Mathematics Assessment Update
FCTM Conference 2019

Test Development Center FSA Mathematics Updates

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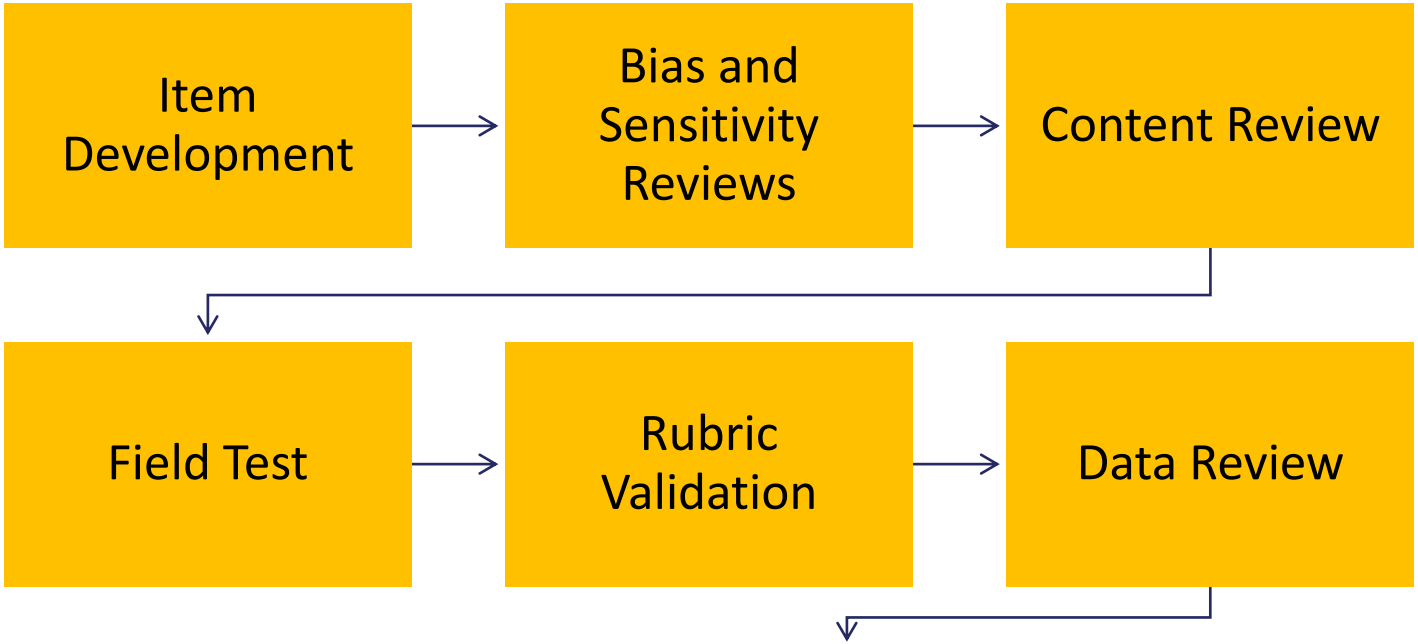
Test Development Center

- Role of the Test Development Center
- Item Development Process

Test Development Center (TDC)

- TDC is funded through a grant by the Florida Department of Education (FDOE). The grant is managed by Tallahassee Community College.
- TDC's purpose is to assist FDOE in the implementation of various aspects of the statewide assessment program.
- TDC works with contractors and Florida educators to develop test items for English Language Arts, Mathematics, Science, and Social Studies assessments.
- TDC also works with contractors and FDOE to produce and distribute interpretive products related to statewide assessments.

FSA Mathematics Item Development Process



Florida Standards Assessments

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General Information

- Grades 3–6 Transition to Paper
- Calculator
- Practice Tests
- Test Item Specifications

