2006

FCAT

Florida Comprehensive Assessment Test®

REPORT ON THE 2006 FCAT MATHEMATICS RELEASED ITEMS

FLORIDA
Solves!

GRADES
5, 8 & 10

Florida Solves! Report on the 2006 FCAT Mathematics Released Items

Grades 5, 8 & 10

Florida Comprehensive Assessment Test

FCAT

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Preface

Florida Solves! Report on the 2006 FCAT Mathematics Released Items is provided to help educators understand the scoring of the short-response performance tasks included on the 2006 "Performance Task Student Report" for FCAT Mathematics (Grades 5, 8, and 10). *Florida Reads! Report on the 2006 FCAT Reading Released Items* (Grades 4, 8, and 10) and *Florida Inquires! Report on the 2006 FCAT Science Released Items* (Grades 5, 8, and 11) provide information about the reading and science performance tasks featured on the 2006 student reports. *Florida Writes! Report on the 2006 FCAT Writing+ Assessment* (three separate publications for Grades 4, 8, and 10) provides information about the writing assessment administered in 2006. Additional information about FCAT reports can be found in *Understanding FCAT Reports 2006* on the FCAT home page of the Florida Department of Education (DOE) web site at http://www.fldoe.org.

The Performance Task Student Report　For FCAT 2006, administered during March 2006, performance task results are provided for students in Grades 5, 8, and 10 on the Mathematics 2006 "Performance Task Student Reports." These reports summarize the total number of points possible on the performance tasks and the number of points each student earned. In addition, each report displays one of the tasks from the test and the number of points the student earned on that task. A copy (image) of the student's actual response to this featured task is printed on the bottom half of the report.

This Booklet　General information about the scoring of the FCAT Mathematics performance tasks is provided. Also included are guidelines for scoring the short-response performance tasks that are printed on the 2006 student reports. Each mathematics task in this booklet includes the following:

- the general rubric for each score point;
- the actual task as it appeared in 2006 on the FCAT;
- the scoring guide for that task, which includes an example of a top-score response;
- four sample (anchor) papers for score point two (2);
- four sample (anchor) papers for score point one (1);
- two sample (anchor) papers for score point zero (0); and
- annotations for each sample paper.

Sunshine State Standards

Development of the Sunshine State Standards began in 1993, and the Standards were adopted by the State Board of Education in May 1996 to provide expectations for student achievement in Florida. The Standards were written in seven subject areas, each divided into four separate grade clusters (PreK–2, 3–5, 6–8, and 9–12). This format was chosen to provide flexibility to school districts in designing curricula based on local needs. As Florida moved toward greater accountability for student achievement at each grade level, the Sunshine State Standards were further refined. In the subject areas of language arts, mathematics, science, and social studies, the Sunshine State Standards were expanded to include Grade Level Expectations (GLEs) for PreK–8.

Background Information About FCAT Mathematics

Florida Comprehensive Assessment Test (FCAT) Design

The FCAT was originally designed to measure the reading and mathematics content defined by the Sunshine State Standards. The state writing assessment, first administered in 1992, became part of the FCAT in 1998 and was expanded to include multiple-choice questions in 2006. A test of the science Sunshine State Standards was added to the FCAT in 2003. The test questions and prompts are written to measure benchmarks from the Sunshine State Standards that identify what students are expected to know and demonstrate in reading, mathematics, writing, and science.

The FCAT is different from other tests students take in three important ways. First, the FCAT is the only test administered in all Florida public schools that is directly linked to the Sunshine State Standards.

Second, the FCAT is designed to represent the kinds of tasks and activities that parents and teachers expect as part of good instruction. In the FCAT Mathematics, Reading, and Science tests, this is accomplished by presenting on the test the types of information and questions that students encounter in the classroom. In FCAT Writing+, students respond to topics similar to those used in the classroom.

Third, the FCAT demands a more in-depth understanding and application of information than is typical of many standardized tests. The FCAT Mathematics, Reading, and Science tests require students to analyze, synthesize, and evaluate information and to apply strategies or procedures they have learned. Similarly, FCAT Writing+ requires students to demonstrate and apply their writing skills by drafting an original piece of writing in response to a real-world prompt, and respond to multiple-choice questions that assess students' skills with sentence structure, spelling, usage, and grammar.

Mathematics Standards, Benchmarks, and Strands

The Sunshine State Standards define the content standards for which test items are developed. The Sunshine State Standards identify the knowledge and skills that students are expected to acquire and include an expectation that students become creative and critical thinkers. The importance of thinking skills and problem solving is identified in *Florida's System of School Improvement and Accountability* Standard 4 of Goal 3: "Florida students use creative thinking skills to generate new ideas, make the best decisions, recognize and solve problems through reasoning, interpret symbolic data, and develop efficient techniques for lifelong learning." FCAT test items and performance tasks are developed with the intent of reinforcing the thinking and problem-solving abilities envisioned by this standard.

The term *benchmark* refers to a knowledge and skill statement presented in the Sunshine State Standards. The benchmarks are statements of expected student achievement and are specific to different grade levels. In some cases, for assessment purposes, two or more related benchmarks are grouped together because the assessment of one benchmark necessarily addresses the other benchmark. More information on the assessment of these benchmarks can be found in the recently updated *FCAT Mathematics Test Item Specifications.* (See Resources.)

The Sunshine State Standards contain benchmarks in the area of mathematics. For the purpose of reporting FCAT results, mathematics benchmarks are organized into five reporting categories called content strands.

Strand 1   Number Sense, Concepts, and Operations
Strand 2   Measurement
Strand 3   Geometry and Spatial Sense
Strand 4   Algebraic Thinking
Strand 5   Data Analysis and Probability

The specific content strand, standard, and benchmark for each performance task contained in this booklet is followed by an image of the actual mathematics task as it appeared in 2006 on the FCAT.

Test Item Formats

Mathematics test items at Grades 5, 8, and 10 are framed in the context of the Sunshine State Standards content areas: the arts, social studies, science, mathematics, foreign language, literature, and health/physical education. Students are asked to solve problems that incorporate actual situations and numerical values, such as the distance between planets in the solar system.

On FCAT Mathematics tests, students respond to three kinds of questions.

- Multiple-choice questions require students to choose the correct answer from four possible choices.

- Gridded-response questions require students to solve a problem and to bubble their numeric answers in answer grids. Students must solve these problems on their own without being able to guess, as they can with multiple-choice questions. In some cases, the correct answer can be represented in more than one way, such as when one student uses decimal fractions and another student uses common fractions to respond to a problem. Similarly, more than one answer can be correct, as can happen when there is a range of acceptable answers.

- Performance tasks require students to think about a problem, develop a strategy, and record their strategy and solution. There are two kinds of performance tasks: short-response tasks, which require approximately five minutes to answer, and extended-response tasks, which require about ten to fifteen minutes to answer.

To emphasize the thinking required, the performance tasks in mathematics are labeled "Think, Solve, Explain." For these questions, students are required to respond to a problem, and the response is later scored by teams of trained scorers. About 20 percent of the total score points of a test are generated by these performance tasks; the remaining score points come from multiple-choice and gridded-response questions.

Examples of FCAT test items for all grade levels are contained in *Sample Test Books* for FCAT Reading, Writing+, Mathematics, and Science tests. Sample Test Materials and released FCAT Mathematics test items and answer keys are distributed to school districts prior to the FCAT administration each year and can be downloaded from the FCAT home page on the DOE web site at http://www.fldoe.org. (See Resources.)

