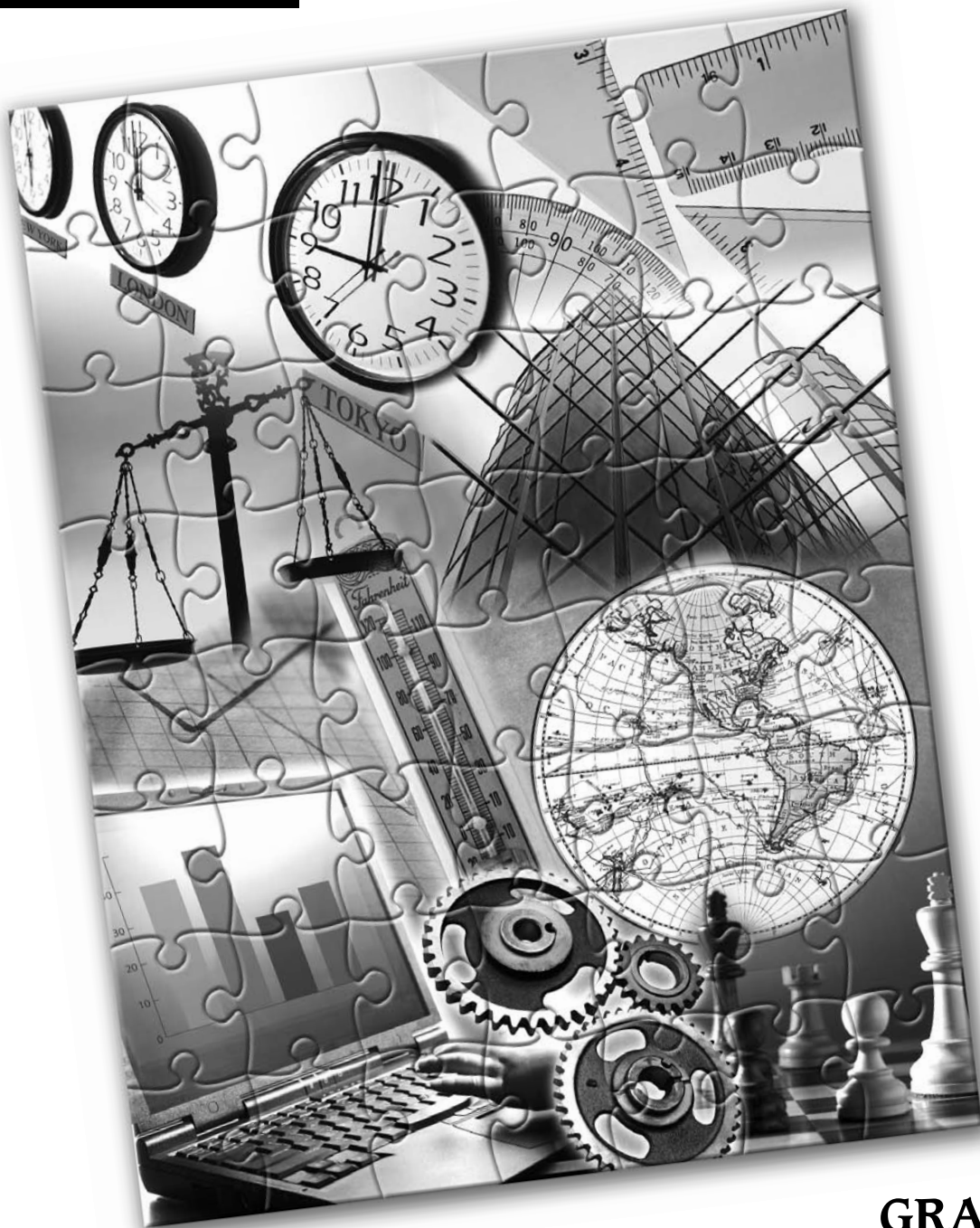


2007

FCAT

Florida Comprehensive Assessment Test®

Student Name _____



MATHEMATICS

Mathematics

Sample Test & Answer Book

GRADE
10

FCAT Sample Test Materials

These sample test materials are designed to help you prepare to answer FCAT questions. These materials introduce you to the kinds of questions you will answer when you take the FCAT and include hints for responding to the different kinds of FCAT questions. The FCAT Mathematics sample test materials for Grade 10 are composed of the books described below:

- Sample Test and Answer Book**
Includes a mathematics sample test, a sample answer book, and instructions for completing the sample test. (Copies are available for all students in the tested grade.)
- Sample Answer Key**
Includes answers and explanations for the questions in the sample test. (Copies are available for classroom teachers only.)

