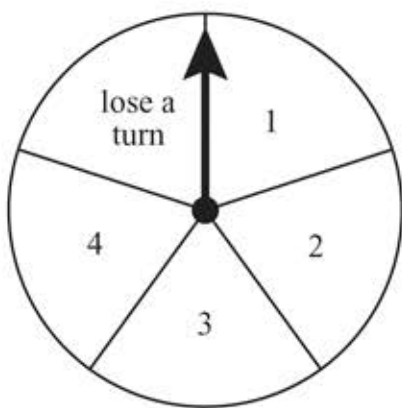# Grade 7 Mathematics
SESSION 1

DIRECTIONS

This session contains eight multiple-choice questions, two short-answer questions, and one open-response question.

1 A game spinner is divided into 5 congruent sections and labeled, as shown below.

The arrow will be spun 100 times. Which of the following is most likely the number of times the arrow will stop on the section labeled "lose a turn"?

A. 10

B. 20

C. 25

D. 50

2 What is the value of the expression below?

$$|12| + |-15|$$

A. −27

B. −3

C. 3

D. 27

3 A store owner uses the expression below to calculate the sale price of each CD player he is discounting.

$$r - 0.2r$$

In the expression, r represents the regular price of a CD player. Which of the following is equivalent to the expression?

A. $0.1r$

B. $0.8r$

C. $0.9r$

D. $1.2r$

4 Coffee, tea, and pastries are sold at a coffee shop. Last week, $\frac{2}{5}$ of the coffee shop's profits were from coffee sales and $\frac{1}{3}$ of its profits were from tea sales. The rest of its profits were from pastry sales.

What fraction of the coffee shop's total profits last week were from pastry sales?

A. $\frac{1}{15}$

B. $\frac{2}{15}$

C. $\frac{4}{15}$

D. $\frac{11}{15}$

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

$$(3)(4)\left(-\frac{3}{4}\right)$$

A. $-12\left(-\frac{3}{4}\right)$

B. $-12\left(\frac{3}{4}\right)$

C. $-12 - \frac{3}{4}$

D. $-12 + \frac{3}{4}$

6 Which of the following numbers is between $4\frac{1}{3}$ and $4\frac{3}{5}$ on a number line?

A. 4.1

B. 4.2

C. 4.3

D. 4.4

Questions 7 and 8 are short-answer questions.

7 Marisol constructed a triangle. One angle in the triangle has a measure of 40°. Another angle in the triangle has a measure of 80°. What is the measure, in degrees, of the third angle in Marisol's triangle?

8 A barge traveled 30 miles up a river in 5 hours. What was the average rate of travel, in miles per hour, of the barge?

Mark your answer to multiple-choice question 9 in the space provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

9   Which of the following expressions has a value of 1.25?

     A. $(2.5)(-0.5)$

     B. $-(2.5)(0.5)$

     C. $(-2.5)(-0.5)$

     D. $-(-2.5)(-0.5)$

Question 10 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.**

10 A snow day occurs when school is canceled for the day because of bad winter weather. The box below shows the number of snow days at Andrew's school during each of the past six winters.

$$2, \ 5, \ 5, \ 3, \ 4, \ 5$$

a. For the past six winters, what was the median number of snow days per winter at Andrew's school? Show or explain how you got your answer.

b. For the past six winters, what was the mean number of snow days per winter at Andrew's school? Show or explain how you got your answer.

c. For the past six winters, what was the mean absolute deviation of the number of snow days per winter at Andrew's school? Show or explain how you got your answer.

Maria lives in another state. The box below shows the number of snow days at Maria's school during each of the past six winters.

$$0, \ 2, \ 9, \ 3, \ 1, \ 3$$

d. At which school, Andrew's or Maria's, is the number of snow days per winter more predictable? Explain your reasoning. Use specific data from **both** schools in your explanation.

11 Sophia needs $1\frac{1}{4}$ cups of honey to make 5 batches of snack bars. What is the number of cups of honey she will need to make 1 batch of snack bars?

A. $6\frac{1}{4}$

B. 4

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

D. $\frac{4}{25}$

DIRECTIONS

This session contains eight multiple-choice questions, one short-answer question, and one open-response question.
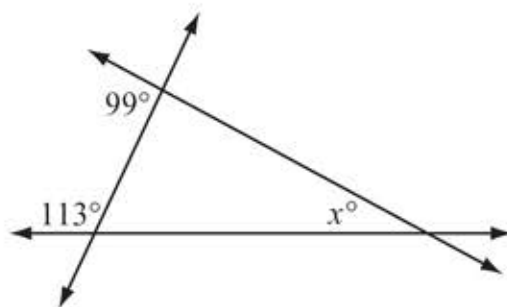
12 Adan has a map with the following scale.

Scale
$\frac{1}{2}$ inch : 50 miles

The distance on the map from Clarksville to Jackson is 2 inches. What is the actual distance from Clarksville to Jackson?

A. 25 miles

B. 50 miles

C. 100 miles

D. 200 miles

13 The diagram below shows three lines that intersect to form a triangle.

Based on the angle measures in the diagram, what is the value of x?