How FCAT Mathematics Is Scored

The FCAT is scored both manually and electronically. All completed answer documents are scanned using a process called *imaging,* which involves capturing electronic images of the pages that include students' answers in their own handwriting. Students' multiple-choice and gridded responses are machine-scored using computer programs that read the students' bubbled answers and evaluate them based on an answer key. Students' answers to the performance tasks, however, must be scored by trained scorers using a process commonly called *handscoring.*

The handscoring of students' written responses is conducted by professional scorers. These scorers are required to have college degrees and are specially trained to score student papers. Scorers may only use the FCAT scoring rubrics and item-specific scoring criteria that have been established and validated by teams of Florida educators at FCAT Rangefinding meetings. (The general scoring rubrics can be found in Appendix A.)

After each mathematics performance task is administered in a field test to a sample of Florida students, a team of Florida mathematics teachers and administrators works with Florida Department of Education staff to score a sample of these papers. A top-score response for each task is defined, and papers representing the possible scores for that task are identified: 4, 3, 2, 1, and 0 for extended-response tasks; and 2, 1, and 0 for short-response tasks. In this way, clear definitions of each score point are developed, and model papers, called *anchor papers,* are selected to represent the range of responses for each possible score point.

These field-test papers, scored by the team of Florida educators, become the training materials for the professional scorers. This process and the quality control measures (reliability and validity checks) implemented during scoring ensure that all performance tasks are scored according to Florida's standards. Each student response is read independently by at least two professional scorers. For short-response performance tasks, if the scorers' two scores are not identical, a third scorer reviews the scoring to resolve the difference. For extended-response performance tasks, a third scorer is used if the first two scores are nonadjacent, that is, if they differ by more than one point. This third scoring, called *resolution scoring,* is performed by a scoring supervisor. All scoring is monitored by Florida Department of Education staff.

Scores from the handscoring process are combined with scores from the machine-scoring process to create a record for each student. The student's total scale score is created by a computer-based analysis procedure that combines the scores from the various types of test items. Scale scores are used to report student results because of their precision and because they can be equated from year to year. Equating scores ensures the same standard of achievement is used each year. In this way, scores can be compared from year to year, and the progress of students and schools can be evaluated fairly.

For more detailed information about scoring performance tasks, see *FCAT Performance Task Scoring—Practice for Educators* publications and software sent to Florida school districts in 2001. Also, more information can be found in the *FCAT Handbook—A Resource for Educators,* which can be downloaded from the DOE web site.

Holistic Scoring

What is holistic scoring? Student responses to the FCAT Mathematics performance tasks are scored holistically. The term *holistic* is used to emphasize the importance of the whole work, including the interdependence of its parts. A rubric is used to evaluate student responses to each task. Different rubrics are used for the two different types of tasks, short- and extended-response. Holistic scoring is a method of evaluation that is used in many state assessments and involves judging a student response for its *total* effect. No single factor is weighted to the exclusion of any other.

Analytic scoring, on the other hand, is a method of scoring in which separate judgments or ratings are made for each of several traits. In mathematics, for example, the scorer might evaluate such traits as procedures (computation), reasoning, and communication, giving a separate score for each. It is important to note that separate analytic judgments are **not** made when scoring the FCAT performance tasks. By scoring holistically, scorers take all traits into consideration and give a single, overall score. Potential bias issues are also discussed with scorers. (See Appendix C.)

What is a rubric? A rubric is a general guide for scoring. It identifies the performance features to be evaluated and describes how performance varies across the scoring scale. For the FCAT Mathematics extended-response tasks, a 4-point rubric is used (4, 3, 2, 1, 0). A 2-point rubric (2, 1, 0) is used for short-response tasks. (Appendix A includes the 2-point and 4-point rubrics used for scoring the FCAT Mathematics performance tasks.) The 2-point rubric precedes each short-response performance task within this booklet as well.

What are anchor papers? Anchor papers are actual, unedited student responses demonstrating typical performance for each point in the rubric. They are used to train professional scorers to recognize, for example, what a score point 4 response looks like or what a score point 2 response looks like. Anchor papers also help scorers make decisions about assigning score points during live scoring.

What are annotations? Annotations explain the reasoning associated with a particular score. They describe the strengths and weaknesses of a paper. Annotations are used to train scorers by giving them insights into the skills and processes that students use in responding to performance tasks.

Scoring Tools for FCAT Mathematics

Two scoring tools are available for scorers of the FCAT Mathematics performance tasks.

- **General Rubrics**   General scoring rubrics are available for both the short-response tasks and the extended-response tasks. (See Appendix A.) These rubrics describe the characteristics associated with each score point. Because they are general, these rubrics apply to all mathematics performance tasks.

- **Example of a Top-Score Response**   The top-score response displays one example of a correct and complete response *for that particular task.* For those tasks that have more than one acceptable answer, the top-score response provides the range of acceptable answers.

When used in combination with the anchor responses and annotations, these scoring tools give scorers and teachers a clear and comprehensive understanding of how to interpret and evaluate students' responses to the FCAT Mathematics performance tasks.

Grade 5

Short-Response Performance Task

- No calculators are used for Grade 5 FCAT Mathematics.
- Any formulas that students need for answering Grade 5 FCAT Mathematics questions are provided with the questions.

THINK
SOLVE
EXPLAIN

General Short-Response Scoring Rubric

Score	Description
2	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	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	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.

Mathematics Short-Response Performance Task from FCAT 2006

The strand, standard, and benchmark for the task are presented below along with the task as it appears in the FCAT 2006 test.

Description of Task

Strand E: Data Analysis and Probability

Standard 2:   The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.

Benchmark: MA.E.2.2.1 The student uses models, such as tree diagrams, to display possible outcomes and to predict events.

Performance Task: Fifth grade students were directed to respond in their test books. The performance task below was reduced to fit on this page. The actual size is shown on the following page.

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD WHEAT BREAD
Meats	TURKEY HAM CHICKEN
Cheeses	American Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.
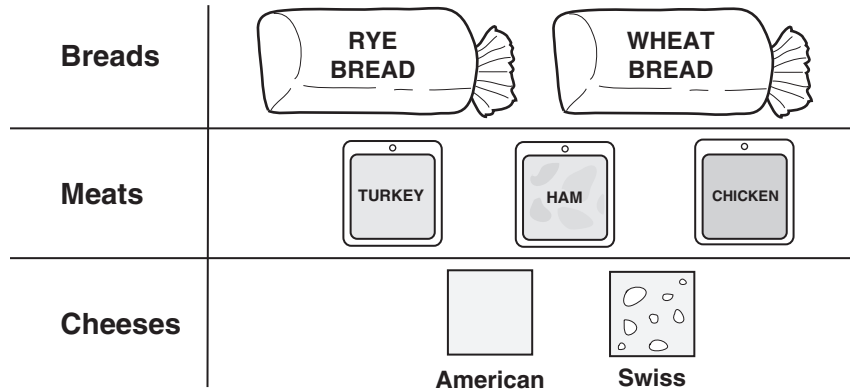
Work Space

What is the total possible number of different sandwich combinations? _____

Example of a Top-Score Response for This Task

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD WHEAT BREAD
Meats	TURKEY HAM CHICKEN
Cheeses	American Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

An explanation similar to the following:

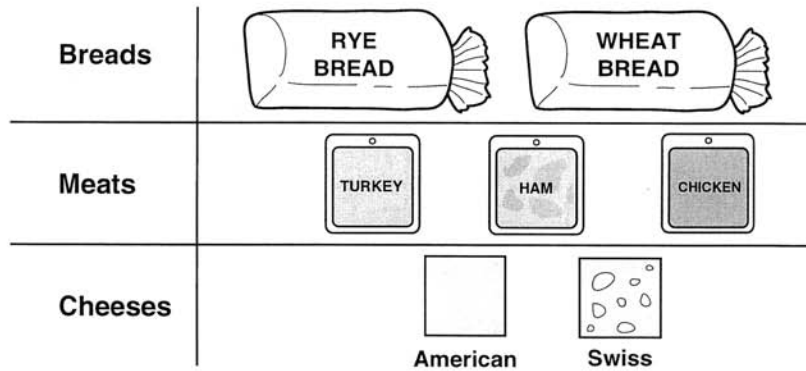|		
RTA	RHA	RCA
RTS	RHS	RCS
WTA	WHA	WCA
WTS	WHS	WCS

OR any comparable listing or tree diagrams that show these twelve unique combinations

What is the total possible number of different sandwich combinations? ___12___

STUDENT RESPONSE

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD	
Meats	TURKEY	HAM	CHICKEN
Cheeses		American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

Breads	Meats	Cheeses
R	T	A
R	T	S
R	H	A
R	H	S
R	C	A
R	C	S
W	T	A
W	T	S
W	H	A
W	H	S
W	C	A
W	C	S
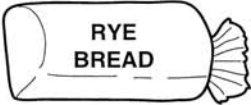
What is the total possible number of different sandwich combinations? __12__

SCORE POINT
2

This response received a score of 2. Twelve correct combinations are clearly shown. Three headings are labeled, "Breads," "Meats," and "Cheeses," with lines separating the list of the horizontally displayed combinations. The correct total number of different sandwich combinations, 12, is written in the space provided. The response demonstrates a thorough understanding of the task and earned full credit.

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD	
Meats	TURKEY	HAM	CHICKEN
Cheeses		American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

Rye Bread
T — A S
H — A S
C — A S

Wheat Bread
T — A S
H — A S
C — A S

What is the total possible number of different sandwich combinations? __12__

SCORE POINT
2

This response received a score of 2. Acceptable and correct tree diagrams, clearly displaying the 12 combinations, are given instead of a list. The correct answer, 12, is reported for the total number of different sandwich combinations. This response is completed correctly, in a mathematically sound manner, and earned full credit.
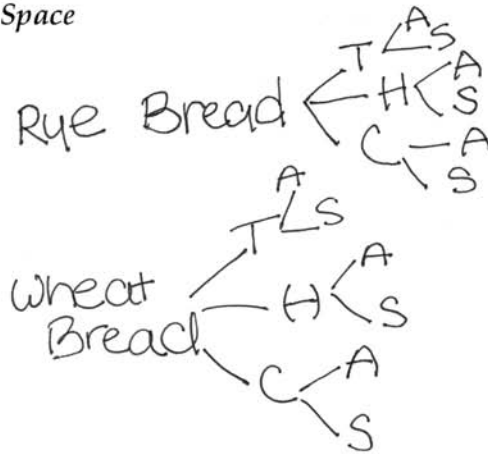
THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD
Meats	TURKEY HAM	CHICKEN
Cheeses	American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

R^1 R^2 R^3 R^4 R^5 R^6 W^7 W^8 W^9 W^{10}
T T H H C C T T H H
A S A S A S A S A S

W^{11} W^{12}
C C
A S

What is the total possible number of different sandwich combinations? __12__

This response received a score of 2. Twelve correct combinations are listed in a vertical orientation. The combinations are numbered, and the correct answer, 12, is written in the provided space. The task is completed correctly and earned full credit.

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD
Meats	TURKEY	HAM	CHICKEN
Cheeses		American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

RB
T
AC

RB
H
AC

RB
C
AC

RB
T
SC

RB
H
SC

RB
C
SC

W
T
AC

W
H
AC

W
C
AC

W
T
SC

W
H
SC

W
C
SC
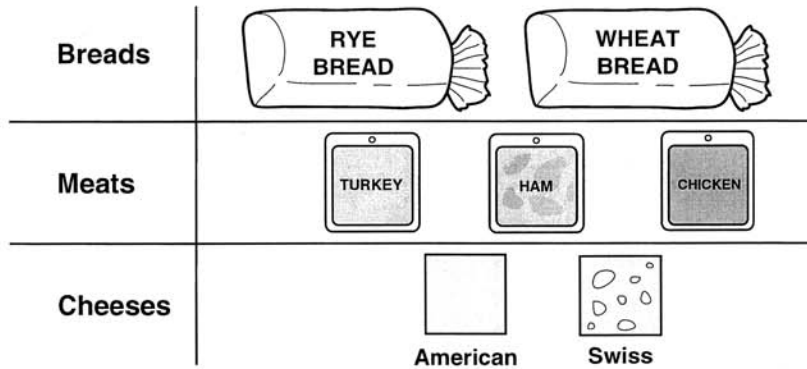
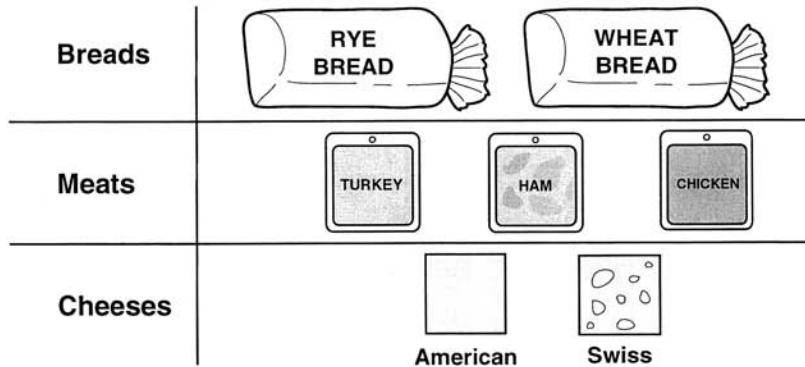What is the total possible number of different sandwich combinations? __12__

SCORE POINT
2

This response received a score of 2. Twelve combinations are listed. The use of two letters to represent an element—"RB" for rye bread, "AC" for American cheese, and "SC" for Swiss cheese—does not detract from the demonstration of a thorough understanding of the task. The response earned full credit.

STUDENT RESPONSE

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD
Meats	TURKEY	HAM	CHICKEN
Cheeses	American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

Rye bread - Turkey - American
Rye bread - Turkey - Swiss
Rye bread - ham - American   = 6 × 2 = 12
Rye bread - Ham - swiss
Rye bread - Chicken - American
Rye bread - chicken - Swiss
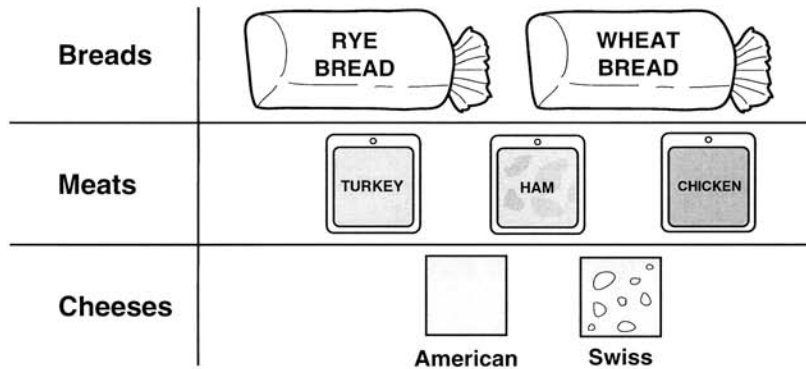
What is the total possible number of different sandwich combinations? __12__

SCORE POINT
1

This response received a score of 1. Six combinations are clearly written. The equation, $6 \times 2 = 12$, is conceptually correct, and the correct answer, 12, is given; however, the display of only six of the 12 combinations demonstrates a less than thorough understanding of the task.

