

2008

# FCAT

Florida Comprehensive Assessment Test®

## TEACHER'S BOOKLET

MATHEMATICS



# MATHEMATICS SAMPLE ANSWER KEY

GRADE

# 10

## FCAT Sample Test Materials

These sample test materials are designed to help students prepare to answer FCAT questions. These materials introduce them to the kinds of questions they will answer when they 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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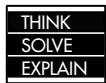
# FCAT Mathematics Sample Answer Key



This book contains answers to the FCAT Mathematics sample test questions. It also gives the Sunshine State Standards benchmark assessed by each item on the sample test. In addition, one or more possible approaches to solving the questions are provided. Students may use approaches other than these and still receive credit if they also obtain a correct answer.

Multiple-choice and gridded-response items are scored by awarding one point for each correct answer. The "Think, Solve, Explain" questions allow partial credit for some answers, even if they are not 100% correct. Answers will be scored and points will be given based on the completeness and correctness of the answers. If a portion of an answer is correct, a portion of the points will be awarded.

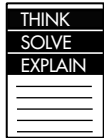
The scoring rubrics for the short-response questions and the extended-response questions are shown below:



## Rubric for Short-Response Questions

- |          |   |
|----------|---|
| 2 points | A score of two indicates that the student has demonstrated a thorough understanding of the mathematics concepts and/or procedures embodied in the task. The student has completed the task correctly, in a mathematically sound manner. When required, student explanations and/or interpretations are clear and complete. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.   |
| 1 point  | A score of one indicates that the student has provided a response that is only partially correct. For example, the student may provide a correct solution, but may demonstrate some misunderstanding of the underlying mathematical concepts or procedures. Conversely, a student may provide a computationally incorrect solution but could have applied appropriate and mathematically sound procedures, or the student's explanation could indicate an understanding of the task, despite the error. |

0 points A score of zero indicates that the student has provided no response at all, or a completely incorrect or uninterpretable response, or demonstrated insufficient understanding of the mathematics concepts and/or procedures embodied in the task. For example, a student may provide some work that is mathematically correct, but the work does not demonstrate even a rudimentary understanding of the primary focus of the task.



**Rubric for Extended-Response Questions**

4 points A score of four is a response in which the student demonstrates a thorough understanding of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations.

The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.

3 points A score of three is a response in which the student demonstrates an understanding of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is essentially correct, with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding.

The response may contain minor flaws that reflect inattentive execution of mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.

2 points A score of two indicates that the student has demonstrated only a partial understanding of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student’s work lacks an essential understanding of the underlying mathematical concepts.

The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.

- 1 point      A score of one indicates that the student has demonstrated a very limited understanding of the mathematics concepts and/or procedures embodied in the task. The student's response is incomplete and exhibits many flaws. Although the student's response has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete.
- The response exhibits many flaws or may be incomplete.
- 0 points      A score of zero indicates that the student has provided no response at all, or a completely incorrect or uninterpretable response, or demonstrated insufficient understanding of the mathematics concepts and/or procedures embodied in the task. For example, a student may provide some work that is mathematically correct, but the work does not demonstrate even a rudimentary understanding of the primary focus of the task.

**1** The correct answer is B (4.50 inches).

Strand: C—Geometry and Spatial Sense

Benchmark: MA.C.3.4.1 The student represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry. (Also assesses MA.C.2.4.1 understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals.)

A proportion may be used to determine the actual length of the dragonfly’s body.

**First Strategy:**

Set up two ratios that compare the drawing size of each object to the actual size of each object.

$$\text{Penny } \frac{0.25 \text{ inch}}{0.75 \text{ inch}} \quad \text{Dragonfly } \frac{1.5 \text{ inches}}{x \text{ inches}}$$

Since the units in each numerator and denominator are the same, they may be eliminated so a proportion can be set up and solved.

$$\frac{0.25}{0.75} = \frac{1.5}{x}$$

Solve the proportion for  $x$ .

$$0.25x = 1.125$$

$$\frac{0.25x}{0.25} = \frac{1.125}{0.25}$$

$$x = 4.50$$

The actual length of the dragonfly’s body is 4.50 inches.

