

# 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 C (5, 3).

Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.5.1 Identify and plot ordered pairs on the first quadrant of the coordinate plane.

In order to find the coordinates of the fourth vertex of the rectangle, use the definition of a rectangle. A rectangle has 4 right angles and opposite sides that are congruent.

Look at the points already on the grid.

The coordinates for the base of the rectangle are (2, 1) and (5, 1).

The coordinates for the top left vertex of the rectangle are (2, 3). To complete the rectangle, a point is needed at the top right vertex, 2 units above (5, 1) and 3 units to the right of (2, 3). To find the coordinates for this point, start at the origin (0, 0), go to the right 5 units, and move up 3 units.

The fourth vertex of the rectangle is at (5, 3).

**2** The correct answer is 57.



Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.1.4 Divide multi-digit whole numbers fluently, including solving real-world problems, demonstrating understanding of the standard algorithm, and checking the reasonableness of results. Also assesses MA.5.A.1.2 Estimate quotients or calculate them mentally depending on the context and numbers involved. MA.5.A.1.3 Interpret solutions to division situations, including those with remainders, depending on the context of the problem.

To find the least whole number of days, divide 675 by 12.

Because the quotient is 56, with a remainder of 3, swimming for 56 days will only give her 672 laps; therefore, an extra day is needed to account for the remainder. She needs to swim 57 days to reach her goal.

			5	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
6	6	6	6	6
7	7	7	7	●
8	8	8	8	8
9	9	9	9	9

**3** The correct answer is 14.



Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.6.5 Solve non-routine problems using various strategies including “solving a simpler problem” and “guess, check, and revise.”

To solve this problem using guess, check, and revise, choose three numbers that are close to 33 when added together.

For example,  $10 + 10 + 10 = 30$

Because this sum is too small and  $33 - 30 = 3$ , distribute the 3 over the three addends.  
 $11 + 11 + 11 = 33$

Because the brothers are all 3 years apart, think about which numbers can be changed but will still equal the sum (33). If 3 is subtracted from the first number ( $11 - 3 = 8$ ) and 3 is added to the third number ( $11 + 3 = 14$ ), the three ages would still equal 33, but each would be 3 years apart.

$8 + 11 + 14 = 33$ ; therefore, the oldest brother’s age is 14.

Please note that other strategies may be used. For example, divide the total, 33, by 3, the number of brothers. The quotient is 11. Now use the process of subtracting 3 from 11, followed by adding 3 to 11, to get the other two ages.  $11 - 3 = 8$ ;  $11 + 3 = 14$ .

1	4			
0	0	0	0	0
●	1	1	1	1
2	2	2	2	2
3	3	3	3	3
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 The correct answer is G (top view).**

Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.3.1 Analyze and compare the properties of two-dimensional figures and three-dimensional solids (polyhedra), including the number of edges, faces, vertices, and types of faces.

To determine a top view of the pyramid, all views of the pyramid should be considered.

Option F is the base of the pyramid.

Option G is the correct answer. This graphic represents the pyramid's top view.

Option H is a view from either side of the pyramid when the pyramid is resting on its base.

Option I is part of the net of the pyramid.

**5 The correct answer is C (comparing the heights of five different mountains in each of two different continents).**

Reporting Category: Expressions, Equations, and Statistics

Benchmark: MA.5.S.7.1 Construct and analyze line graphs and double bar graphs. Also assesses MA.5.A.4.2 Construct and describe a graph showing continuous data, such as a graph of a quantity that changes over time.

To find the answer, each option should be read to determine if the situation could be represented by the double bar graph shown.

Option A. A double bar graph could be used to compare the prices of 5 kinds of apples in October to the prices of the apples in April. A key would show the October prices vs. the April prices, and Kind of Apple would be labeled along the  $x$ -axis.

Option B. A double bar graph could be used to compare the number of boys to the number of girls competing in the 5 activities. A key would show girls vs. boys, and Kind of Activity would be labeled along the  $x$ -axis.

Option C. The correct answer is C. The individual mountains on one continent are not matched to other mountains on a second continent; therefore, this data should not be represented by a double bar graph.