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

THINK
SOLVE
EXPLAIN

Breads	RYE BREAD	WHEAT BREAD	
Meats	TURKEY	HAM	CHICKEN
Cheeses		American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

What is the total possible number of different sandwich combinations? __18 possible__

SCORE POINT

1

This response received a score of 1. The twelve combinations are clearly displayed in two tree diagrams, using words and abbreviations rather than initials; however, an incorrect number of combinations, 18, is given. Although the tree diagram is correct, this incorrect number of combinations demonstrates some misunderstanding of the task.
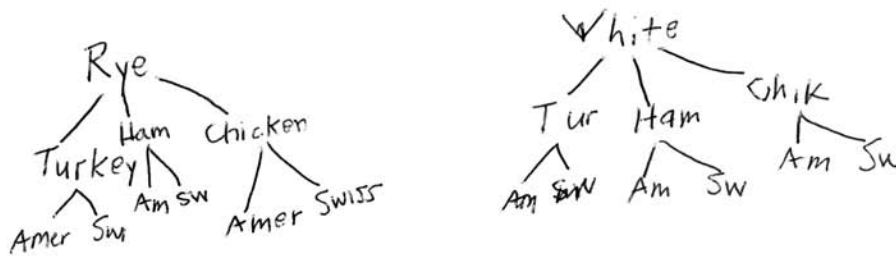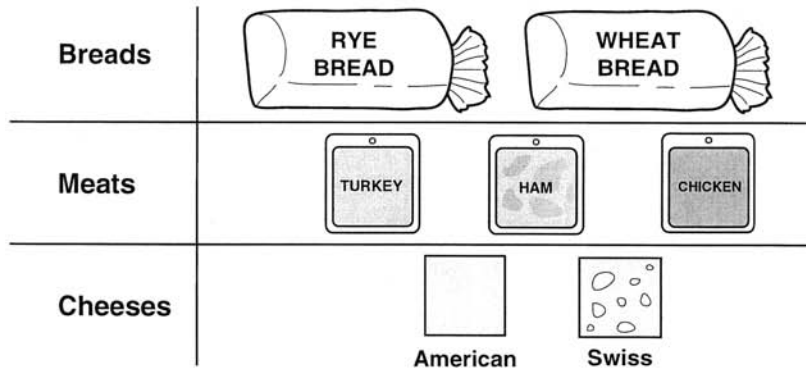
THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD
Meats	TURKEY	HAM	CHICKEN
Cheeses	American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

What is the total possible number of different sandwich combinations? __12__

SCORE POINT
1

This response received a score of 1. An attempt was made to display the 12 combinations in a tree diagram; however, the combinations in this type of display are not clearly delineated. The correct solution, 12, is given. By using this type of mathematically incorrect tree diagram, the response demonstrates a less than thorough understanding of the task.
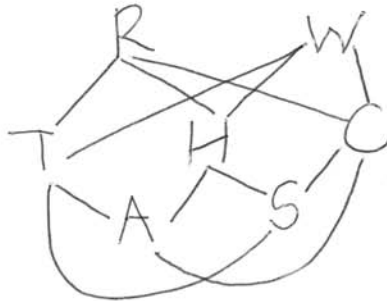
THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads

RYE BREAD   WHEAT BREAD

Meats

TURKEY   HAM   CHICKEN

Cheeses

American   Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

What is the total possible number of different sandwich combinations? __12__

SCORE POINT

1

This response received a score of 1. There are no combinations listed or tree diagrams drawn; however, the correct total number of different sandwich combinations, 12, is written in the provided space. By not addressing all parts of the task, this response demonstrates only a partial understanding.

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

THINK
SOLVE
EXPLAIN

Breads	RYE BREAD	WHEAT BREAD
Meats	TURKEY	HAM	CHICKEN
Cheeses	American	Swiss

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.
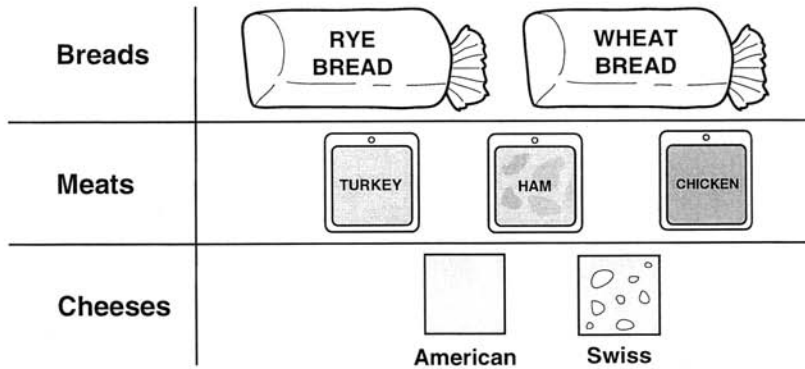
Work Space

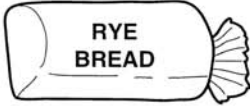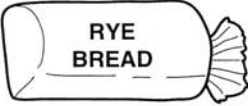What is the total possible number of different sandwich combinations? ___12___

SCORE POINT
0

This response received a 0. Two correct combinations, "W,T,A" and "R,T,S," are listed, and then five permutations of each are given. Although a final solution, 12, is reported, counting the ten permutations as part of the total solution clarifies that there is a misunderstanding of combinations. Listing only two correct combinations demonstrates an insufficient understanding of the task and no credit was earned.

THINK
SOLVE
EXPLAIN

Nik was trying to decide what kind of sandwich he wanted for lunch. He could choose from the 2 kinds of bread, 3 kinds of meats, and 2 kinds of cheeses shown below.

Breads	RYE BREAD	WHEAT BREAD	
Meats	TURKEY	HAM	CHICKEN
Cheeses	American	Swiss	

In the space below, list all the different combinations of 1 bread, 1 meat, and 1 cheese that are possible. You may use the first letter of each (for example, R, W, T, H, C, A, S) to make your list.

Work Space

WTS
RHA
WCS
RTC
WHS
WHA

What is the total possible number of different sandwich combinations? ___6___

This response received a score of 0. Five correct combinations are listed and one incorrect combination, "RTC," is listed. Showing less than half of the correct combinations demonstrates an insufficient understanding of the task. No credit was earned.

Grade 8

Short-Response Performance Task

- Calculators are provided for Grade 8 students to use for FCAT Mathematics.
- FCAT Mathematics Reference Sheets with formulas and conversions are provided for Grade 8 students. (See Appendix B.)

General Short-Response Scoring Rubric

THINK
SOLVE
EXPLAIN

Score	Description
2	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	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	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.

Mathematics Short-Response Performance Task from FCAT 2006

The strand, standard, and benchmark for the task are presented below along with the task as it appears in the FCAT 2006 test.

Description of Task

Strand D: Algebraic Thinking

Standard 1:   The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.

Benchmark: MA.D.1.3.2 The student creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.

