

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 D (13).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.S.7.1 Construct and analyze frequency tables, bar graphs, pictographs, and line plots from data, including data collected through observations, surveys, and experiments.

To solve the problem, determine how many students are represented by each milk carton.

If 6 students drink milk at lunch on Monday and 3 milk cartons are shown, then $6 \div 3 = 2$. If 10 students drink milk at lunch on Wednesday and 5 milk cartons are shown, then $10 \div 5 = 2$. Each milk carton represents 2 students who drink milk at lunch.

Next, determine the number of students who drink milk at lunch on Friday. Count the 6 whole milk cartons shown for Friday. Using the information that 1 milk carton represents 2 students, multiply 6×2 to get 12 students. If 1 milk carton represents 2 students, then half of a milk carton represents 1 student. $12 + 1 = 13$. Thirteen students drink milk at lunch on Friday, option D.

2 The correct answer is F $[(9 \times 5) + (9 \times 3)]$.

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.1.2 Solve multiplication and division fact problems by using strategies that result from applying number properties.

To solve this problem, use the strategy of making an easier problem. First, change the number 8 to $(5 + 3)$. Then, multiply both digits by 9.

$$9 \times 5 = 45 \text{ and } 9 \times 3 = 27$$

The product of 9×8 is the same as the sum of $45 + 27$, or 72.

Therefore, F $[(9 \times 5) + (9 \times 3)]$ is the correct answer.

3 The correct answer is B (2).

Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.3.3 Build, draw, and analyze two-dimensional shapes from several orientations in order to examine and apply congruence and symmetry.

To solve this problem, imagine folding the picture of the scallop in half so that the two halves match. Draw a line on the picture where it can be folded so the two halves match. The picture can be folded vertically and horizontally, giving it 2 lines of symmetry.

- 4** The correct answer is H (third triangle in pattern).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.4.1 Create, analyze, and represent patterns and relationships using words, variables, tables, and graphs.

To solve this problem, recognize that a complete iteration of the pattern consists of four figures (triangle, square, rotated triangle, circle). There are three complete iterations of this pattern shown. Repeating the pattern, extend the pattern to identify the next figure, which is the third figure (rotated triangle) of a full iteration.

- 5** The correct answer is D ($\frac{3}{4}$).

Reporting Category: Number: Fractions

Benchmark: MA.3.A.2.4 Use models to represent equivalent fractions, including fractions greater than 1, and identify representations of equivalence.

To solve this problem, list all the factors of 6 and 8. Identify 2 as a factor of 6 and 8.

Divide both 6 and 8 by 2; therefore, $\frac{3}{4}$ is the equivalent fraction.

6 The correct answer is H ($32 \div 4$).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.1.1 Model multiplication and division, including problems presented in context: repeated addition, multiplicative comparison, array, how many combinations, measurement, and partitioning.

To solve this problem, recognize that the 32 pieces of candy must be shared equally among the 4 friends (partitive model of division). The only expression that can be used is H, $32 \div 4$.

7 The correct answer is A ($\frac{1}{2} > \frac{2}{5}$).

Reporting Category: Number: Fractions

Benchmark: MA.3.A.2.3 Compare and order fractions, including fractions greater than 1, using models and strategies. Also assesses MA.3.A.2.2 Describe how the size of the fractional part is related to the number of equal-sized pieces in the whole.

To solve this problem, recognize that each whole flower has 10 petals. On Flower A, $\frac{5}{10}$ of the petals are shaded; $\frac{5}{10}$ is equivalent to $\frac{1}{2}$. On Flower B, $\frac{4}{10}$ of the petals are shaded; $\frac{4}{10}$ is equivalent to $\frac{2}{5}$. Because $\frac{5}{10}$ is greater than $\frac{4}{10}$, option A, $\frac{1}{2}$ is greater than $\frac{2}{5}$, is the correct answer.

- 8** The correct answer is I ($b \div 8 = 2$).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.1.3 Identify, describe, and apply division and multiplication as inverse operations.