Option D. A double bar graph could be used to compare the number of cameras sold at the two different stores. A key would show the two different stores, and Month would be labeled along the  $x$ -axis.

**6** The correct answer is F (-70).

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.6.4 Compare, order, and graph integers, including integers shown on a number line.

To find the temperature that is higher, or greater than point  $T$ , first determine the temperature that point  $T$  represents.

Because there are 5 divisions between -100 and 0, and 5 divisions between 0 and 100, divide 100 by 5 to determine the number of degrees represented by each line segment on the number line.

$$100 \div 5 = 20$$

Therefore, the numbers on this number line to the right of 0 would be 20, 40, 60, and 80. The numbers to the left of 0 would be -20, -40, -60, and -80, which is point  $T$ .

By plotting all of the temperatures on the number line, -90 would be between -100 and -80. The only point that is higher than -80 is -70, which is between -60 and -80 and to the right of point  $T$ .

Another strategy would be to draw a thermometer with the same intervals as indicated above. Follow the same explanations to determine the correct answer.

**7** The correct answer is 25.

Reporting Category: Expressions, Equations, and Statistics

Benchmark: MA.5.A.4.1 Use the properties of equality to solve numerical and real-world situations.

To solve for  $s$  in this equation, first simplify the equation,  $17 + 30 = s + 22$ , by adding  $17 + 30$ .

$$(17 + 30) = s + 22$$

$$47 = s + 22$$

(continued on next page)

**7** (continued)

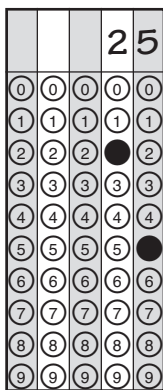
To solve for  $s$ , find a number that equals 47 when added to 22. A guess, check, and revise strategy may work, or think about the meaning of the equation,  $47 = s + 22$ . Note that the sum of  $s$  and 22 equals 47. Because  $s$  must be 22 less than 47, subtract 22 from 47.

$$47 - 22 = 25$$

To check that 25 tickets is the correct answer, substitute 25 for  $s$  in the equation.

$$17 + 30 = 25 + 22$$

$$47 = 47$$



**8** The correct answer is A (2°F).

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.6.3 Describe real-world situations using positive and negative numbers.

To determine Florida’s lowest recorded temperature, first find  $-2^\circ$  on the thermometer.

Count up  $4^\circ$  on the thermometer. The resulting temperature is  $2^\circ$ .

Another strategy, without using the thermometer, is to think about a number line with negative and positive numbers. Starting at  $-2$ , count 4 units to the right. The result is 2; therefore, the correct answer is  $2^\circ$ .

**9** The correct answer is 96.



Reporting Category: Expressions, Equations, and Statistics

Benchmark: MA.5.A.6.2 Use the order of operations to simplify expressions, which include exponents and parentheses.

To find the value of the expression, operations should be performed in the following order:

	$(24 \cdot 5) \div 2 + 6^2$
Parentheses: $24 \cdot 5 = 120$	$(120) \div 2 + 6^2$
Exponents: $6^2 = 36$	$120 \div 2 + 36$
Division: $120 \div 2 = 60$	$60 + 36$
Addition: $60 + 36 = 96$	96

			<b>9</b>	<b>6</b>
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	●
7	7	7	7	7
8	8	8	8	8
9	9	9	●	9