Performance Task: The performance task below was reduced to fit on this page. The actual size is shown on the following page.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK SOLVE EXPLAIN

Let n represent the number of stuffed animals sold per day, and let p represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation _____

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

Net Profit _____

Example of a Top-Score Response for This Task

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let n represent the number of stuffed animals sold per day, and let p represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $p = 2.25n - 18$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$p = 2.25(22) - 18$

$p = 49.50 - 18$

$p = 31.50$

Net Profit $31.50

STUDENT RESPONSE

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $\underline{2.25n - 18.00 = p}$

Part B Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$$2.25(22) - 18.00 = p$$
$$49.50 - 18.00 = p$$
$$\$31.50 = p$$

By using the 2.25 and mult. it by 22, I get the total payment from the animals. Then, all you have to do is subtract 18.

Net Profit $\underline{\$31.50}$

SCORE POINT
2

This response received a score of 2. This response contains a correct equation using information from the prompt. The solution for *Part B* is shown, and the correct answer, $31.50, is provided. The work provided demonstrates a thorough understanding of the task, earning full credit.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let n represent the number of stuffed animals sold per day, and let p represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $2.25n - 18.00 = p$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$$\$2.25 \cdot 22 - \#18 = 31.50$$

Net Profit _____

SCORE POINT
2

This response received a score of 2. This response contains a correct equation using information from the prompt. Complete work is shown, which includes the correct answer, $31.50. No answer is provided in the answer space, but the correct answer in the work is acceptable. The response earned full credit.

STUDENT RESPONSE

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let n represent the number of stuffed animals sold per day, and let p represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $n \cdot 2.25 - 18.00 = p$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

Net Profit 31.50

SCORE POINT 2

This response received a score of 2. This response contains a correct equation using information from the prompt. Writing the term 2.25n as $n \cdot 2.25$ is considered a minor flaw. No work is shown, but the correct answer, $31.50, is provided. The correct equation with the correct answer in *Part B* earned the response full credit.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $(2.25 \times n) - \text{Stall expense} = P$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

Net Profit $ 31.50

SCORE POINT
2

This response received a score of 2. The response contains a correct equation using information from the prompt. Using the written expression "stall expense" instead of its numerical equivalent, $18.00, is acceptable. No work is shown, but the correct answer, $31.50, is provided. The response earned full credit.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $\$2.25N - 18.00 = P$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$$2.25N - 18.00 = P$$
$$2.25(22) - 18.00 = P$$
$$49.5 - 18.00 = P$$

Net Profit _____

SCORE POINT
1

This response received a score of 1. This response contains a correct equation using information from the prompt. Some correct work is shown, but the equation is not completely solved. Not providing a correct answer to *Part B* demonstrates a less than thorough understanding of the task.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $2.25n - 18 = p$

Part B Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$$2.25 \cdot 22 = 49.5 - 8 =$$
$$41.5$$

Net Profit $\$41.50$

SCORE POINT

1

This response received a score of 1. This response contains a correct equation using information from the prompt. The work shown displays a transcription error (8 instead of 18) in the equation. Correct follow-through is provided after the transcription error, but the incorrect answer of $41.50 demonstrates a less than thorough understanding of the task.

STUDENT RESPONSE

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $(2.25)(n) - p$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

$$2.25 \times 22 - 18 = \$31.50$$

31.50   **Net Profit** $\$31.50$

This response received a score of 1. The response contains an incorrect expression, $(2.25)(n) - p$, instead of the required equation. Correct work is shown, and the correct answer is provided. By not giving an equation, the response displays only a partial understanding of the task.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A   Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $P = 2.25n + 18.00$

Part B   Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space   2.25 for each sold, pays 18.00 per day

$$P = 2.25 \cdot 22 + 18$$
$$P = 49.50 + 18$$
$$P = 67.50$$

Net Profit   67.50

SCORE POINT
1

This response received a score of 1. This response contains an incorrect equation, $P = 2.25n + 18.00$. Adding the stall expense versus subtracting the value, while incorrect, still demonstrates a partial understanding of the mathematical concepts of the task. The equation is solved correctly, and the appropriate answer for the incorrect equation, 67.50, is provided.

STUDENT RESPONSE

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let n represent the number of stuffed animals sold per day, and let p represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $\$2.25n + \$18.00$

Part B Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space
$$\begin{array}{r} \times 2.25 \\ 22 \\ \hline 4.50 \\ 45.00 \\ \hline 49.50 \end{array}$$

Net Profit 49.50

SCORE POINT
0

This response received a score of 0. This response contains an incorrect expression, $2.25*n* + $18.00, instead of the required equation. Some correct work is shown, but the expression is not evaluated completely. The response demonstrates an insufficient understanding of the task and earns no credit.

Ellen sells stuffed animals at a flea market on weekends. Her gross profit from each animal sold is $2.25, but she has to pay $18.00 per day to use a stall in the market.

THINK
SOLVE
EXPLAIN

Let *n* represent the number of stuffed animals sold per day, and let *p* represent the net profit, after stall-use expenses, from all stuffed animals sold.

Part A Write an equation that represents the relationship between Ellen's net profit, after stall-use expenses, and the number of stuffed animals she sells in 1 day.

Equation $n = 2.25 - 18 = p$

Part B Use your equation to find her net profit, after stall-use expenses, if she sells 22 stuffed animals in 1 day.

Work Space

Net Profit _____

SCORE POINT
0

This response received a score of 0. This response contains a run-on equation $n = 2.25 - 18 = p$. No answer is provided for *Part B*. The response demonstrates an insufficient understanding of the task and earns no credit.

Grade 10

Short-Response Performance Task

- Calculators are provided for Grade 10 students to use for FCAT Mathematics.
- FCAT Mathematics Reference Sheets with formulas and conversions are provided for Grade 10 students. (See Appendix B.)

General Short-Response Scoring Rubric

THINK
SOLVE
EXPLAIN

Score	Description
2	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	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	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.

Mathematics Short-Response Performance Task
from FCAT 2006

The strand, standard, and benchmark for the task are presented below along with the task as it appears in the FCAT 2006 test.

Description of Task

Strand B:	Measurement
Standard 1:	The student measures quantities in the real world and uses the measures to solve problems.
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.
Performance Task:	The performance task below was reduced to fit on this page. The actual size is shown on the following page.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

Perimeter of the shaded square section, in feet _____

Example of a Top-Score Response for This Task

> Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.
>
> THINK
> SOLVE
> EXPLAIN
>
> **1–ACRE LOT**
>
>
>
> The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.
>
> *An explanation similar to the following:*
>
> **On FCAT Reference Sheet (see Appendix B):**   1 acre = 43,560 square feet
>
> **Area of shaded square section:** $\left(\frac{1}{10}\right)(43,560) = 4,356$ square feet
>
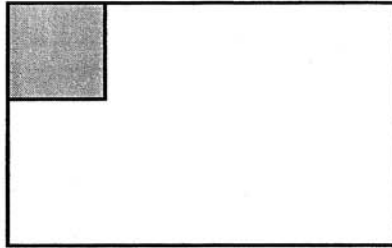> **Length of one side of shaded square section:** $\sqrt{4,356} = 66$ feet
>
> **Perimeter of shaded square section:** $(66)(4) = 264$ feet
>
> *Perimeter of the shaded square section, in feet*   264 feet