= This book

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FCAT Mathematics Sample Test Book



Calculator Instructions Page 2

A calculator is provided for you to use during the test. This section provides helpful hints for using a calculator on the test.

Gridded-Response Instructions Page 3

Some FCAT Mathematics questions require you to provide your answers by filling in numeric grids. This section shows different ways of completing the response grids correctly.

Taking the FCAT Mathematics Sample Test Page 7

This section introduces the FCAT Mathematics Sample Test. It includes a description of the different kinds of questions on the FCAT, hints for answering FCAT Mathematics questions, and an estimate of the time required to complete the sample test.

FCAT Mathematics Sample Test Page 9

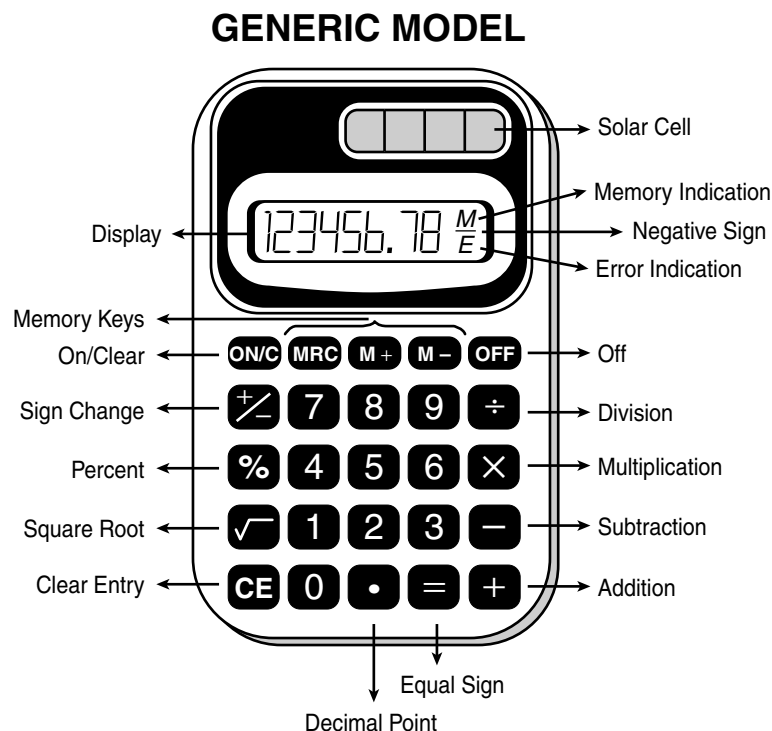
The Mathematics Sample Test consists of 19 practice questions that are similar to questions on the FCAT. It includes a perforated (tear-out) Mathematics Reference Sheet found on page 11.

FCAT Mathematics Sample Answer Book Page 23

Your answers to the sample test questions should be placed in the Mathematics Sample Answer Book. The answer book is perforated and may be removed before you start the sample test.

Calculator Instructions


This is a picture of a generic calculator and its parts.



HELPFUL HINTS FOR TAKING THE FCAT MATHEMATICS TEST

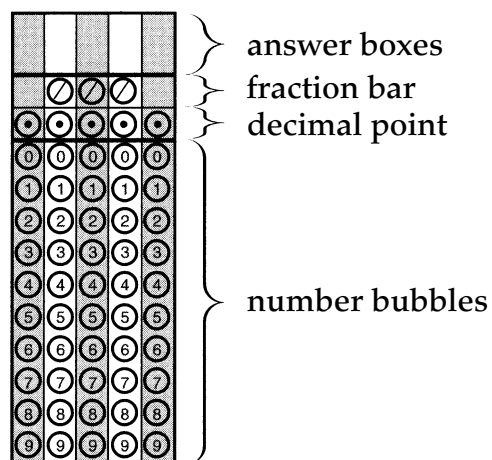
1. Read the problem very carefully. Then decide whether or not you need the calculator to help you solve the problem.
2. When starting a new problem, always clear your calculator by pressing the clear key.
3. If you see an **E** in the display, clear the error before you begin.
4. If you see an **M** in the display, clear the memory and the calculator before you begin.
5. If the number in the display is not one of the answer choices, check your work. Remember that when computing with certain types of fractions, you may have to round the number in the display.
6. Remember, your calculator will NOT automatically perform the algebraic order of operations.
7. Calculators might display an incorrect answer if you press the keys too quickly. When working with calculators, use careful and deliberate keystrokes, and always remember to check your answer to make sure that it is reasonable.
8. The negative sign may appear either to the left or to the right of the number.
9. Always check your answer to make sure that you have completed all of the necessary steps.