Grades 3–6 Transition to Paper

TEST FORMAT BY YEAR FOR FLORIDA'S STATEWIDE ASSESSMENTS						
Assessment		**2014–15**	**2015–16**	**2016–17**	**2017–18**	**2018–19***
FLORIDA STANDARDS ASSESSMENTS						
Grade 3 ELA Reading		PBT	PBT	PBT	PBT	PBT
Grade 3 Mathematics		PBT	PBT	1st year CBT	CBT	PBT
Grade 4 ELA	**Writing**	PBT	PBT	PBT	PBT	PBT
	Reading	PBT	1st year CBT	CBT	CBT	PBT
Grade 4 Mathematics		PBT	PBT	1st year CBT	CBT	PBT
Grade 5 ELA	**Writing**	PBT	PBT	PBT	PBT	PBT
	Reading	1st year CBT	CBT	CBT	CBT	PBT
Grade 5 Mathematics		CBT	CBT	CBT	CBT	PBT
Grade 6 ELA	**Writing**	PBT	PBT	PBT	PBT	PBT
	Reading	CBT	CBT	CBT	CBT	PBT
Grade 6 Mathematics		CBT	CBT	CBT	CBT	PBT

https://info.fldoe.org/docushare/dsweb/Get/Document-7048/dps-2014-81b.pdf

Practice Using the Online Calculator

The Desmos calculator for grades 7 and 8 and the EOCs can be found at:

https://fsassessments.org/resources/ela-mathematics/

FSA Scientific Calculator (Desmos)	Use this link to access the calculator that will be used for FSA Algebra 1 and Geometry EOC and Grade 7 and Grade 8 FSA Mathematics tests.

Handheld Calculators

- No updates have been made to the information in the calculator policies document on the FSA Portal.
- Districts are responsible for noting any functionality changes to approved models.
- FDOE will not review/approve additional models for the list; however, districts may provide calculators if mathematics specialists in the district determine that they meet the published specifications.
- Handheld calculators are OPTIONAL for CBT and REQUIRED for PBT in calculator sessions.

Handheld Calculators

- School staff and Test Administrators MUST be trained on the appropriate use of calculators:
  - Grades 7 and 8—**SESSIONS 2 and 3 ONLY**
  - FSA EOCs—**SESSION 2 ONLY**
- Tests for students who have access to a calculator during non-calculator sessions OR who have access to a calculator with prohibited functionalities must be invalidated.

Practice Tests

- In all FSA Mathematics grades and courses, at least one new or revised paper-based practice item per grade/course will be updated by January 2020.
  - Updates are intended to show item types, item type combinations, and item formats.
  - Multi-interaction items will be added to paper-based practice tests.

Test Item Specifications

- Test Item Specifications provide content and format information to item writers and reviewers.
- A summary of any revision(s) or update(s) is available in Appendix B of each grade/course's specifications document.
- The latest updates to the specifications were released in September 2018.

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Administration Updates

- Algebra 1 Administrations
- PBT Reference Sheets
- New Standardization Procedures
- CBT and PBT Practice Tests

FSA Algebra 1

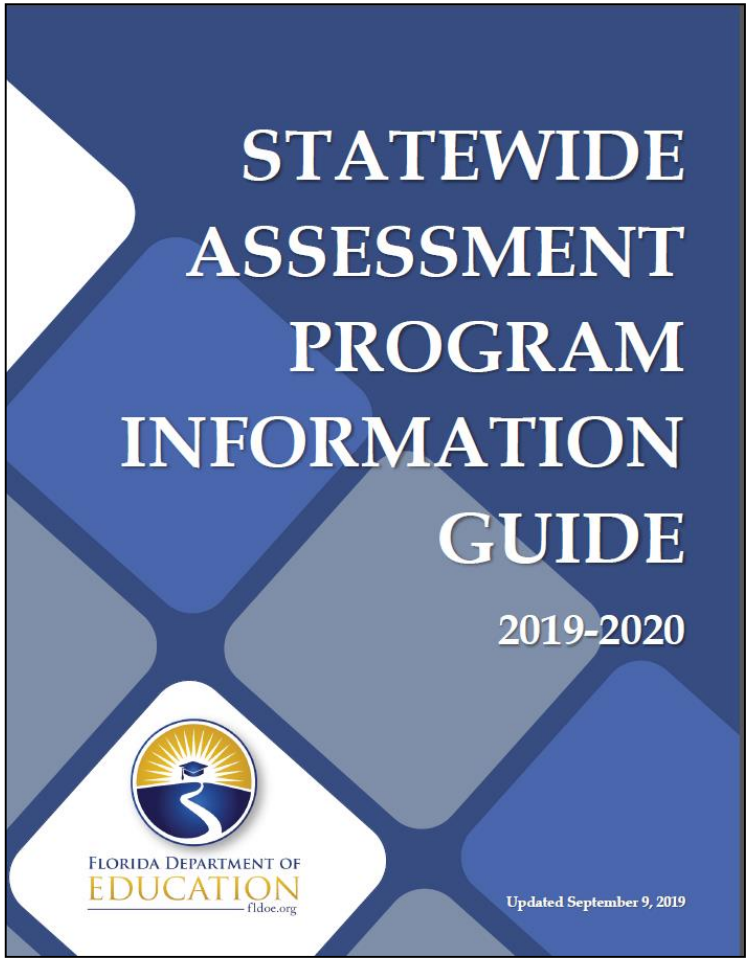
	Fall EOC (9/9–9/27)	Winter EOC (12/2–12/20)	Spring Algebra 1 Retake (2/24–3/13)	Spring EOC (5/1–5/29)	Summer EOC (7/13–7/24)
First-Time Test Takers	X	X	Retaker enrolled in the class again. →	X*	X
Retakers	X	X	X* ←	Senior transfer student (first-time)	X

