FCAT 2.0
Florida Comprehensive Assessment Test®

Grade 7 FCAT 2.0 Mathematics Sample Answers

This booklet contains the answers to the FCAT 2.0 Mathematics sample questions, as well as explanations for the answers. It also gives the Next Generation Sunshine State Standards (NGSSS) benchmark assessed by each item. Although the Florida State Board of Education adopted the Common Core State Standards in the summer of 2010, these standards have not yet been implemented. For this reason, the FCAT 2.0 tests and sample questions and answers are based on the 2007 NGSSS. The benchmarks included in this booklet provide teachers with additional information. For more detailed information, follow this link to the Florida NGSSS website: http://www.floridastandards.org/index.aspx, or follow this link to the current benchmark language in the *FCAT 2.0 Mathematics Test Item Specifications*: http://fcat.fldoe.org/fcat2/itemspecs.asp.

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 in FCAT 2.0 Mathematics tests are scored by awarding one point for each correct answer.

The intent of these sample test materials is to orient teachers and students to the types of questions on FCAT 2.0 tests. By using these materials, students will become familiar with the types of items and response formats they will see on the actual test. The sample questions and answers are not intended to demonstrate the length of the actual test, nor should student responses be used as an indicator of student performance on the actual test. Additional information about test items can be found in the *FCAT 2.0 Test Item Specifications* at http://fcat.fldoe.org/fcat2/itemspecs.asp.

The sample questions for students and the sample answers for teachers will only be available online, at http://fcat.fldoe.org/fcat2/fcatitem.asp.

1 **The correct answer is B ($\frac{1}{4}$ of the large room's area).**

Reporting Category: Geometry and Measurement

Benchmark: MA.7.G.4.1 Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures, and apply these relationships to solve problems.

Use the area formula, $A = \pi r^2$, from the Grades 6–8 FCAT 2.0 Mathematics Reference Sheet, to find the relationship between the two areas.

The area of the smaller room is $\pi 3^2$.

A (of smaller room) = 9π

The area of the large room is $\pi 6^2$.

A (of large room) = 36π

Therefore, the area of the smaller room is $\frac{9\pi}{36\pi}$, or $\frac{1}{4}$ of the large room's area.

2 **The correct answer is H (80).**

Reporting Category: Statistics and Probability

Benchmark: MA.7.S.6.2 Construct and analyze histograms, stem-and-leaf plots, and circle graphs.

To find the number of readers who chose museums as their favorite attraction, the percent of readers who chose museums must first be found. Because the percent of all readers equals 100, add the percents that are labeled and subtract that number from 100.

$25 + 25 + 18 = 68$

$100 - 68 = 32$; therefore, 32% of the readers chose museums.

To find 32% of the total, multiply .32 by 250 (the total number of readers who responded).

$.32 \times 250 = 80$, or 80 readers who responded chose museums as their favorite attraction.

The correct answer is 80 readers.

3 **The correct answer is B (2 heads and 1 tail).**

Reporting Category: Statistics and Probability

Benchmark: MA.7.P.7.2 Determine, compare, and make predictions based on experimental or theoretical probability of independent or dependent events.

To solve this problem, use the following ratio for probability.

$$\text{probability} = \frac{\text{favorable outcomes}}{\text{total outcomes}}$$

Each of the 24 students flipped a coin three times and recorded the results. To find which outcome matches the theoretical probability, compute the experimental probability for the class. Then, compare the experimental probability to the theoretical probability, as shown in the table below.

Outcome	Experimental Probability	Theoretical Probability
3 heads	$\frac{2}{24}$	$\frac{1}{8} = \frac{3}{24}$
2 heads and 1 tail	$\frac{9}{24}$	$\frac{3}{8} = \frac{9}{24}$
1 head and 2 tails	$\frac{8}{24}$	$\frac{3}{8} = \frac{9}{24}$
3 tails	$\frac{5}{24}$	$\frac{1}{8} = \frac{3}{24}$

The outcome of the class experiment that matches the theoretical probability is 2 heads and 1 tail.

4 **The correct answer is 7.**

Reporting Category: Number: Base Ten

Benchmark: MA.7.A.3.3 Formulate and use different strategies to solve one-step and two-step linear equations, including equations with rational coefficients. Also assesses MA.7.A.5.2 Solve non-routine problems by working backwards.

The steps below show how to solve for the value of x.

$2x + 6x = 56$

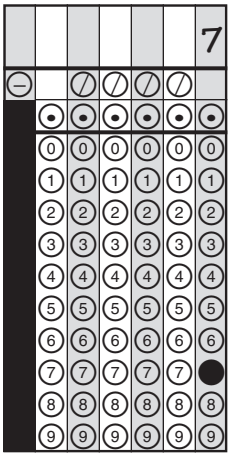
To simplify this equation, first add the coefficients of the like terms.