How to Complete the Response Grids

Mathematics test questions with this symbol  require that you fill in a grid in your answer book. There may be more than one correct way to fill in a response grid. This section shows you different ways the response grid may be completed.

Parts of a Response Grid

For Grade 10, response grids have the following parts:



Directions

1. Work the problem and find an answer.
2. Write your answer in the answer boxes at the top of the grid.
 - Print your answer with the first digit in the left answer box, OR with the last digit in the right answer box.
 - Print only one digit or symbol in each answer box. Do NOT leave a blank answer box in the middle of an answer.
 - Be sure to write a decimal point or fraction bar in the answer box if it is a part of the answer.

3. Fill in a bubble under each box in which you wrote your answer.

- Fill in one and ONLY one bubble for each answer box. Do NOT fill in a bubble under an unused answer box.
- Fill in each bubble by making a solid black mark that completely fills the circle.
- You MUST fill in the bubbles accurately to receive credit for your answer.

Examples

Whole Number

$60 + 10 =$

7	0		
/	/	/	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

OR

		7	0
/	/	/	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Decimal

Show the decimal equivalent of $5\frac{6}{100}$.

5	.	0	6
/	/	/	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

OR

	.	0	6
/	/	/	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Decimal or Fraction

Many answers may be shown as either a decimal or a fraction.

.	6	2	5	
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	•	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	•	5
6	•	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

OR

.	6	2	5	
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	•	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	•
6	6	•	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

OR

5	5	/	8	8
/	•	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	•	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	•	•
9	9	9	9	9

OR

		5	/	8
/	/	•		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	•	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	•
9	9	9	9	9

Ranges

A correct answer within a range of values may be represented in various ways. For example, for the inequality

$$18.8 < n < 19.2$$

values of n could be written as shown below.

1	8	.	9	
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	•	8	8	8
9	9	9	•	9

OR

1	9			
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	•	9	9	9

OR

			1	9
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	•	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	•

OR

		1	9	.	1
/	/	/			
•	•	•	•	•	•
0	0	0	0	0	0
1	•	1	1	•	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	•	9	9	9

There are also other correct answers.

Taking the FCAT Mathematics Sample Test

Hints for Taking the FCAT Mathematics Test

Here are some hints to help you do your best when you take the FCAT Mathematics test. Keep these hints in mind when you answer the sample questions.

- ✓ **Learn how to answer each kind of question.** The FCAT Mathematics test for Grade 10 has four types of questions: multiple-choice, gridded-response, short-response, and extended-response.
- ✓ **Read each question carefully and think about ways to solve the problem before you try to answer the question.**
- ✓ **Answer the questions you are sure about first. If a question seems too difficult, skip it and go back to it later.**
- ✓ **Be sure to fill in the answer bubbles correctly. Do not make any stray marks around answer spaces.**
- ✓ **Think positively. Some problems may seem hard to you, but you may be able to figure out what to do if you read each question carefully.**
- ✓ **When you have finished each problem, reread it to make sure your answer is reasonable.**
- ✓ **Relax. Some people get nervous about tests. It's natural. Just do your best.**

How to Answer the “Think, Solve, Explain” Questions

Answers to the short- and extended-response problems can receive full or partial credit. You should try to answer these questions even if you are not sure of the correct answer. If a portion of the answer is correct, you will get a portion of the points.

- ✓ Allow about 5 minutes to answer the short “Think, Solve, Explain” questions and about 10 to 15 minutes to answer the long questions.
- ✓ Read the question carefully.
- ✓ If you do not understand the question, read and answer one part at a time.
- ✓ Be sure to answer every part of the question.
- ✓ Use numbers and other information from the problem to answer the question.
- ✓ Show your work. This shows that you understand how to solve the problem.
- ✓ Write your explanations in clear, concise language. Use only the space provided in the Sample Answer Book.
- ✓ Check your work to make sure the procedure and calculations are correct.
- ✓ Reread your explanation to make sure it says what you want it to say.