STUDENT RESPONSE

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

$1 \text{ acre} = 43,560 \text{ ft}^2$

$\frac{1}{10}(43560) = \text{Area}_\blacksquare$

$4356 \text{ ft} = \text{Area}_\blacksquare$

$s^2 = \text{Area}_\blacksquare$

$s = \sqrt{\text{Area}_\blacksquare}$

$\sqrt{s^2} = \sqrt{4356}$

$s = 66$

Perimeter$_\blacksquare = 4s$

$s = 66$

perimeter$_\blacksquare = 4(66)$

perimeter $= 264$

Perimeter of the shaded square section, in feet ___264 ft.___

SCORE POINT

2

This response received a score of 2. The work shows $\frac{1}{10}$ multiplied by the area of an acre to arrive at the area of the shaded square, noted as "Area$_\blacksquare$." The square root of the area is taken to arrive at the length of one side of the square, $s = 66$. The response uses the fact that "Perimeter$_\blacksquare = 4s$," arriving at "264 ft." as a final answer. The work provided demonstrates a thorough understanding of the task, earning the response full credit.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN
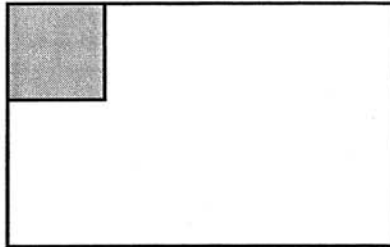
1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

1 acre = 43,560 sq feet

43,560 sq ft × 1/10 = 4356 sq ft

$\sqrt{4356}$ = 66 ft per side   66h(2)=132
                                       66w(2)=132
                                             +
                                       264 ft
                                       perimeter

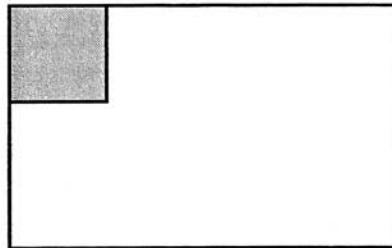Perimeter of the shaded square section, in feet ___264 ft___

SCORE POINT
2

This response received a score of 2. The work shows $\frac{1}{10}$ multiplied by the area of an acre. The square root is then taken of the area found, indicating the amount is the length per side, "66 ft per side." The height and width of the square is found and doubled, then added together to arrive at a final answer of 264 ft. The response earned full credit.

STUDENT RESPONSE

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

One acre is 43,560 ft². Of that Mrs. Hanover wanted 1/10 of that fenced. 1/10 of that is 4356. But she wanted the perimeter so I found the square root to get rid of the ² and multiplied by 4.

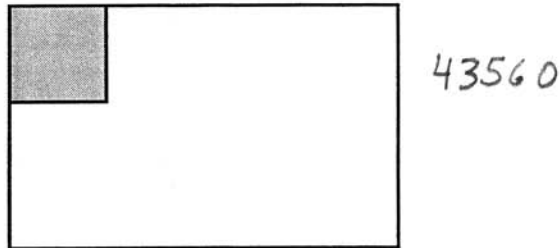*Perimeter of the shaded square section, in feet* _____264 ft_____

SCORE POINT 2

This response received a score of 2. This response gives a verbal explanation of how the solution was found. Although little numerical support is demonstrated, the process can be followed in the stated order to arrive at the correct given answer, 264 ft. The explanation provided demonstrates a thorough understanding of the task, earning the response full credit.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

43560

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

$$\frac{43560 \text{ft}}{10} \quad 1 \text{ acre}$$

4356 ft   66 by 66

Perimeter of the shaded square section, in feet _264 ft_____

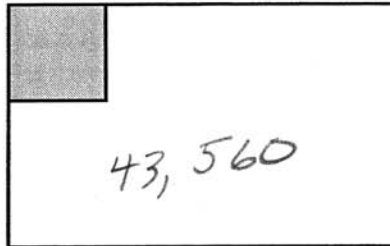**STUDENT RESPONSE**

SCORE POINT
2

This response received a score of 2. Although little work is shown, and no verbal explanation is given, the key numbers to the correct mathematical process are shown: 4356 ft and 66 by 66. The correct answer, 264 ft., is provided. The lack of detailed mathematical explanation does not detract from a demonstration of a thorough understanding of the task. The response earned full credit.

STUDENT RESPONSE

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

43, 560

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

$$43,560 \cdot 10\% = 4356$$

$$\sqrt{4356} = 66.4 =$$

264

Perimeter of the shaded square section, in feet ____ 264 ft² ____
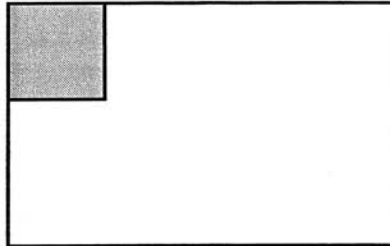
SCORE POINT 1

This response received a score of 1. Although a run-on equation is used in the work space, it is considered a minor flaw. The steps in the procedure are in the correct order to arrive at the answer; however, there is a conceptual error in the understanding of perimeter and area. By providing a wrong label, 264 ft², a less than thorough understanding is demonstrated.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

Perimeter of the shaded square section, in feet __264 feet__

SCORE POINT
1

This response received a score of 1. Although the final answer of 264 feet is correct, no work is shown to support the answer. This response demonstrates a less than thorough understanding of the task.

THINK
SOLVE
EXPLAIN

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

1–ACRE LOT

4356
Ft26 — w

ℓ —
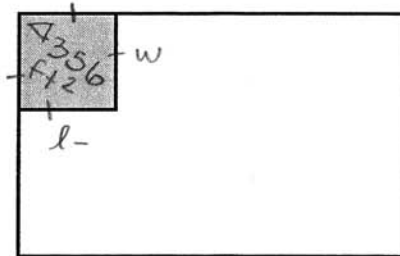
The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

1 acre = 43560 ft^2
43560 × $\frac{1}{10}$ = 4356 ft^2 (area fenced)
Since area = ℓw and ℓ ≅ w then
$\sqrt{area}$ = perimeter

$\sqrt{4356}$ = 66

check work
66 × 66 =
4356 ft^2 ✓

66 ft

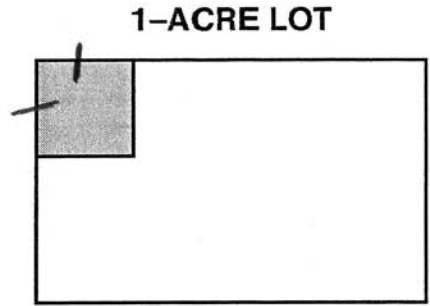*Perimeter of the shaded square section, in feet* 66

SCORE POINT
1

This response received a score of 1. The work shown is correct but incomplete, arriving at 66 as a final answer. By not completing the task and finding only the length of one side of the square, this response demonstrates only a partial understanding of the task.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN

1–ACRE LOT

Acres
$43560 \, Ft^2$
$\div 10$
$\overline{43560 \, Ft^2}$

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

The area of the lot is 43560 Sq. Feet as shown above. Taking the square root of this and multiplying by four will come up with the perimiter

$\sqrt{43560} = 208 \cdot 7 \cdot 4 =$

Perimeter of the shaded square section, in feet ___834.8 Ft.___

STUDENT RESPONSE

SCORE POINT
1

This response received a score of 1. The work shown attempts to calculate $\frac{1}{10}$ of the area of the lot, with a mathematical error. The square root of the wrong number is then multiplied by 4 to determine the perimeter, 834.8 Ft. The steps in the process are correct with a mathematical error at the beginning. This response demonstrates only a partial understanding of the task.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

THINK
SOLVE
EXPLAIN
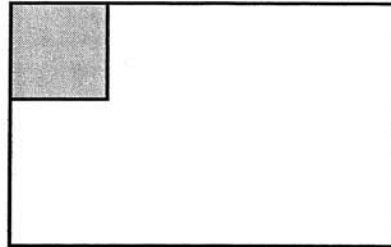
1–ACRE LOT

The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

1 acre = 43,560 sq. feet

$$\frac{4356}{10)43560}$$

Divide 10 into the acre

Perimeter of the shaded square section, in feet __4,356 feet__

STUDENT RESPONSE

SCORE POINT
0

This response received a score of 0. The only step of the process completed is finding $\frac{1}{10}$ of the area of the 1-acre lot, 4,356 feet. Although the step is correct, it is insufficient to show an understanding of the task and no credit is earned.

