}{3}$
19	234	*Geometry*	G.4	D
20	234	*Statistics and Probability*	SP.1	A
21	235	*Ratios and Proportional Relationships*	RP.3	

* 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, will be posted to the Department's website later this year.

Grade 7 Mathematics
Spring 2013 Unreleased Common Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
22	*Ratios and Proportional Relationships*	RP.2
23	*Expressions and Equations*	EE.3
24	*The Number System*	NS.2
25	*Expressions and Equations*	EE.1
26	*Ratios and Proportional Relationships*	RP.1
27	*Expressions and Equations*	EE.4
28	*Ratios and Proportional Relationships*	RP.2
29	*Geometry*	G.3
30	*Geometry*	G.4
31	*The Number System*	NS.3
32	*Geometry*	G.5
33	*Expressions and Equations*	EE.4
34	*Ratios and Proportional Relationships*	RP.3
35	*Ratios and Proportional Relationships*	RP.1
36	*Geometry*	G.6
37	*Ratios and Proportional Relationships*	RP.2
38	*Ratios and Proportional Relationships*	RP.2
39	*Expressions and Equations*	EE.4
40	*Statistics and Probability*	SP.4
41	*Geometry*	G.1
42	*Geometry*	G.1