Directions for Taking the Mathematics Sample Test

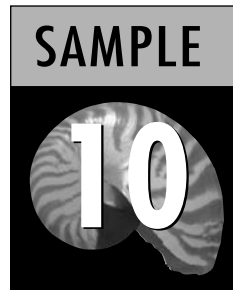
The Sample Test contains the Reference Sheet and 19 questions. It should take about 40 to 50 minutes to answer all the questions. You will mark your answers in the Mathematics Sample Answer Book which begins on page 23. If you don’t know how to work a problem, just ask your teacher to explain it to you. Your teacher has the answers to the sample test questions.

You may need formulas and conversions to help you solve some of the problems. You may refer to the Reference Sheet on page 11 as often as you like.

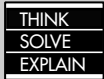
Use the space in your Mathematics Sample Test Book to do your work on the multiple-choice and gridded-response questions, but be sure to put your answers in the Sample Answer Book. For the “Think, Solve, Explain” questions, show your work in the Sample Answer Book, because you will be scored on your work as well as on your answer.

Before you begin, remove the Sample Answer Book by tearing along the dotted line.

FCAT Mathematics Sample Test

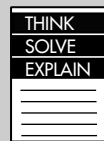


FCAT Question Symbols



This symbol appears next to questions that require short written answers. Use about 5 minutes to answer each of these questions.

A complete and correct answer to each of these questions is worth 2 points. A partially correct answer is worth 1 point.



This symbol appears next to questions that require longer written answers. Use about 10 to 15 minutes to answer these questions.

A complete and correct answer to each of these questions is worth 4 points. A partially correct answer is worth 1, 2, or 3 points.






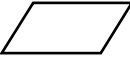

This symbol appears next to questions that require you to fill in your answer on a grid in your answer book. There may be more than one correct way to fill in a response grid. You **MUST** fill in the bubbles accurately to receive credit for your answer.

A correct answer to each of these questions is worth 1 point.

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Grades 9–10 FCAT Mathematics Reference Sheet

Fold and Tear Carefully Along Dotted Line.




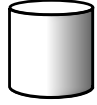

		Area
	Triangle	$A = \frac{1}{2}bh$
	Rectangle	$A = lw$
	Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
	Parallelogram	$A = bh$
	Circle	$A = \pi r^2$

KEY	
b = base	d = diameter
h = height	r = radius
l = length	A = area
w = width	C = circumference
ℓ = slant height	V = volume
$S.A.$ = surface area	
Use 3.14 or $\frac{22}{7}$ for π .	

Circumference

$$C = \pi d \quad \text{or} \quad C = 2\pi r$$

Volume/Capacity

	Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$
	Right Square Pyramid	$V = \frac{1}{3}lwh$
	Sphere	$V = \frac{4}{3}\pi r^3$
	Right Circular Cylinder	$V = \pi r^2 h$
	Rectangular Prism	$V = lwh$

Total Surface Area

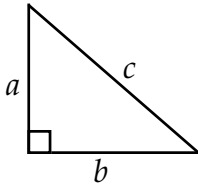
$S.A. = \frac{1}{2}(2\pi r)\ell + \pi r^2$ or $S.A. = \pi r\ell + \pi r^2$
$S.A. = 4(\frac{1}{2}l\ell) + l^2$ or $S.A. = 2l\ell + l^2$
$S.A. = 4\pi r^2$
$S.A. = 2\pi rh + 2\pi r^2$
$S.A. = 2(lw) + 2(hw) + 2(lh)$

In the following formulas, n represents the number of sides.

- In a polygon, the sum of the measures of the interior angles is equal to $180(n - 2)$.
- In a regular polygon, the measure of an interior angle is equal to $\frac{180(n - 2)}{n}$.

Grades 9–10 FCAT Mathematics Reference Sheet

Pythagorean theorem:



$$a^2 + b^2 = c^2$$

Distance between two points

$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$:

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint between two points

$P_1(x_1, y_1)$ and $P_2(x_2, y_2)$:

$$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

Slope-intercept form of an equation of a line:

$$y = mx + b$$

where m = slope and b = the y -intercept.

Distance, rate, time formula:

$$d = rt$$

where d = distance, r = rate, t = time.