Mrs. Hanover wants to enclose part of her 1-acre lot with fencing so that it forms a square, as indicated by the shaded section of the diagram below.

**THINK
SOLVE
EXPLAIN**

1–ACRE LOT

$\frac{1}{10}$
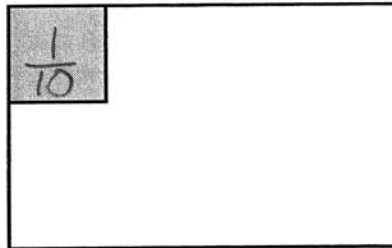
The shaded square section occupies $\frac{1}{10}$ of the area of the 1-acre lot. What is the perimeter of the shaded square section of the lot, **in feet**? Show work or provide an explanation to support your answer.

1 acre = 43,560 feet
x   .1
———————
4356 ÷ 4

Perimeter of the shaded square section, in feet ___1089 feet___

STUDENT RESPONSE

SCORE POINT 0

This response received a score of 0. The work correctly calculates $\frac{1}{10}$ of the acre lot, and then incorrectly divides the answer, 4356, by 4, resulting in a final answer of 1089 feet. The response demonstrates an insufficient understanding of the task and no credit is earned.

Appendix A
FCAT Mathematics Short-Response Rubric

General Short-Response Scoring Rubric

THINK
SOLVE
EXPLAIN

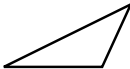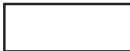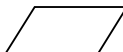| Score	Description
2	A score of two indicates that the student has demonstrated a thorough understanding of the mathematics concepts and/or procedures embodied in the task. The student has completed the task correctly, in a mathematically sound manner. When required, student explanations and/or interpretations are clear and complete. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.
1	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	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.

# FCAT Mathematics Extended-Response Rubric

THINK
SOLVE
EXPLAIN

General Extended-Response Scoring Rubric

Score	Description
4	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	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	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	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	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.

Appendix B
Grades 6–8 FCAT Mathematics Reference Sheet

Area

Triangle $\qquad A = \frac{1}{2}bh$

Rectangle $\qquad A = lw$

Trapezoid $\qquad A = \frac{1}{2}h(b_1 + b_2)$

Parallelogram $\qquad A = bh$

Circle $\qquad A = \pi r^2$

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

Circumference

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

Pythagorean Theorem

$a^2 + b^2 = c^2$
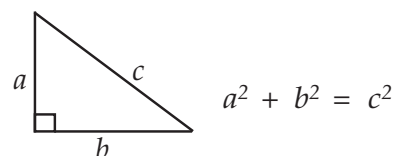
In a polygon, the sum of the measures of the interior angles is equal to $180(n - 2)$, where n represents the number of sides.

Volume/Capacity

Right Circular Cylinder $\qquad V = \pi r^2 h$

Rectangular Prism $\qquad V = lwh$

Total Surface Area

$S.A. = 2\pi rh + 2\pi r^2$

$S.A. = 2(lw) + 2(hw) + 2(lh)$

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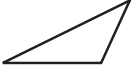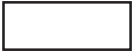
1 liter = 1000 milliliters = 1000 cubic centimeters
1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

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).

# Grades 9–10 FCAT Mathematics Reference Sheet

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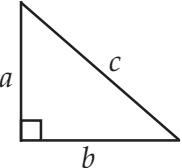
$$C = \pi d \quad \text{or} \quad C = 2\pi r$$

	Volume/Capacity	Total Surface Area
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	$S.A. = \frac{1}{2}(2\pi r)\ell + \pi r^2$ or $S.A. = \pi r\ell + \pi r^2$
Right Square Pyramid	$V = \frac{1}{3}lwh$	$S.A. = 4(\frac{1}{2}l\,\ell) + l^2$ or $S.A. = 2l\ell + l^2$
Sphere	$V = \frac{4}{3}\pi r^3$	$S.A. = 4\pi r^2$
Right Circular Cylinder	$V = \pi r^2 h$	$S.A. = 2\pi rh + 2\pi r^2$
Rectangular Prism	$V = lwh$	$S.A. = 2(lw) + 2(hw) + 2(lh)$

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 $\dfrac{180(n-2)}{n}$.

Grades 9–10 FCAT Mathematics Reference Sheet

Pythagorean theorem:

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

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.

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 $P_2(x_2, y_2)$:

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

Simple interest formula:

$$I = prt$$

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

Conversions

1 yard = 3 feet = 36 inches	1 cup = 8 fluid ounces
1 mile = 1760 yards = 5280 feet	1 pint = 2 cups
1 acre = 43,560 square feet	1 quart = 2 pints
1 hour = 60 minutes	1 gallon = 4 quarts
1 minute = 60 seconds	

1 liter = 1000 milliliters = 1000 cubic centimeters	1 pound = 16 ounces
1 meter = 100 centimeters = 1000 millimeters	1 ton = 2000 pounds
1 kilometer = 1000 meters	
1 gram = 1000 milligrams	
1 kilogram = 1000 grams	

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).

Appendix C
Scorer Bias

Scorer bias refers to factors that have no basis in the scoring criteria or rubric, but have an effect on a scorer's perception of a student's response. Scorers are trained to avoid these biases because research indicates that biases can interfere with a consistent application of the scoring rubric.

1. **Reactions to Scoring Criteria from Other Assessments, Previous Experience with Instruction, or the Use of the Test or Test Scores.** Do you prefer the scoring criteria of another project, state, or grade level? Do you have an issue with instruction, the appropriateness of the rubric, the soundness of the administration, or the use of the assessment? Your role is to score the responses according to the scoring criteria rather than to react to the scoring criteria, administration procedures, or the use of the assessment.

2. **Appearance of Response.** How does the paper look at first glance? How long is the response? You should not be influenced by handwriting, neatness, and margins. Handwriting ability is not the same as writing ability. The scoring criteria are based on the quality of the response rather than on the appearance of the response.

3. **Knowledge of Topic.** Are you knowledgeable about the topic? When evaluating student responses, you should consistently adhere to the scoring criteria, regardless of your expertise (or lack of expertise) about the topic.

4. **Reactions to Style.** Does the student begin sentences with "And" or "But"; use an informal tone; use first person; use clichés; place the thesis statement in the conclusion rather than in the introduction; use one-sentence paragraphs; or choose a formulaic, a traditional, or a non-traditional organizational structure? Does the use of a particular stylistic or organizational method prejudice your scoring? Are you unduly influenced by the use of one well-turned phrase in what otherwise is a non-illustrative response? Florida's scoring criteria do not mandate a particular style or organizational structure.

5. **Reactions to Content.** Has the student used vulgar or violent content? Is the response mundane? Does the student include information that either subtly or directly identifies the student's culture, ethnicity, religion, gender, sexual preference, or exceptionality? Does the student come across as brash, shy, cute, honest, willing to take a chance, or being like (or unlike) you were at that age? Your views about any of the preceding should never influence your scoring of a response. You should judge the student's ability to communicate, not the student's personality or voice. All scores must reflect the scoring criteria.