$8x = 56$

To isolate the x, divide both sides by 8.

$8x \div 8 = 56 \div 8$

$x = 7$



5 **The correct answer is -9.**

Reporting Category: Number: Base Ten

Benchmark: MA.7.A.3.2 Add, subtract, multiply, and divide integers, fractions, and terminating decimals, and perform exponential operations with rational bases and whole number exponents including solving problems in everyday contexts.

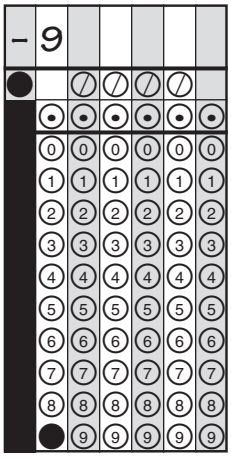
To find the temperature at 12:00 noon, subtract 15 from $-5°$, because the temperature dropped 15°.

$-5 - 15 = -20$ (or $-20°$)

Because the temperature then rose by 11°, 11 should be added to -20.

$-20 + 11 = -9$ (or $-9°$)

The temperature, in degrees Fahrenheit, at 3:00 p.m. was -9.



6 **The correct answer is 36 inches.**

Reporting Category: Ratios/Proportional Relationships

Benchmark: MA.7.A.1.6 Apply proportionality to measurement in multiple contexts, including scale drawings and constant speed.

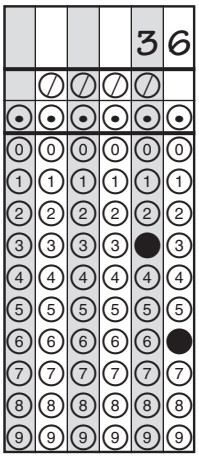
To find the height of the actual kite, use the information provided in the scale legend.

First, find the number of $\frac{1}{4}$-inch increments contained in the $1\frac{1}{2}$ scale height of the kite by dividing $1\frac{1}{2}$ by $\frac{1}{4}$.

$1\frac{1}{2} \div \frac{1}{4} = \frac{3}{2} \times \frac{4}{1}$, or 6

Because each $\frac{1}{4}$ inch on the drawing represents 6 inches on the actual kite, multiply 6 by 6 to find the actual height of the kite.

The height of the actual kite, in inches, is 36.



7 **The correct answer is G (36 feet).**

Reporting Category: Ratios/Proportional Relationships

Benchmark: MA.7.A.1.3 Solve problems involving similar figures.

One way to find the height of the palm tree is to use a proportion. Using the corresponding lengths, a proportion like the one shown below may be used.

$\frac{x}{4} = \frac{27}{3}$

To eliminate the denominators, multiply both sides of the equation by 12, or use cross multiplication.

$3x = 108$

$x = 36$

The height of the palm tree is 36 feet.

8 **The correct answer is B ($\frac{1}{4}$).**

Reporting Category: Ratios/Proportional Relationships

Benchmark: MA.7.A.1.4 Graph proportional relationships and identify the unit rate as the slope of the related linear function.

Find the slope of the ramp by using the ratio of the change in y (vertical change) to the change in x (horizontal change).

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

First Strategy

To determine the slope, find the ratio with respect to the starting point at (0, 0) and the ending point at (10, 2.5). (The y-coordinate changes from 0 to 2.5 as the x-coordinate changes from 0 to 10.)

$$\text{slope} = \frac{2.5-0}{10-0}$$

$$\text{slope} = \frac{1}{4}$$

OR

Second Strategy

The line representing the slope of the ramp appears to pass through the coordinates (4, 1) and (8, 2). Using the ratio given above, the slope could be represented by

$$\text{slope} = \frac{(2-1)}{(8-4)}$$

The slope is $\frac{1}{4}$.

9 **The correct answer is H (164).**

Reporting Category: Geometry and Measurement

Benchmark: MA.7.G.4.4 Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)), dimensions, and derived units to solve problems.

To find the closest length of the hose, in feet, the length of the hose must be converted from meters to feet. Use the conversion between systems, 1 meter = 3.28 feet (or, 1 foot = 0.305 meters), from the Grades 6–8 FCAT 2.0 Mathematics Reference Sheet.

Multiply 50 by 3.28, because the length of the hose is 50 meters.

$50 \cdot 3.28 = 164.00$

Or, divide 50 by 0.305 $(50 \div 0.305 = 163.93)$.