Simple interest formula:

$$I = prt$$

where p = principal, r = rate, t = time.

Conversions

1 yard = 3 feet = 36 inches
1 mile = 1760 yards = 5280 feet
1 acre = 43,560 square feet
1 hour = 60 minutes
1 minute = 60 seconds

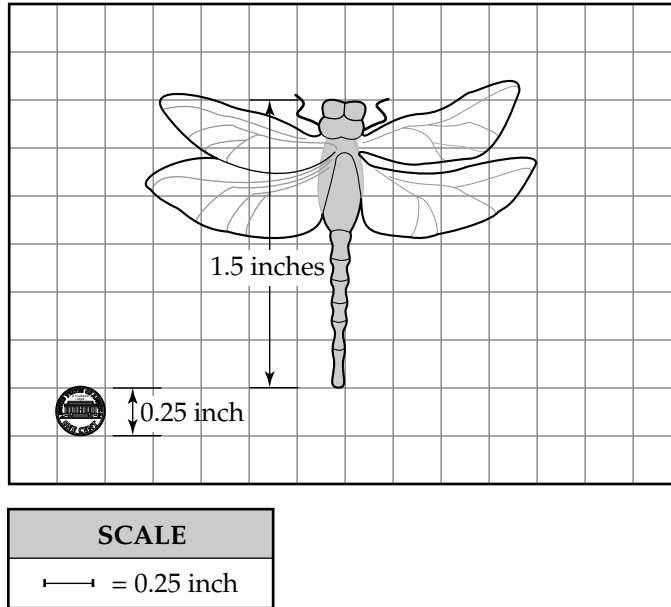
1 liter = 1000 milliliters = 1000 cubic centimeters
1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2000 pounds

Metric numbers with four digits are presented without a comma (e.g., 9960 kilometers). For metric numbers greater than four digits, a space is used instead of a comma (e.g., 12 500 liters).

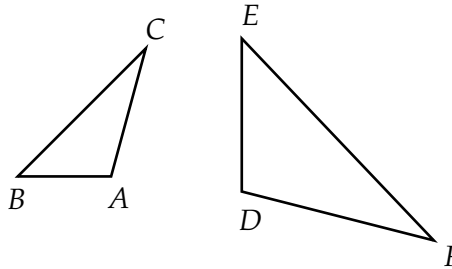
- 1 A dragonfly specimen has been photographed next to a penny to show the difference in their sizes.



The diameter of the penny's image in the photograph is 0.25 inch, and the length of the dragonfly's body in the photograph is 1.5 inches. If the actual diameter of a penny is 0.75 inch, what is the actual length of the dragonfly's body?

- A. 3.00 inches
- B. 4.50 inches
- C. 6.75 inches
- D. 8.00 inches

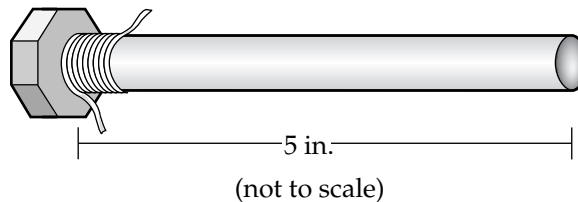
- 2 Triangle ABC and triangle DEF are similar.



Which of the following statements about the similar triangles is true?

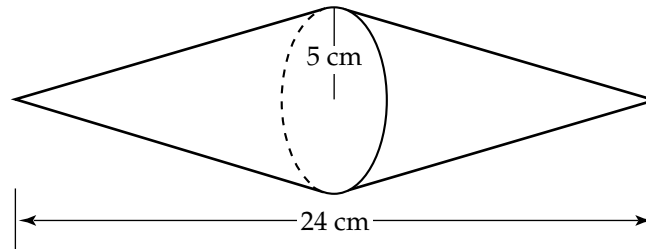
- E. $m\angle A = m\angle B$
- G. $m\angle A = m\angle C$
- H. $m\angle A = m\angle D$
- I. $m\angle A = m\angle F$

- 3 Jenny is making an electromagnet by wrapping wire around an iron bolt, as shown in the picture below.



The wire is 0.1 inch in diameter so each wrap is 0.1 inch wide. Jenny makes one wrap every 3 seconds. To the nearest tenth of a second, how many seconds will it take Jenny to wrap the 5-inch bolt?