**OR**

**Second Strategy:**

Direct variation ( $y = kx$ ) can also be used to determine the actual length of the dragonfly’s body, where  $k$  is the constant of variation.

$$\frac{y(\text{actual size})}{x(\text{photograph size})} = k \quad \text{can be rewritten as } \frac{0.75}{0.25} = k, \text{ therefore } k = 3.$$

Using the direct variation formula ( $y = kx$ ), substitute the known values for  $k$  and  $x$  for the dragonfly and solve for  $y$ .

$$y = (3)(1.5)$$

$$y = 4.5 \text{ inches}$$

**2 The correct answer is H ( $m\angle A = m\angle D$ ).**

Strand: C—Geometry and Spatial Sense

Benchmark: MA.C.2.4.1 The student understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals. (Also assesses MA.B.1.4.3 relates the concepts of measurement to similarity and proportionality in real-world situations; MA.C.1.4.1 uses properties and relationships of geometric shapes to construct formal and informal proofs; and MA.C.3.4.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry.)

To determine which statement about the triangles is true, use the definition of similar triangles. If two triangles are similar, the measures of their corresponding angles are equivalent. Since it is given that  $\triangle ABC$  is similar to  $\triangle DEF$ , then  $\angle A$  corresponds to  $\angle D$ . Therefore,  $m\angle A = m\angle D$ .

**3 The correct answer is 150 seconds.**



Strand: A—Number Sense, Concepts, and Operations

Benchmark: MA.B.1.4.2 The student uses concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc lengths. (Also assesses MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.)

To determine how many seconds it will take to wrap a 5-inch bolt you must first find how many 0.1-inch wraps are in 5 inches.

0.1 inch is one-tenth of an inch

So, there are 10 of these in 1 inch. Next, you need to multiply that number by the total number of inches to be wrapped.

$$10 \times 5 \text{ inches of bolt} = 50$$

Next, take the number of wraps, 50, and multiply it by the 3 seconds it takes to make each wrap.

$$50 \times 3 = 150 \text{ seconds}$$

It will take 150 seconds to wrap the 5-inch bolt.

		1	5	0
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0	<input checked="" type="radio"/>
1	1	<input checked="" type="radio"/>	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	<input checked="" type="radio"/>	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

**4** The correct answer is 628 cm<sup>3</sup>.



Strand: B—Measurement

Benchmark: MA.B.1.4.1 The student uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids. (Also assesses MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.)

To determine the volume of the sculpture, the volume of one cone must be calculated and doubled. Use the volume formula from the FCAT Mathematics Reference Sheet for a right circular cone.

**First Strategy:**

The height of each cone is 12 cm (24 ÷ 2).

For one cone,  $V = \frac{1}{3}(3.14)(5^2)(12) \approx 314$ .

The volume of the sculpture is 628 cm<sup>3</sup> (314 × 2).

**OR**

**Second Strategy:**

For one cone,  $V = \frac{1}{3}\left(\frac{22}{7}\right)(5^2)(12) \approx 314.28571$ .

The volume of the sculpture is approximately 629 cm<sup>3</sup> (314.28571 × 2).

NOTE: Other correct responses may include 628.6 or 629.

		6	2	8
	○	○	○	
○	○	○	○	○
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	5
6	6	●	6	6
7	7	7	7	7
8	8	8	8	●
9	9	9	9	9

6	2	8	.	6
	○	○	○	
○	○	○	○	○
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	5
6	●	6	6	●
7	7	7	7	7
8	8	●	8	8
9	9	9	9	9

		6	2	9
	○	○	○	
○	○	○	○	○
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	5
6	6	●	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	●

**5** The correct answer is 3000 pounds.



Strand: B—Measurement

Benchmark: MA.B.1.4.1 The student uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids. (Also assesses MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.)

To determine the total weight of the satellite, first determine the volume of the satellite in cubic feet. Use the volume formula from the FCAT Mathematics Reference Sheet for a rectangular prism ( $V = lwh$ ).

The volume of the satellite is 125 cubic feet ( $5 \times 5 \times 5$ ).

Use the volume to determine the total weight.

125 cubic feet  $\times$  24 pounds/cubic feet = 3000 pounds.

	3	0	0	0
	0	0	0	
○	○	○	○	○
0	0	●	●	●
1	1	1	1	1
2	2	2	2	2
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** The correct answer is \$15.00.