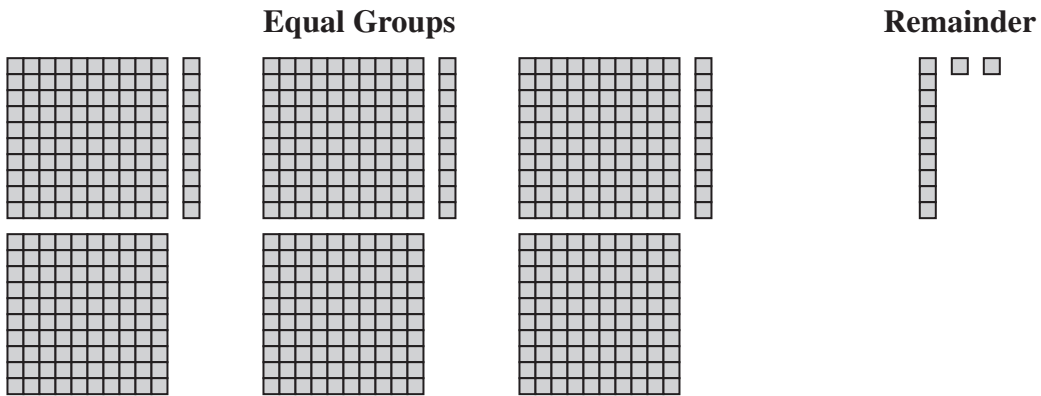


**10** The correct answer is F, as shown below.

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.1.1 Describe the process of finding quotients involving multi-digit dividends using models, place value, properties, and the relationship of division to multiplication.

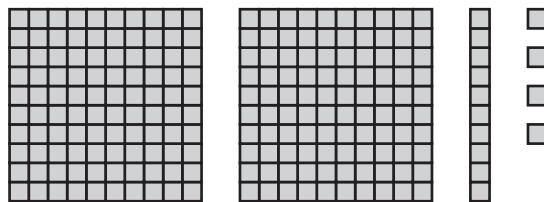
To determine the number of blocks in each group, first separate the blocks into 3 equal groups, with a remainder.



The bar in the remainder is separated into 10 unit squares:



The 10 unit squares from the bars plus the 2 individual units = 12 unit squares. Each group receives 4 of these unit squares. Thus, each group would have the unit squares shown below.



**11** The correct answer is \$2.55.

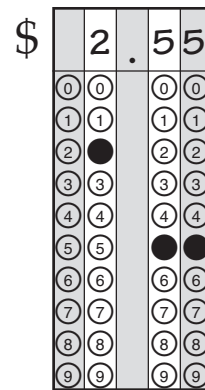


Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.2.1 Represent addition and subtraction of decimals and fractions with like and unlike denominators using models, place value, or properties.

Because each square represents \$0.05, each rectangle of 20 shaded squares represents \$1.00. The value of Alex's coins is \$1.35, and the value of Stephanie's coins is \$1.20.

$$\begin{array}{r} \$1.35 \\ +\$1.20 \\ \hline \$2.55 \end{array}$$



**12** The correct answer is D ( $5 \times 5 \times 6$ ).

Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.3.2 Describe, define, and determine surface area and volume of prisms by using appropriate units and selecting strategies and tools.

Because each edge of a cube is the same length, the length of each edge of the cube must be 5 inches.

Each face of the cube is a square with an area of  $5 \times 5$  square inches.

Because there are 6 faces on a cube, the total surface area of the cube would be  $5 \times 5 \times 6$  square inches.

- 13** The correct answer is F (She should use a line graph because the data are continuous).

Reporting Category: Expressions, Equations, and Statistics

Benchmark: MA.5.S.7.2 Differentiate between continuous and discrete data, and determine ways to represent those using graphs and diagrams. Also assesses MA.5.A.4.2 Construct and describe a graph showing continuous data, such as a graph of a quantity that changes over time.

The table, HEIGHT OF BAMBOO PLANT, represents the height of Emily's bamboo plant over time and should be represented by a line graph. This eliminates options H and I, as both list bar graphs. Although the correct type of graph is listed in option G, the reason is incorrect.

Because both the number of days and the height of the plant can be any of an infinite number of values between the whole numbers used, the data are continuous and a line graph should be used; therefore, option F is correct.

- 14** The correct answer is C, as shown below.

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.2.4 Determine the prime factorization of numbers.

To determine the correct factor tree of 80, first find factors of 8 and 10.

$$\begin{array}{c} 8 \quad \times \quad 10 \\ / \quad \backslash \quad / \quad \backslash \\ 4 \times 2 \quad \times \quad 5 \times 2 \end{array}$$

Of the four factors shown, 2 and 5 are prime numbers and 4 is a composite number. Because 4 is a composite number, it must be factored as shown below.

$$\begin{array}{c} 8 \quad \times \quad 10 \\ / \quad \backslash \quad / \quad \backslash \\ 4 \times 2 \quad \times \quad 5 \times 2 \\ / \quad \backslash \\ 2 \times 2 \end{array}$$

The numbers 2, 2, 2, 5, and 2 are all prime numbers; therefore, the factor tree is complete.