To solve this problem, write the multiplication equation that could be used to find the total number of beach balls, $8 \times 2 = b$. Of the equations shown, $b \div 8 = 2$ is the only equation that could also be used to find the total number of beach balls, as it is the inverse equation of $8 \times 2 = b$.

- 9** The correct answer is A ($2\frac{1}{4}$).

Reporting Category: Number: Fractions

Benchmark: MA.3.A.2.1 Represent fractions, including fractions greater than 1, using area, set, and linear models.

First Strategy:

To solve the problem, make the last figure one whole by moving $\frac{1}{4}$ of the second figure to it. That results in $2\frac{1}{4}$ of the figures being shaded.

OR

Second Strategy:

Count the total number of fourths that are shaded, $\frac{9}{4}$. Of the fractions given, $2\frac{1}{4}$ is the only one that is equivalent to $\frac{9}{4}$.

- 10** The correct answer is H $\left(\frac{29}{9}\right)$.

Reporting Category: Number: Fractions

Benchmark: MA.3.A.2.4 Use models to represent equivalent fractions, including fractions greater than 1, and identify representations of equivalence.

To solve this problem, recognize that each whole is divided into 9 equal parts or $\frac{9}{9}$. Three wholes are $\frac{27}{9}$. Of the last whole, only $\frac{2}{9}$ are shaded. Counting, a total of $\frac{29}{9}$ is shaded. Of the fractions given, $\frac{29}{9}$ is the only one that is equivalent to $3\frac{2}{9}$.

11 The correct answer is C (7,000).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.6.1 Represent, compute, estimate, and solve problems using numbers through hundred thousands.

First Strategy:

To solve this problem, estimate the number of students in each school.

Greendale 1,789 estimates to 2,000

Jones Park 1,032 estimates to 1,000

Shady River 2,115 estimates to 2,000

Wakefield 1,992 estimates to 2,000

Add all 4 estimates to get a total of 7,000. About 7,000 calendars should be ordered for the students in the 4 schools.

OR

Second Strategy:

To solve this problem, use the idea of compatible numbers:

$1,789 + 1,032$ is about 3,000

$2,115 + 1,992$ is about 4,000

Add the two estimates together ($3,000 + 4,000 = 7,000$). About 7,000 calendars should be ordered for the students in the 4 schools.

12 The correct answer is G (6).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.6.2 Solve non-routine problems by making a table, chart, or list and searching for patterns.

To solve this problem, list all of the possible pairs of students.

Charles—Erin

Charles—Gayle

Charles—Paco

Erin—Gayle

Erin—Paco

Gayle—Paco

The ordering of the pairs is not important (i.e., Charles—Erin is the same pair as Erin—Charles). There are 6 different possible pairs of students.

13 The correct answer is C (Each shape is a regular polygon).

Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.3.1 Describe, analyze, compare, and classify two-dimensional shapes using sides and angles—including acute, obtuse, and right angles—and connect these ideas to the definition of shapes.

To solve this problem, analyze each option and eliminate all false statements.

Option A is false because the square is the only shape that has exactly two pairs of parallel sides.

Option B is false because the pentagon is the only shape that has exactly five vertices.

Option D is false because the square is the only quadrilateral.

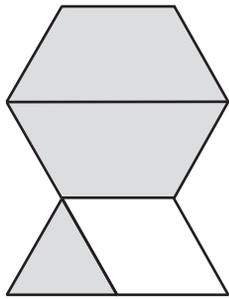
Option C is the correct answer because all shapes given (square, triangle, hexagon, and pentagon) are regular polygons. A regular polygon is both equilateral (all sides congruent) and equiangular (all angles congruent).

14 The correct answer is G (picture of 3 rhombi and 3 triangles).

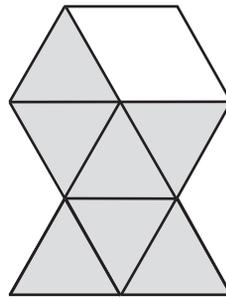
Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.3.2 Compose, decompose, and transform polygons to make other polygons, including concave and convex polygons with three, four, five, six, eight, or ten sides.