Strand: D—Algebraic Thinking

Benchmark: MA.D.2.4.2 The student uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices. (Also assesses MA.D.2.3.1 represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities; MA.D.2.3.2 uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities; and MA.D.2.4.1 represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.)

To determine the cost, in dollars, of a dozen roses, use your preferred method to solve the system of equations.

**First Strategy:**

Linear Combination

$$20r + 34c = 504$$

$$15r + 17c = 327$$

Multiply the second equation by 2 and subtract it from the first equation.

$$\begin{array}{r} 20r + 34c = 504 \\ -30r + -34c = -654 \\ \hline -10r \qquad = -150 \\ \qquad r = 15 \end{array}$$

Since  $r = 15$ , the cost of a dozen roses is \$15.00.

**OR**

**Second Strategy:**  
Substitution Method

$$20r + 34c = 504$$

$$34c = 504 - 20r$$

$$\frac{34c}{34} = \frac{504 - 20r}{34}$$

$$c = \frac{(504 - 20r)}{34}$$

Substitute the value for  $c$  in the other equation and solve for  $r$ .

$$15r + 17\left(\frac{504 - 20r}{34}\right) = 327$$

$$15r + 252 - 10r = 327$$

$$5r + 252 = 327$$

$$5r = 75$$

$$\frac{5r}{5} = \frac{75}{5}$$

$$r = 15$$

**OR**

**Third Strategy:**

A graphical method is also possible; however, the coefficients in these two equations would make this an inefficient method to use on the FCAT.

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**7** The correct answer is shown below.

THINK
SOLVE
EXPLAIN

Strand: D—Algebraic Thinking

Benchmark: MA.D.2.4.2 The student uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices. (Also assesses MA.D.2.3.1 represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities; MA.D.2.3.2 uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities; and MA.D.2.4.1 represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.)

**Part A**

One example of an equation that can be used to determine the electrician’s hourly rate is  $45 + 3r = 145.5$

**Part B**

The correct answer is \$33.50. To receive full credit, work must be shown in Part B that supports the correct answer. An example of this is shown below.

$$45 + 3r = 145.5$$

$$3r = 100.5$$

$$\frac{3r}{3} = \frac{100.5}{3}$$

$$r = 33.5$$

The hourly rate is \$33.50.

**8** The correct answer is B (6).

Strand: D—Algebraic Thinking

Benchmark: MA.D.1.4.1 The student describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs.

To determine in which week the attendance will first drop below 200, the pattern in the table must be extended.

The attendance drops by half each week.

**WEEKLY ATTENDANCE FIGURES**

Week	Attendance
1	6,160
2	3,080
3	1,540
4	770
5	385
6	192.5

The attendance first drops below 200 during Week 6.

**9 The correct answer is I (more than 7.5 million).**

Strand: E—Data Analysis and Probability

Benchmark: MA.E.1.4.1 The student interprets data that has been collected, organized, and displayed in charts, tables, and plots. (Also assesses MA.E.1.3.1 collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations; and MA.E.1.4.3 analyzes real-world data and makes predictions of larger populations by applying formulas to calculate measures of central tendency and dispersion using the sample population data, and using appropriate technology, including calculators and computers.)

To determine the number of computers in Russia in the year 2000, extend the graph.

Assuming the rate continues to rise, estimating and extending the graph indicates that there would be more than 7.5 million computers in the year 2000.

**10 The correct answer is C (hydrochloric acid).**

Strand: A—Number Sense, Concepts, and Operations

Benchmark: MA.A.1.4.2 The student understands the relative size of integers, rational numbers, irrational numbers, and real numbers.

To determine which molecule is the heaviest, evaluate the weight of each molecule.

$10^{-22}$  is larger than  $10^{-24}$ ,  $10^{-26}$ , and  $10^{-28}$ ; therefore,  $5.832 \times 10^{-22}$  has the greatest value and hydrochloric acid is the heaviest molecule listed in the table.

- 11** The correct answer is H (a number less than  $-5$ ).

Strand: A—Number Sense, Concepts, and Operations

Benchmark: MA.A.3.4.1 The student understands and explains the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships. (Also assesses MA.A.2.4.2 understands and uses the real number system.)

To determine the result of multiplying  $-5$  by a number greater than 1, two strategies may be used.