PBT Reference Sheets

- The reference sheets for Grades 4–8 Mathematics and Algebra 1 and Geometry EOCs will be included in Sessions 1 and 2 (and 3, if applicable).
- These sheets do not have perforated pages, so students may not tear them out.
- Schools may print copies of the reference sheet.
- This policy information will be included in administration manuals.

Statewide Assessment Program Guide

- Online resource for information on the statewide assessment program
- Updated for the 2019–20 school year
  - Expanded description of test construction
  - Information on the standalone ELA Writing Field Test
  - Updated Resources in Section 8.0



New Standardization Policies

- **Validity**
  - Assessments are aligned to the content they are intended to measure
- **Reliability**
  - Assessments consistently measure what they intend to measure
- **Standardization**
  - Students take tests under the same conditions
  - Scores are comparable
- **Independent Test Taking**
  - Student test taking is free of **any** outside influence

New Standardization Policies

- Spring 2019 Test Monitoring
  - Peer Review: "The State adequately monitors the administration of its State assessments to ensure that standardized test administration procedures are implemented with fidelity across districts and schools."
  - One main purpose and outcome of the Spring 2019 pilot was to refine policies to improve standardization based on observations.
  - New policies and prohibited activities are in place **once test materials are distributed** (test and answer books, work folders).

New Standardization Policies

1. **Testing Strategies**
   - No monitoring, incentivizing, or using checklists.
2. **Check Your Work**
   - No instructing individual students to go back and check their work once they have finished.
   - Does not apply to verbal encouragement accommodations on IEP or Section 504 Plan.
3. **"Brain Dumping"**
   - No instructing students to write down formulas, acronyms, or other strategies on test materials once they are distributed but before testing begins.

Examples

Testing Strategies

- **Incentivizing** could be instructing students to use certain strategies, such as underlining key words in passages, and then **monitoring the room** to see if each student is using the strategy.
- A **checklist** would have the students' names and boxes next to "underlined passages," which would then presumably be used to praise or caution the student after testing depending on his or her behavior.
- A TA could say, "Jay, you weren't underlining. I better see you underlining in Session 2." The student's testing behavior is being influenced by the monitoring, and is not fully independent.

Examples

Check Your Work

- If a student has finished testing and closed his test and answer book before the allotted time is up, he may not be approached or told to go back and check his work.
- Requiring a student to return to the test when she feels she has finished is not independent test taking and could cause her to change something (right or wrong) she otherwise would not have.
- It must be the student's decision to check work.
- Reminders (script excerpts) may be displayed or re-read for the whole group during the break.

Examples

Brain Dumping

- Once students have test materials, a TA or other school staff may not instruct them to write specific items from memory before testing begins (e.g., formulas, acronyms).
- Students may choose to do this on their own; that is not prohibited.
- As with testing strategies, TAs may not monitor to see if students wrote specific items from memory on their materials.

New Standardization Policies

- FDOE will be creating a Security Training for Test Administrators.
- New instructions will be included in the manuals, training materials, and on checklists and agreements.
- What is allowed?
  - Monitoring the testing room for cheating, electronic devices.
  - Re-reading portions of the script during the break (e.g., Do not circle bubbles, review your work in this session only)
  - Displaying portions of the script in the testing room (e.g., a sign, poster, projection, note written on the board)
  - Accommodations that allow some of these behaviors (e.g., verbal encouragement)

PBT Practice Tests

- Students who will take an **FSA ELA Reading or Mathematics** paper-based test are strongly encouraged to practice at school.
  - Student Presentations with animations and narrations
  - Directions for Completing – shorter practice with test items
  - Paper-Based Practice Tests
- Students taking PBT **ELA Writing** are strongly encouraged to take a practice test to become familiar with the amount of space they will have for their responses.