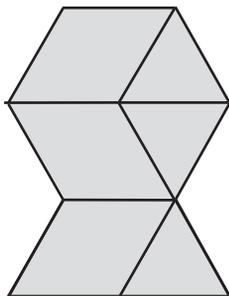
To solve this problem, draw in the shapes that would be used to compose the figure. The shapes from each option are shaded in the composed figures.



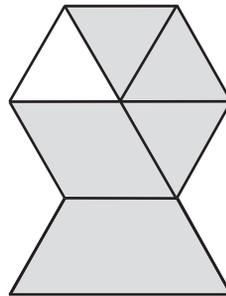
F.



H.



G.



I.

15 The correct answer is B (32 centimeters).

Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.5.1 Select appropriate units, strategies, and tools to solve problems involving perimeter.

First Strategy:

To solve this problem, apply the definition of perimeter (the distance around a figure) by using the centimeter ruler to measure all 8 sides of the picture. Then add the 8 measurements together.

$$2 \text{ cm} + 9 \text{ cm} + 2 \text{ cm} + 3 \text{ cm} + 5 \text{ cm} + 3 \text{ cm} + 5 \text{ cm} + 3 \text{ cm} = 32 \text{ cm}$$

OR

Second Strategy:

To solve this problem, recognize that the figure is composed of 2 rectangles (opposite sides have equal measure). Using this information, recognize that there are 2 pairs of congruent segments. After measuring one segment, double that measurement to compensate for the congruent segment.

$$2 \text{ cm} \times 2 = 4 \text{ cm}$$

$$5 \text{ cm} \times 2 = 10 \text{ cm}$$

Add these to the additional side measures: $4 + 10 + 9 + 3 + 3 + 3 = 32 \text{ cm}$, which is the perimeter.

- 16** The correct answer is H ($2\frac{1}{4}$ inches).

Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.5.2 Measure objects using fractional parts of linear units such as $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{10}$.

To solve this problem, use the inch side of the ruler to measure the stone arrowhead. To measure, align the beginning of the figure with the zero indicated on the ruler.

Interpret the markings on the ruler as fractions of an inch.

The stone arrowhead has a length of $2\frac{1}{4}$ inches.

- 17** The correct answer is D (a quarter after eight).

Reporting Category: Geometry and Measurement

Benchmark: MA.3.G.5.3 Tell time to the nearest minute and to the nearest quarter hour, and determine the amount of time elapsed.

To solve this problem, identify the time displayed as 7:50. Add 25 minutes to 7:50, or count clockwise in 5-minute intervals. 8:15 is twenty-five minutes later than 7:50.

The correct answer is D, 8:15, or a quarter after 8.

18 The correct answer is H (6).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.A.1.1 Model multiplication and division, including problems presented in context: repeated addition, multiplicative comparison, array, how many combinations, measurement, and partitioning.

First Strategy:

To solve this problem, use the combination model for multiplication. Each shirt is paired with each pair of shorts to find that 2 (shirts) multiplied by 3 (pairs of shorts) equals 6 uniform combinations.

OR

Second Strategy:

To solve this problem, match the red shirt with each of the 3 colors of shorts to get 3 uniform combinations. Match the white shirt with each of the 3 colors of shorts to get 3 more uniform combinations. Calculate $3 + 3$ to get a total of 6 possible uniform combinations.

19 The correct answer is D (correct bar graph).

Reporting Category: Number: Operations, Problems, and Statistics

Benchmark: MA.3.S.7.1 Construct and analyze frequency tables, bar graphs, pictographs, and line plots from data, including data collected through observations, surveys, and experiments.

To solve this problem, determine the correct graph by comparing each graph to the given data.

In Graph A, the data for votes for the flip-flops and sneakers are displayed incorrectly. There should be 8 votes for flip-flops and 10 votes for sneakers displayed.

In Graph B, the data for the votes for sandals are displayed incorrectly. There should only be 4 votes indicated, not 8.

In Graph C, the data for the votes for flip-flops, sandals, and sneakers are displayed incorrectly. In this graph, the data have been incorrectly doubled.

Graph D is the correct answer. All the data have been displayed accurately.



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