- 4 Two identical right circular cones have been placed with their bases touching to create the sculpture shown in the drawing below. The radius of each base is 5 cm and the total length of the object is 24 cm.



What is the volume, in cubic centimeters, of the sculpture? Use one of the approximations for π found on the FCAT Mathematics Reference Sheet.

- 5 The *Spartan* satellite is in the shape of a cube that measures 5 feet on each edge. If the satellite weighs 24 pounds per cubic foot on Earth, what is the total weight in pounds of the satellite on Earth?

- 6 A wholesaler is offering two different package deals of roses and carnations to florists. One package contains 20 dozen roses and 34 dozen carnations for \$504.00. The other package contains 15 dozen roses and 17 dozen carnations for \$327.00. This information can be represented by the system of equations below, where r represents the cost of one dozen roses and c represents the cost of one dozen carnations.

$$20r + 34c = 504$$

$$15r + 17c = 327$$

Solve the system of equations to find the cost, in dollars, of a dozen roses.

7

THINK
SOLVE
EXPLAIN

Go to your Sample Answer Book to answer Number 7.

8

Weekly attendance figures for a movie shown at a theater are given in the chart below. The movie will no longer be shown when the weekly attendance drops below 200.

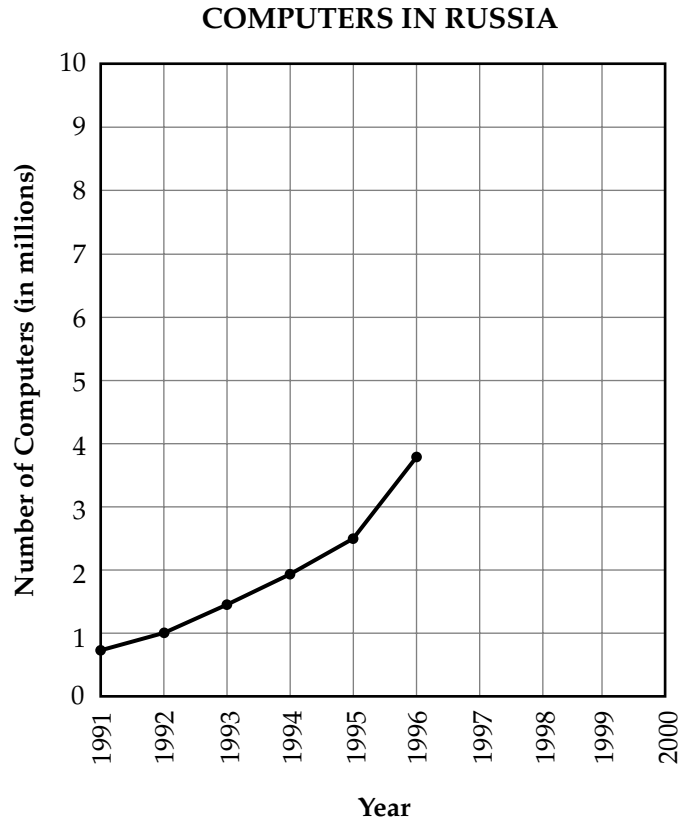
WEEKLY ATTENDANCE FIGURES

Week	Attendance
1	6,160
2	3,080
3	1,540
4	770

If this attendance pattern continues, during which week will attendance first drop below 200?

- A. 5
- B. 6
- C. 7
- D. 8

- 9 The graph below shows the estimated number of computers in Russia from 1991 to 1996.



If the rate of increase in the number of computers continues, which of the following gives the best estimate of the number of computers in Russia in the year 2000 ?

- F. 3 to 5 million
- G. 5 to 6.5 million
- H. 6.5 to 7.5 million
- I. over 7.5 million

- 10 A scientist is comparing the weights of the four molecules listed in the table below.


WEIGHTS OF MOLECULES

Molecule	Weight (in kilograms)
Salt	9.350×10^{-28}
Pure water	2.879×10^{-26}
Hydrochloric acid	5.832×10^{-22}
Potassium hydroxide	8.976×10^{-24}

Which of these molecules is the heaviest?

- A. salt
 - B. pure water
 - C. hydrochloric acid
 - D. potassium hydroxide
- 11 If -5 is multiplied by a number greater than 1, which of the following describes the result?