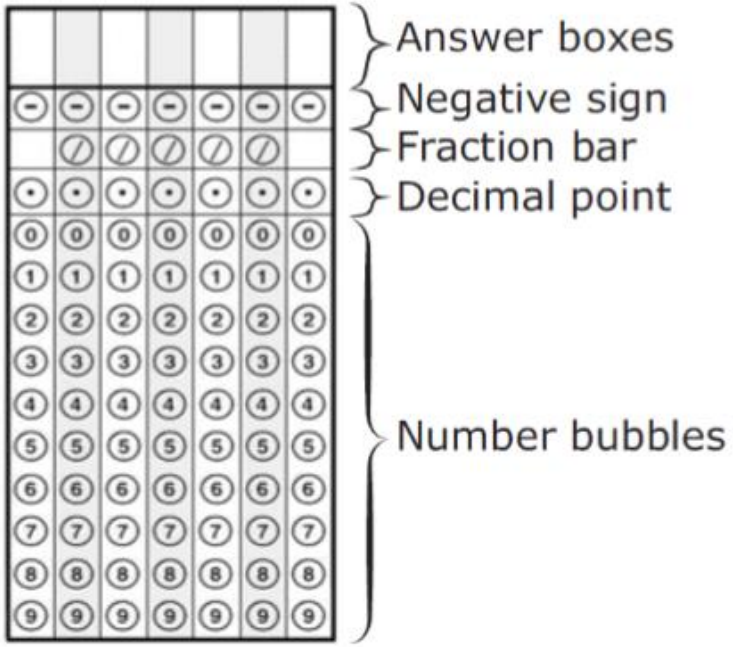
CBT Practice Tests

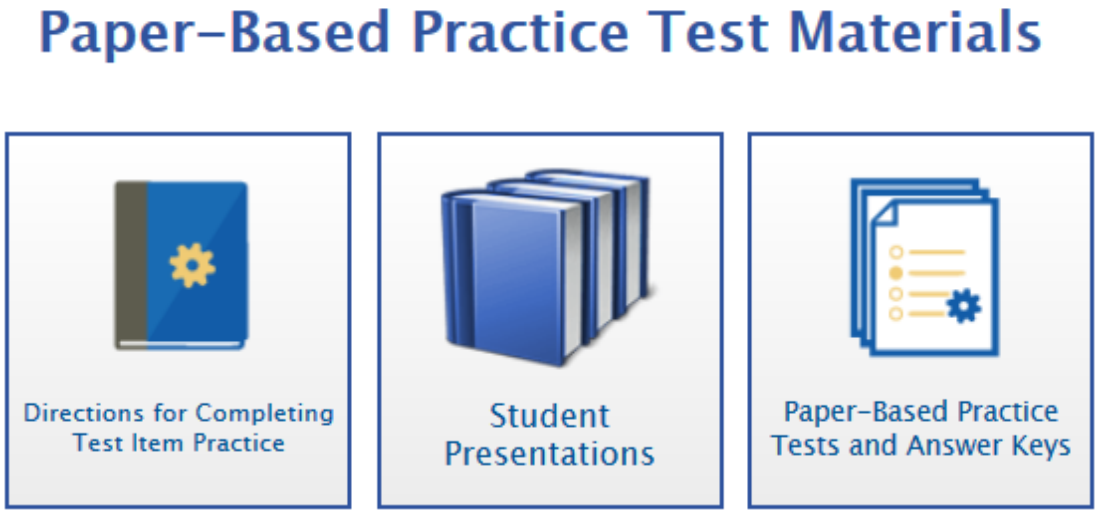
- CBT students are required to participate in a practice test session prior to testing.
- Students retaking an assessment who previously completed this requirement for the test they will take (EOC or Retake) are not required to participate in another practice test.
- Students with CBT accommodations must use the appropriate accommodated practice test.
- Ensure test administrators do not start an Operational Session for practice.

FSA Portal

- https://fsassessments.org/resources/test-administration/

CBT Work Folder [PDF]	A four-page work folder that students taking computer-based FSA Mathematics and FSA EOC assessments may use to work the mathematics problems.