6. **Transference in Scoring.** Have many responses looked very similar? Is your scoring prejudiced by previously scored responses? In spite of the sameness or uniqueness of responses, an individual student wrote each response. You are responsible for applying the scoring criteria to each response as if it is the only response. Your judgment of a paper should never be influenced by the characteristics and quality of a previously scored paper.

7. **Well-being of Scorer.** Is your physical or mental state impeding your scoring accuracy? Each student's score must reflect the scoring criteria and not your state of mind, state of health, or state of rest.

Resources
FCAT Publications and Products

The Department of Education produces many materials to help educators, students, and parents better understand the FCAT program. A list of FCAT-related publications and products is provided below. Additional information about the FCAT program is available on the FCAT home page of the DOE web site at http://www.fldoe.org.

About the FCAT Web Brochure

> This web-based brochure is found on the DOE web site in English, Spanish, and Haitian Creole and provides information about FCAT Reading, Writing+, Mathematics, and Science for Grades 3–11. It is designed to provide an overview as well as detailed information across grades and subject areas and to link the reader to other helpful DOE web resources.

Assessment & Accountability Briefing Book

> This book provides an overview of Florida's assessment, school accountability, and teacher certification programs. FCAT topics include frequently asked questions, content assessed by the FCAT, reliability, and validity. This booklet can be downloaded from the DOE web site.

FCAT Handbook—A Resource for Educators

> This publication provides the first comprehensive look at the FCAT, including history, test content, test format, test development and construction, test administration, and test scoring and reporting. Educator involvement is emphasized, demonstrating how Florida teachers and administrators participate in reviewing test items, determining how standards should be assessed, finding ranges of scores, and providing input on aspects of the test administration process. The PDF version is available on the DOE web site.

FCAT Myths vs. Facts

> By providing factual information about the FCAT program, this brochure addresses common concerns about the FCAT that are based on myths. It is also available in Spanish and can be downloaded from the DOE web site.

FCAT Performance Task Scoring—Practice for Educators (publications and software)

> These materials are designed to help teachers learn to score FCAT Reading, Writing, and Mathematics performance tasks at Grades 4, 5, 8, and 10. A *Trainer's Guide* includes instructions for using the scoring publications and software in teacher education seminars and workshops. The publications mirror the scorer training experiences by presenting samples of student work for teachers to score.

FCAT Posters

> Newly designed 17" by 23" elementary, middle, and high school FCAT Reading, Writing+, Science, and Mathematics posters have an instructional focus. Two additional posters provide information about achievement levels and which FCAT tests are given at each grade. A high school poster reminds students about the graduation requirement to pass the FCAT Reading and Mathematics tests and the multiple opportunities available to retake the tests. New posters were delivered to districts in August 2005 and are available at the district assessment offices.

FCAT Released Tests
> *Reading, Grades 4, 8, and 10*
> *Mathematics, Grades 4, 8, and 10*

> In 2005, the DOE released previously used full tests of FCAT Reading and FCAT Mathematics for Grades 4, 8, and 10. This web-based release included not only the tests, but also several other important documents including: answer keys, *How to Use the FCAT Released Tests, How to Score the FCAT Released Tests,* and *Frequently Asked Questions about the FCAT Released Tests.* These supplemental materials provide many details about the FCAT that are informative for all audiences, especially the range of correct answers and points needed for each achievement level. All materials are available on the DOE web site.

FCAT Results Folder: A Guide for Parents and Guardians

> This folder is designed for parents and guardians of students in Grades 3–11. It provides information about FCAT student results and allows parents to store student reports for future reference. Spanish and Haitian Creole versions are available. Delivery coincides with the spring delivery of student reports.

FCAT Test Item Specifications
> *Reading, Grade Levels 3–5, 6–8, and 9–10*
> *Mathematics, Grade Levels 3–5, 6–8, and 9–10*
> *Science, Grades 5, 8, and 10*
> *Writing+ draft versions, Grades 4, 8, and 10*

>> Defining both the content and the format of the FCAT test questions, the *Specifications* primarily serve as guidelines for item writers and reviewers, but also contain information for educators and the general public. The *Specifications* are designed to be broad enough to ensure test items are developed in several formats to measure the concepts presented in each benchmark. These materials can be downloaded from the DOE web site.

Florida Reads! Report on the 2006 FCAT Reading Released Items (Grades 4, 8 & 10)
Florida Solves! Report on the 2006 FCAT Mathematics Released Items (Grades 5, 8 & 10)
Florida Inquires! Report on the 2006 FCAT Science Released Items (Grades 5, 8 & 11)

>> These reports provide information about the scoring of the FCAT Reading, Mathematics, and Science performance tasks displayed on the 2006 student reports. *Florida Reads!* combines Grades 4, 8, and 10 in one document; *Florida Solves!* covers Grades 5, 8, and 10; and *Florida Inquires!* includes Grades 5, 8, and 11. The reports are available each May.

Florida Writes! Report on the 2006 FCAT Writing+ Assessment, Grade 4
Florida Writes! Report on the 2006 FCAT Writing+ Assessment, Grade 8
Florida Writes! Report on the 2006 FCAT Writing+ Assessment, Grade 10

>> Each grade-level publication describes the content and application of the FCAT Writing+ tests and offers suggestions for activities that may be helpful in preparing students for the assessments. The reports are available each May.

Frequently Asked Questions About FCAT

>> This brochure provides answers to frequently asked questions about the FCAT program and is available on the DOE web site.

Keys to FCAT, Grades 3–5, 6–8, and 9–11

>> These booklets are distributed each January and contain information for parents and students preparing for FCAT Reading, Writing+, Mathematics, and Science. *Keys to FCAT* are translated into Spanish and Haitian Creole and are available, along with the English version, on the DOE web site.

Lessons Learned—FCAT, Sunshine State Standards and Instructional Implications

> This document provides an analysis of previous years' FCAT results and contains analyses of FCAT Reading, Writing, and Mathematics state-level data through 2000. The analysis will assist educators in interpreting and understanding their local FCAT scores, which will help improve instruction in the classroom. The PDF version is available on the DOE web site.

Sample Test Materials for the FCAT
> *Reading and Mathematics, Grades 3–10*
> *Science, Grades 5, 8, and 11*
> *Writing+, Grades 4, 8, and 10*

> These materials are produced and distributed each fall for teachers to use with students. The student's test booklet contains a list of the different kinds of FCAT questions, practice questions, and hints for answering them. The teacher's answer key provides the correct answer, an explanation for the correct answer, and also indicates which Sunshine State Standards benchmark is being assessed by each question. These booklets are available in PDF format on the DOE web site.

The New FCAT NRT: Stanford Achievement Test, Tenth Edition (SAT10)

> This brochure outlines differences between the previous FCAT NRT (SAT9) and the current FCAT NRT (SAT10) and provides specifications of the classifications and composition of the Reading and Mathematics NRT assessments. It is available in PDF format on the DOE web site.

Understanding FCAT Reports

> This booklet provides information about the FCAT student, school, and district reports for the recent test administration. Samples of reports, explanations about the reports, and a glossary of technical terms are included. Distribution to districts is scheduled to coincide with the delivery of student reports each May. The booklet can be downloaded from the DOE web site.

What every teacher should know about FCAT

> This document provides suggestions for all subject-area teachers to use in helping their students be successful on the FCAT. It can be downloaded from the DOE web site.

FLORIDA DEPARTMENT OF EDUCATION
www.fldoe.org

Assessment and School Performance
Florida Department of Education
Tallahassee, Florida