Of the options provided, the length of the hose is closest to 164 feet.

10 **The correct answer is 736 square feet.**

Reporting Category: Geometry and Measurement

Benchmark: MA.7.G.2.1 Justify and apply formulas for surface area and volume of pyramids, prisms, cylinders, and cones.

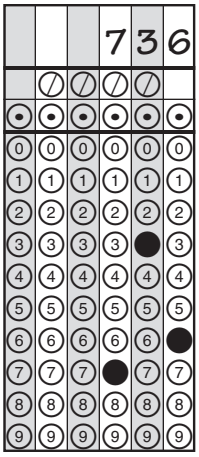
To find the surface area of the tent, find the area for both triangles on each end of the tent and all three rectangular-shaped faces of the tent. The base of each side triangle is 12 feet and the height is 8 feet. The dimensions of the two faces of the tent are 20 feet by 10 feet, and the base of the tent is 20 feet by 12 feet.

First, find the area of 1 triangle and multiply by 2. Then, add the product to the areas of the 2 rectangular faces of the tent and the area of the base of the tent, as shown below.

$$S.A. = 2\left[\tfrac{1}{2}(12) \cdot (8)\right] + 2\left[(10) \cdot (20)\right] + (12 \cdot 20)$$

$$96 + 400 + 240 = 736$$

The surface area is 736 square feet.



11 **The correct answer is C.**

Reporting Category: Ratios/Proportional Relationships

Benchmark: MA.7.A.1.5 Distinguish direct variation from other relationships, including inverse variation.

To find which one of the tables represents an inverse variation, each table must be analyzed to determine the kind of relationship that is represented.

In table A, each value of x is multiplied by 2; therefore, $2x = y$ and $\frac{y}{x}$ is a constant. The relationship is a direct variation.

In table B, although each value of y decreases as each value of x increases, this table does not represent an inverse relationship. In an inverse variation, xy must equal a constant; therefore, an inverse variation is not represented.

In table C, each value of x when multiplied by each value of y equals 24. Because xy equals a constant and each value of y decreases as each value of x increases, this table represents an inverse variation.

In table D, each value of x is squared $\left(x^2 = y\right)$. Because xy does not equal a constant, it is not an inverse variation, and because $\frac{y}{x}$ does not equal a constant, it is not a direct variation.

12 **The correct answer is G $|12 - 53 + 14|$.**

Reporting Category: Number: Base Ten

Benchmark: MA.7.A.3.1 Use and justify the rules for adding, subtracting, multiplying, dividing, and finding the absolute value of integers.

To find the expression that is equivalent to 27, each option must be evaluated, as shown below.

F.

$-|12 - 53 + 14|$

$-|-41 + 14|$

$-|-27|$

-27

H.

$|12| + |-53| + |14|$

$12 + 53 + 14$

$65 + 14$

79

G.

$|12 - 53 + 14|$

$|-41 + 14|$

$|-27|$

27, which is the correct answer

I.

$|-12| - |53| - |-14|$

$12 - 53 - 14$

$-41 - 14$

-55

13 **The correct answer is A $\left[20 + (1.5h - 1.5) = 32\right]$.**

Reporting Category: Number: Base Ten

Benchmark: MA.7.A.3.4 Use the properties of equality to represent an equation in a different way and to show that two equations are equivalent in a given context.

By use of the distributive property, $(h - 1)(1.5) = (1.5h - 1.5)$.

Now, substitute $(1.5h - 1.5)$ for $(h - 1)(1.5)$ in the original equation.

$20 + (1.5h - 1.5) = 32$

14 **The correct answer is 40 fish.**

Reporting Category: Geometry and Measurement

Benchmark: MA.7.G.2.2 Use formulas to find surface areas and volume of three-dimensional composite shapes.

To determine the number of fish Jay purchased, first find the volume of the water the tank holds when it is filled to 2 inches from the top of the tank.

Because the height of the tank is 14 inches, the height of the water is $14 - 2$, or 12 inches.

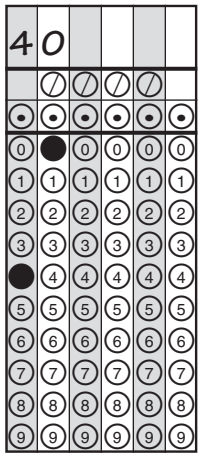
To compute the volume of the water, use the volume formula, $V = bwh$.

$V = 48 \times 10 \times 12$

$V = 5{,}760$ cubic inches

To find the number of fish, divide the volume by 144.

$\frac{5{,}760}{144} = 40$



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