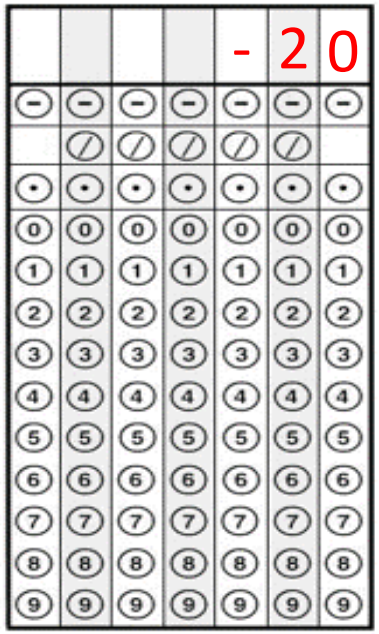


- https://fsassessments.org/students-and-families/practice-tests/paper-based-materials/index.stml

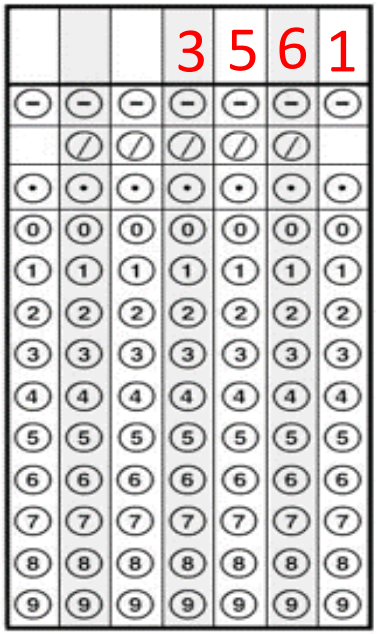
Gridding in numerical answers

- Practice gridding
  - Negative numbers (Grade 6)
  - Whole numbers in the thousands
  - Percent numbers