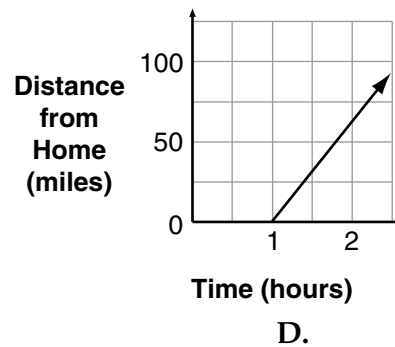
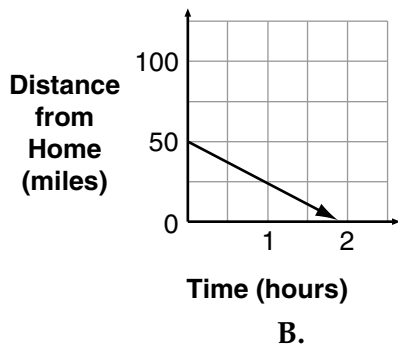
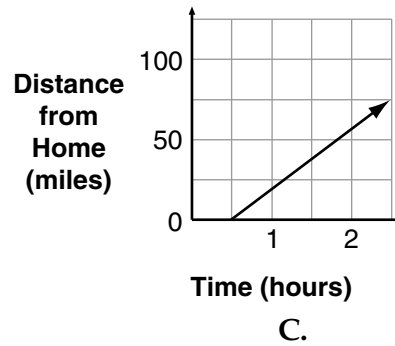
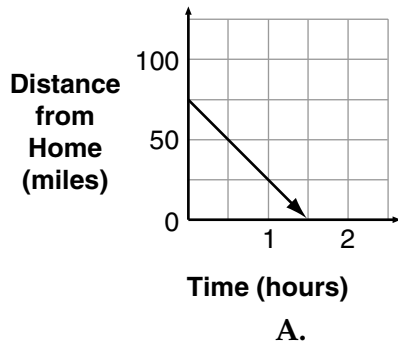
- F. a number between -5 and 5
- G. a number greater than 5
- H. a number less than -5
- I. a number greater than -5

- 12  The "lightweighting" process makes it possible for manufacturers to use less material to produce glass bottles. In 1972 it took 75.7 pounds of glass to produce one hundred 16-ounce glass bottles. In 1992 it took 48 pounds of glass to make the same number and size of bottles. What is the percent decrease in the number of pounds of glass used in 1972 compared with 1992 to produce one hundred 16-ounce bottles?

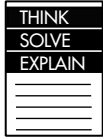


13 The Regal High Debate Club qualified for the state meet. How many possible two-member debate teams can be formed from a pool of six students in the Regal High Debate Club?

14 It took Myron 90 minutes, at an average rate of 50 miles per hour, to drive home from a business trip. Which of these graphs best represents Myron's drive home?



15

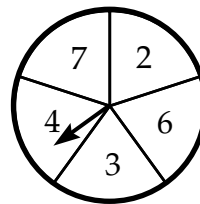
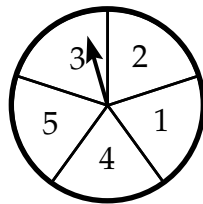


Go to your Sample Answer Book to answer Number 15.

16

The two spinners below are used for a math game. Each arrow has an equal chance of landing on any one number on its spinner. If both arrows land on even numbers, one point is given. Which of these fractions expresses the probability of getting two even numbers?

- F. $\frac{5}{25}$
- G. $\frac{6}{25}$
- H. $\frac{10}{25}$
- I. $\frac{19}{25}$

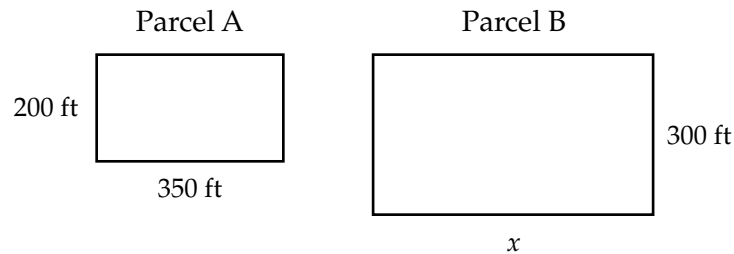


17

David and Terri drove a small motorboat down a river with the current. The rate the boat traveled in still water was r miles per hour and the current's average speed was c miles per hour. It took them 1.5 hours to travel 4 miles downstream. Which of the following equations can be used to represent this information?