**First Strategy:**

If  $x > 1$ , then  $-5x < -5$ , since the product of a positive number and a negative number is always negative. The correct answer is H.

**OR**

**Second Strategy:**

Choose a number greater than 1 to multiply by  $-5$ . For example,  $3 \times -5 = -15$ . Since  $-15$  is less than  $-5$ , the correct answer is H.

**12** The correct answer is 36.59%.



Strand: A—Number Sense, Concepts, and Operations

Benchmark: MA.A.3.4.3 The student adds, subtracts, multiplies, and divides real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. (Also assesses MA.A.2.4.2 understands and uses the real number system.)

A variety of methods may be used to determine the percent of decrease.

**First Strategy:**

First, subtract to find the amount of change:

$$75.7 - 48 = 27.7 \text{ pounds}$$

Write and solve a proportion to find the percent decrease:

$$\frac{\text{Amount of decrease} \rightarrow 27.7}{\text{Original amount} \rightarrow 75.7} = \frac{x}{100}$$

$$2770 = 75.7x$$

$$\frac{2770}{75.7} = \frac{75.7x}{75.7}$$

$$x = 36.59\%$$

**OR**

**Second Strategy:**

$$\frac{\text{Amount of decrease} \rightarrow 27.7}{\text{Original amount} \rightarrow 75.7}$$

Change this fraction to a decimal (0.365918) and convert it to a percent (36.59%).

OR

**Third Strategy:**

Divide the new amount by the original amount.

$$\frac{\text{New amount} \rightarrow 48}{\text{Original amount} \rightarrow 75.7} = 0.6340819$$

Subtract the result from 1 and write the decimal as a percent.

$$1.0 - 0.6340819 = 0.365918 \text{ or } 36.59\%$$

Note: Other correct responses may include 36.6% or 37%.

3	6	.	5	9
/	/	/		
○	○	●	○	○
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
●	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	●

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

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

**13** The correct answer is 15.



Strand: E—Data Analysis and Probability

Benchmark: MA.E.2.4.1 The student determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations. (Also assesses MA.E.2.4.2 determines the probability for simple and compound events as well as independent and dependent events.)

Use a list to determine the number of two-member teams that can be formed. First, give the 6 students each a letter, A, B, C, D, E, F.

Next, make all the teams that can have student A in them.

AB, AC, AD, AE, AF

Then make all the remaining teams with student B.

BC, BD, BE, BF

Then make all the remaining teams with student C.

CD, CE, CF

Then make all the remaining teams with student D.

DE, DF

Then make all the remaining teams with student E.

EF

There are no remaining teams with student F.

So, there are 15 two-member debate teams possible.

			1	5
	7	7	7	
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

**14** The correct answer is A.

Strand: E—Data Analysis and Probability

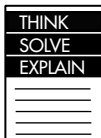
Benchmark: MA.E.3.4.1 The student designs and performs real-world statistical experiments that involve more than one variable, then analyzes results and reports findings. (Also assesses MA.E.3.3.1 formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics [range, mean, median, and mode] and tables, graphs, and charts; and MA.E.3.4.2 explains the limitations of using statistical techniques and data in making inferences and valid arguments.)

To determine which graph is correct, first notice that the  $x$ -axis is labeled Time (hours) and the  $y$ -axis is labeled Distance from Home (miles).

Next, the question states that Myron is driving home, so the distance from home should decrease as time passes. This happens in options A and B.

Next, the question states that it took Myron a total of 90 minutes to get home, so option A is correct because this shows that Myron's trip ended halfway between 1 and 2 hours, which would be 90 minutes.

**15** The correct answer is shown below.



Strand: C—Geometry and Spatial Sense

Benchmark: MA.C.2.4.1 The student understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals. (Also assesses MA.B.1.4.3 relates the concepts of measurement to similarity and proportionality in real-world situations; MA.C.1.4.1 uses properties and relationships of geometric shapes to construct formal and informal proofs; and MA.C.3.4.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems, including ratio, proportion, and properties of right triangle trigonometry.)

**Part A**

- Explanation similar to the following:

Triangle  $ACB$  and  $\Delta AED$  are similar because two angles of  $\Delta ACB$  are congruent to two angles of  $\Delta AED$ . Both triangles contain  $\angle BAC$ , and  $\angle ACB$  in  $\Delta ACB$  is congruent to  $\angle AED$  in  $\Delta AED$  (given).