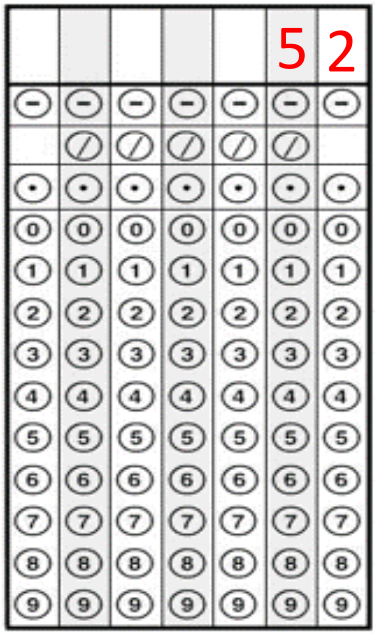
If answer = -20



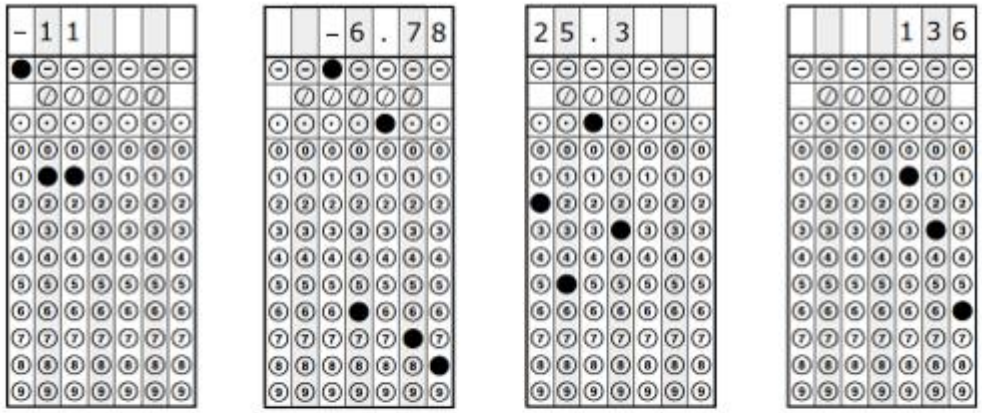
If answer = 3,561
Do not need comma



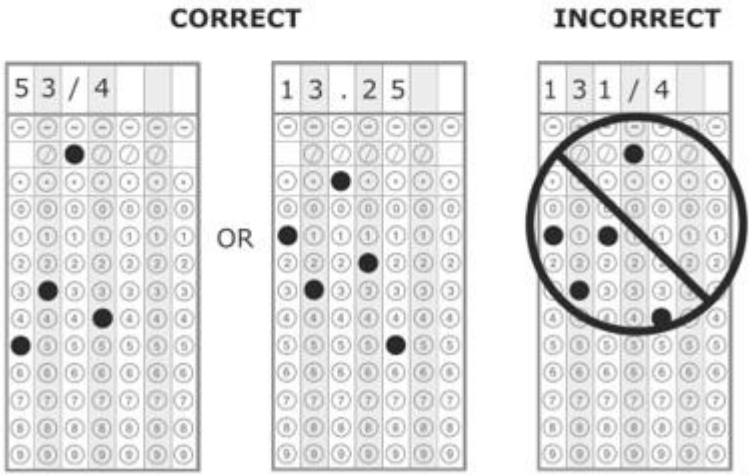
If answer = 52%
Do not need % symbol



Gridding in numerical answers



Do NOT write a mixed number, such as $13\frac{1}{4}$, in the answer boxes. Change the mixed number to an equivalent fraction, such as $\frac{53}{4}$, or to an equivalent decimal, such as 13.25. Do not try to fill in $13\frac{1}{4}$, as it would be read as $\frac{131}{4}$ and would be counted wrong.



- Remind students that directions for gridding is at the front of the PBT booklet.
- The directions are not located in a session and they can flip back to look at it any time during the test.

Contact Information – Test Administration

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Released Tests

Released Tests: Timeline of Activities

- Summer 2019–Spring 2020: Finalize format of released test interpretive products (IP)
- Summer 2020: Select operational test forms for use in spring 2021; begin parallel production of released test forms and accompanying IP
- June 30, 2021: Report all scores; release test forms in grades 3 and 10 ELA (including grade 10 ELA Writing prompt), Algebra 1, and middle grade ELA (w/prompt) and Mathematics (grade TBD), science (grade TBD) and social studies (subject TBD)
- July 2021: Districts receive individual student score reports, which will include individual Writing responses in released grades only

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Executive Order 19-32

Executive Order 19-32

Executive Order 19-32 directs Florida Department of Education Commissioner Richard Corcoran to comprehensively review the academic standards for Florida's Kindergarten through grade twelve students and provide recommended revisions to Governor DeSantis.

- Articulate how Florida will eliminate Common Core (Florida Standards) and ensure we return to the basics of reading, writing and arithmetic
- Provide a roadmap to make Florida's standards number one in the nation
- Suggest innovative ways to streamline testing

- **There will be no changes to statewide assessments related to the executive order in 2019–20.**

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Content Advisory Committee (CAC)

- October 2019 Mathematics Item Specifications CAC

Fall 2019 Mathematics Test Item Specifications CAC

The Department is planning a Content Advisory Meeting to:

- Gather feedback on FSA Mathematics Test Item Specifications for grades 3–8, Algebra 1, and Geometry.
- Seek committee guidance and recommendations regarding the Test Item Specifications, such as Assessment Limits, Calculator Use, etc., and ensuring appropriateness across grade bands (i.e., grades 5 and 6, grade 8 and Algebra 1/Geometry).

Recommendations gathered from the committee may also be used to inform Department actions to help enhance instructional support for Florida's mathematics teachers.

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Lessons Learned

- Challenges (based on content observations from the Spring 2019 FSA administration)
- Connections
- Resources for consideration

Student Challenges in Standards

- Grade 6: EE.3.9 - write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation
- Grade 6: G.1.2 – Find the volume by packing it with unit cubes.
- Grade 6: SP.1.1
  - Clarify difference between statistical question and survey question.
  - Does the answer to a statistical question need to have more than one answer?

Dependent vs Independent Variables

A coffee storage bin contains 1500 grams of coffee beans. To make a cup of coffee, n grams of coffee beans are removed.

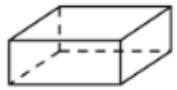
1. Write an equation to model the relationship between the quantity of coffee beans removed, n, and the quantity of coffee beans remaining in the storage bin, q.