A. 32

B. 67

C. 81

D. 99

**14** The prices for different spices at a grocery store are shown in the table below.

Prices of Spices

Spice	Size	Price
cumin	1.5 ounces	$4.80
ginger	0.8 ounce	$3.60
nutmeg	1.8 ounces	$6.30
thyme	1.25 ounces	$4.50

Which of the following spices has the least price **per ounce**?

A. cumin

B. ginger

C. nutmeg

D. thyme

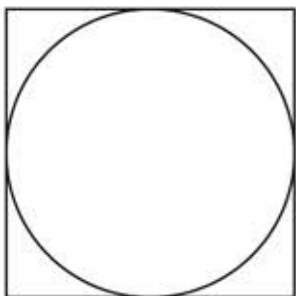**15** Mr. Kramer's patio is in the shape of a trapezoid. The trapezoid and its dimensions are shown below.
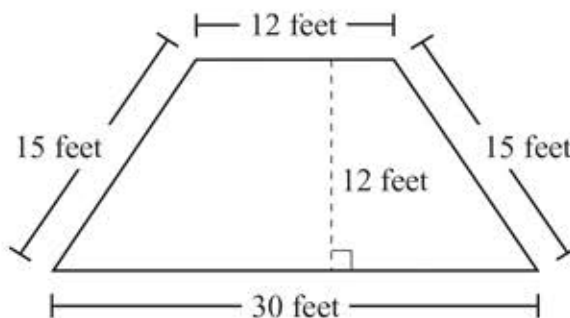
What is the area of the patio?

A. 144 square feet

B. 252 square feet

C. 315 square feet

D. 360 square feet

16 A circle inscribed in a square is shown below.

The area of the square is 81 square centimeters.

Which of the following is closest to the circumference, in centimeters, of the circle inscribed in the square? (Use 3.14 for π.)

A.   14.13

B.   28.26

C.   63.59

D.   127.17

17 Amin has 16 pots of equal size. He used 9 bags of potting soil to fill 12 of the pots. At that rate, how many bags of potting soil does Amin need to fill the remaining 4 pots?

A. 1

B. $1\frac{4}{5}$

C. 3

D. $5\frac{1}{3}$

Question 18 is a short-answer question.

18 Dana has 8 baseball cards, 10 football cards, 4 hockey cards, and 14 basketball cards. All the cards are the same size and shape. Dana will select one card at random. What is the probability that the card selected will be a hockey card?

19 A bottle contains 120 fluid ounces of laundry detergent. Which of the following is closest to the number of liters in 120 fluid ounces? (1 fluid ounce $\approx$ 0.0296 liter)

A. 3.55 liters

B. 4.05 liters

C. 4.16 liters

D. 4.47 liters

20 The formula for the surface area of a sphere that has a radius r is shown in the box below.

$$SA = 4\pi r^2$$

A sphere and one of its dimensions are shown in the diagram below.
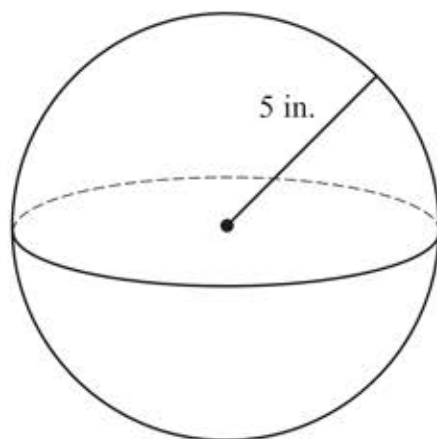
What is the surface area, in square inches, of the sphere?

A. 40π

B. 80π

C. 100π

D. 400π

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)**
- **If you do the work in your head, explain in writing how you did the work.**

21 Peter hired a cleaning company to clean his house. The cleaning company charges a fixed fee of $15 plus $17 per hour to clean a house.

a. Write an equation that can be used to determine c, the total amount in dollars that the cleaning company charges to clean a house in h hours.

b. The cleaning company charged a total of $83 to clean Peter's house. How many hours did it take to clean Peter's house? Show or explain how you got your answer.

A second cleaning company charges $20 per hour to clean a house. The second company does **not** charge a fixed fee in addition to their hourly rate.

c. For what number of hours is the total amount charged for cleaning a house the same for both companies? 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

Reporting Categories, Standards, and Correct Answers*

Item No.		Reporting Category	Standard	Correct Answer (MC/SA)*
1		*Statistics and Probability*	SP.6	B
2		*The Number System*	NS.1	D
3		*Expressions and Equations*	EE.2	B
4		*The Number System*	NS.3	C
5		*The Number System*	NS.2	B
6		*The Number System*	NS.3	D
7		*Geometry*	G.2	60°
8		*Ratios and Proportional Relationships*	RP.2	6 miles per hour
9		*The Number System*	NS.2	C
10		*Statistics and Probability*	SP.4	
11		*Ratios and Proportional Relationships*	RP.1	C
12		*Ratios and Proportional Relationships*	RP.3	D
13		*Geometry*	G.5	A
14		*Ratios and Proportional Relationships*	RP.1	A
15		*Geometry*	G.6	B
16		*Geometry*	G.4	B
17		*Ratios and Proportional Relationships*	RP.3	C
18		*Statistics and Probability*	SP.7	1/9 or equivalent
19		*The Number System*	NS.3	A
20		*Geometry*	G.7	C
21		*Expressions and Equations*	EE.4	

* 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,