**OR** other valid explanation

**Part B**

- One of the following proportions:

$$\frac{DE}{14} = \frac{32 + 16}{32}$$

$$\frac{DE}{14} = \frac{48}{32}$$

$$\frac{14}{DE} = \frac{32}{48}$$

$$\frac{DE}{32 + 16} = \frac{14}{32}$$

$$\frac{DE}{48} = \frac{14}{32}$$

**OR** other valid proportion

**Part C**

- 21 (miles)

**AND**

- Work equivalent to the following:

$$\frac{DE}{14} = \frac{48}{32}$$

$$14 \times \frac{DE}{14} = 14 \times \frac{48}{32}$$

$$DE = 21 \text{ miles}$$

**OR** other valid work that includes correctly solving the proportion in **Part B** to find the distance along  $\overline{DE}$ .

- 16 The correct answer is G  $\left(\frac{6}{25}\right)$ .

Strand: E—Data Analysis and Probability

Benchmark: MA.E.2.4.1 The student determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations. (Also assesses MA.E.2.4.2 determines the probability for simple and compound events as well as independent and dependent events.)

Use the spinners to determine the probability of spinning two even numbers. For the first spinner, the probability of the spinner landing on an even number is  $\frac{2}{5}$ . For the second spinner, the probability of the spinner landing on an even number is  $\frac{3}{5}$ . The probability of the spinner landing on two even numbers is  $\frac{2}{5} \times \frac{3}{5} = \frac{6}{25}$ .

- 17 The correct answer is C  $[4 = (r + c)1.5]$ .

Strand: D—Algebraic Thinking

Benchmark: MA.D.1.4.1 The student describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs.

Use the formula  $distance = (rate)(time)$  to determine which equation represents the information in the question.

The distance the boat traveled is 4 miles. The rate is determined by adding the rate of the boat in still water ( $r$ ) to the average speed of the downstream current ( $c$ ). The time is 1.5 hours.

The correct equation would be  $[4 = (r + c)1.5]$ .

**18** The correct answer is H (157,500 square feet).

Strand: C—Geometry and Spatial Sense

Benchmark: MA.C.3.4.1 The student represents and applies geometric properties and relationships to solve real-world and mathematical problems, including ratio, proportion, and properties of right triangle trigonometry. (Also assesses MA.C.2.4.1 understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals.)

A variety of methods can be used to determine the area of Parcel B.

**First Strategy:**

To determine the area of Parcel B, first determine the length of  $x$ . Since the parcels are proportional in size, the following proportion can be used to determine  $x$ :

$$\frac{200}{300} = \frac{350}{x}$$

$$200x = 105,000$$

$$\frac{200x}{200} = \frac{105,000}{200}$$

$$x = 525$$

Since  $x = 525$ , the area of Parcel B is 157,500 square feet ( $525 \times 300$ ).

**OR**

**Second Strategy:**

The ratio of the areas is  $\left(\frac{300}{200}\right)^2 = \frac{9}{4}$ .

Since the area of Parcel A is 70,000 square feet ( $200 \times 350$ ), the area of Parcel B is  $\left(\frac{9}{4}\right)(70,000)$ , which is 157,500 square feet.

**19** The correct answer is B (6.78 inches).

Strand: B—Measurement

Benchmark: MA.B.2.4.1 The student selects and uses direct (measured) or indirect (not measured) methods of measurement as appropriate.

To determine the radius of the container, use the volume formula from the FCAT Mathematics Reference Sheet for a right circular cylinder ( $V = \pi r^2 h$ ).

First, convert 15 gallons to cubic inches.

15 gallons  $\times$  231 cubic inches = 3465 cubic inches.

The volume of the container, in cubic inches, is 3465. Substitute this amount for  $V$  in the formula. Then, solve the equation for  $r$ .

$$3465 = 3.14(r^2)(24)$$

$$3465 = 75.36(r^2)$$

$$\frac{3465}{75.36} = \frac{75.36(r^2)}{75.36}$$

$$45.979 = r^2$$

$$\sqrt{45.979} = \sqrt{r^2}$$

$$6.781 \approx r$$

The radius of the container is approximately 6.78 inches. (A similar result occurs if  $\pi \approx \frac{22}{7}$  is used.)



**MATHEMATICS**



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