- A. $1.5 = (r + c)4$
- B. $1.5 = (r - c)4$
- C. $4 = (r + c)1.5$
- D. $4 = (r - c)1.5$

- 18 A developer is looking at the drawings of two proportional parcels of land shown below. One of the dimensions of parcel B is not readable.



How many square feet are in parcel B?

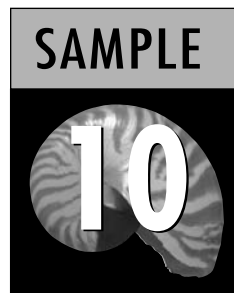
- E. 70,000 square feet
 - G. 87,500 square feet
 - H. 157,500 square feet
 - I. 227,500 square feet
- 19 A science lab needs a right circular cylindrical container that holds exactly 15 gallons of liquid and is 24 inches tall. A reference manual states that 231 cubic inches is equivalent to 1 gallon. What is the approximate radius, in inches, of the container?
- A. 1.92 inches
 - B. 6.78 inches
 - C. 22.99 inches
 - D. 45.98 inches



This is the end of the Mathematics Sample Test.
Until time is called, go back and check your work or answer questions you did not complete. When you have finished, close your Sample Test Book and Sample Answer Book.

Name _____

FCAT Mathematics Sample Answer Book



Answer all the questions that appear in the Sample Test Book in this Sample Answer Book. Answer multiple-choice questions by filling in the bubble for the answer you select. Answer gridded-response questions by filling in the correct bubbles. Write your answers to "Think, Solve, Explain" questions on the lines provided.

To remove your Sample Answer Book, carefully tear along the dotted line.

1 (A) (B) (C) (D)

2 (F) (G) (H) (I)

3

	○	○	○	
●	●	●	●	●
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

4

	○	○	○	
●	●	●	●	●
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
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6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

5

	○	○	○	
●	●	●	●	●
0	0	0	0	0
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2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

6

	○	○	○	
●	●	●	●	●
0	0	0	0	0
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2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

7

An electrician charges a \$45 fee to make a house call plus an hourly rate for labor. The electrician will work at one house for 3 hours and charge \$145.50 for the job.

THINK
SOLVE
EXPLAIN

Part A Write an equation that could be used to find the electrician’s hourly rate. Let r be the electrician’s hourly rate.

Equation _____

Part B Determine the electrician’s hourly rate. Show all work necessary to justify your answer.

Hourly rate _____

8 (A) (B) (C) (D)

9 (F) (G) (H) (I)

10 (A) (B) (C) (D)

11 (F) (G) (H) (I)

12

	/	/	/	
•	•	•	•	•
0	0	0	0	0
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4	4	4	4	4
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6	6	6	6	6
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8	8	8	8	8
9	9	9	9	9

13

	/	/	/	
•	•	•	•	•
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4	4	4	4	4
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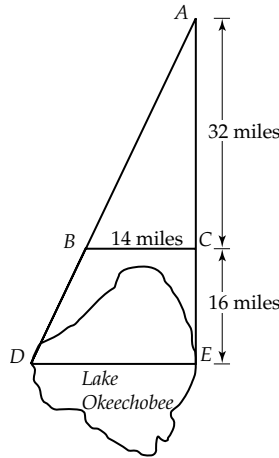
14 (A) (B) (C) (D)

15

A geographer is trying to determine the distance across Lake Okeechobee from point D to point E as shown in the diagram below. She has drawn triangles using known distances so that $\angle ACB$ is congruent to $\angle AED$.

THINK
SOLVE
EXPLAIN

LAKE OKEECHOBEE



Part A Explain in words why $\triangle ACB$ is similar to $\triangle AED$.

Part B Write a proportion that could be used to find the distance between point D and point E .

Proportion _____

Part C Solve the proportion in **Part B** to determine the distance in miles across Lake Okeechobee along \overline{DE} . Show the mathematics needed to determine the distance.

Distance _____

16 (F) (G) (H) (I)

17 (A) (B) (C) (D)

18 (F) (G) (H) (I)

19 (A) (B) (C) (D)



This is the end of the Mathematics Sample Answer Book. Until time is called, go back and check your work or answer questions you did not complete. When you have finished, close your Sample Test Book and Sample Answer Book.



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1 2 3 4 5 6 7 8 9 10 11 12 A B C D E

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MATHEMATICS