Although prime numbers may be shown in one line or circled, these presentations are correct, but not necessary.

- 15** The correct answer is I (He should measure the width of the window to the nearest  $\frac{1}{2}$  inch).

Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.5.3 Solve problems requiring attention to approximation, selection of appropriate measuring tools, and precision of measurement.

Measurements are more precise when smaller units of measurement are used. Because  $\frac{1}{2}$  inch is the smallest unit given, option I is correct.

**16** The correct answer is D (point S).

Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.5.4 Derive and apply formulas for areas of parallelograms, triangles, and trapezoids from the area of a rectangle.

A guess, check, and revise strategy may be used. Create trapezoids for each of the points given. Determine which of the trapezoids results in an area of 32 square units by decomposing the trapezoids into rectangles and triangles.

For example, using point S, an isosceles trapezoid can be formed. Trapezoid  $ABCS$  can be decomposed into two triangles, each with an area of 2 square units, and a rectangle with an area of 28 square units.

The area of trapezoid  $ABCS = 2 + 2 + 28 = 32$  square units.

**17** The correct answer is G (157 days).

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.1.4 Divide multi-digit whole numbers fluently, including solving real-world problems, demonstrating understanding of the standard algorithm, and checking the reasonableness of results. Also assesses MA.5.A.1.2 Estimate quotients or calculate them mentally depending on the context and numbers involved. MA.5.A.1.3 Interpret solutions to division situations, including those with remainders, depending on the context of the problem.

Several strategies may be used, one of which involves estimation.

First, estimate by rounding 6,272 miles to a number compatible with 80, such as 6,400.

Then, divide 6,400 by 80, which is 80.

Because 80 represents the number of days for a one-way journey, multiply the result by 2, which is 160.

Select 157, as this is closest to 160.

**18** The correct answer is 4 yards.



Reporting Category: Geometry and Measurement

Benchmark: MA.5.G.5.2 Compare, contrast, and convert units of measure within the same dimension (length, mass, or time) to solve problems.

Because the question asks for the least number of yards needed, the following sentence is not required to solve this problem: "Each yard of ribbon costs \$6, not including tax."

To find the number of yards of ribbon, use the Grade 5 FCAT 2.0 Mathematics Reference Sheet. First, convert 144 inches to feet, and then convert feet to yards, as the conversion for inches to yards is not given on the reference sheet.

Because 12 inches equals 1 foot, divide 144 inches by 12 inches to determine the number of feet of ribbon. ( $144 \div 12 = 12$ )

Because 3 feet equals 1 yard, divide 12 by 3 to determine the number of yards.

$$(12 \div 3 = 4)$$

Ms. Mather needs 4 yards of ribbon.

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
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

**19** The correct answer is B (between 10 and  $10\frac{1}{8}$  pounds).

Reporting Category: Number: Base Ten and Fractions

Benchmark: MA.5.A.2.2 Add and subtract fractions and decimals fluently, and verify the reasonableness of results, including in problem situations.

To solve this problem, use an estimation strategy.

First, note that  $5\frac{7}{8}$  is close to 6, and  $\frac{15}{16}$  is close to 1.

Substitute the estimates for the original numbers,  $6 + 3\frac{1}{4} + 1 = 10\frac{1}{4}$ .

The total weight of the three items must be less than  $10\frac{1}{4}$  because two of the weights were rounded up.

This narrows the answer to option A or B. Because  $\frac{15}{16}$  is exactly  $\frac{1}{16}$  less than 1, and  $\frac{7}{8}$  is  $\frac{2}{16}$  less than 1, the exact answer is  $\frac{3}{16}$  less than  $10\frac{1}{4}$ . Because the correct answer is still greater than 10, the answer must be between 10 and  $10\frac{1}{8}$  pounds.



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