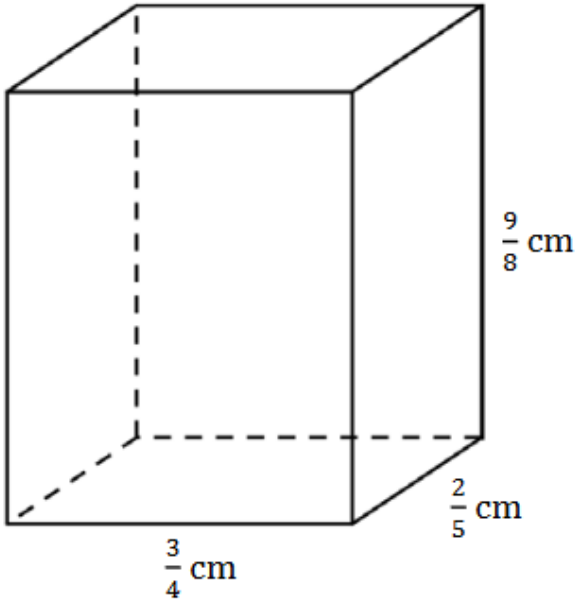
2. Identify the dependent variable in your equation and explain why it is dependent.

- Grinding Equations – Cpalms Formative Assessment

Packing a prism with unit cubes

Imagine that the prism pictured below is packed full of smaller identical prisms. The length of each edge of the small prisms is a **unit fraction**.





1. Give the dimensions of the small prisms that can be used to pack the larger prism.
2. How many of the small prisms would it take to completely fill the larger prism?
3. Explain how the number of the small prisms needed to fill the larger prism is related to the volume of the large prism.

- Prism Packing – Cpalms Formative Assessment

Statistical Questions

a. Which of the following are statistical questions that someone could ask Zeke about his buttons? (A statistical question is one that anticipates an answer based on data that vary.) For each question, explain why it is or is not a statistical question.

i. What is a typical number of holes for the buttons in the jar? Statistical
ii. How many buttons are in the jar? Not Statistical
iii. How large is the largest button in the jar? Statistical
iv. If Zeke grabbed a handful of buttons, what are the chances that all of the buttons in his hand are round? Statistical
v. What is a typical size for the buttons in the jar? Statistical
vi. How are these buttons distributed according to color? Statistical

Justification and reasoning for answers on next slide. All answers in red are correct.

- Buttons: Statistical Questions – Cpalms Problem Solving Task

Statistical Questions

1. "What is a typical number of holes for the buttons in the jar" is statistical. One would need to collect data on how many holes each button in the jar has and find the "typical" number or average. Average is a statistical measure that requires the collection of data with variability.
2. "How many buttons are in the jar" is not statistical. One would count the single jar of buttons and get only one answer. If there was more than one jar of buttons with different amount of buttons in each jar, then it could become statistical.
3. "How large is the largest button" is statistical. One would need to collect data on all the sizes of the buttons which would vary and find the "largest" aka maximum. Maximum is a statistical measure found that requires the collection of data with variability.
4. "What are the chances that all of the buttons are round in a handful" is statistical. Each time Zeke grabbed a handful of buttons, the answer or probability of it being round could be different. Chances is finding probability or likelihood and has variability.
5. "What is a typical size for the buttons" is statistical for the same reason as number 1. Typical is another way of asking for average. The size for each button in the jar would vary the same as it would for the collection of data for number 2.
6. "How are these buttons distributed according to color" is statistical. That is similar to finding range, but with categorical information like color. One would make a bar graph with data that has variability. Not all buttons are the same color.

Student Challenges in Standards

- Grade 7: RP.1.3 – Use proportional relationships to solve multistep ratio and percent problems.
  - Difference between 0.07 and 1.07 when dealing with tax and other questions that could be asked
  - Percent increase and decrease
- Grade 7: EE.1.1 – Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions.
- Grade 7 Geometry
  - When finding area and circumference of circles, students should be able to write their answers as decimal estimations, 188.496, and in terms of π, 60π.

Percent Increase & Percent Decrease

Task

There were 24 boys and 20 girls in a chess club last year. This year the number of boys increased by 25% but the number of girls decreased by 10%. Was there an increase or decrease in overall membership? Find the overall percent change in membership of the club.

- Chess Club – Cpalms Problem Solving Task

Using tax and tip percentages

Tax and Tip

After eating at your favorite restaurant, you know that the bill before tax is $52.60 and that the sales tax rate is 8%. You decide to leave a 20% tip for the waiter based on the pre-tax amount. How much should you leave for the waiter? How much will the total bill be, including tax and tip? Show work to support your answers.

- Tax and Tip – Cpalms Problem Solving Task

Writing Equivalent Expressions

Write an expression equivalent to $8\left(\frac{3}{4}x - \frac{1}{4}\right) - 6(12 - x)$ using the fewest possible terms. Show all work neatly and clearly.

- Equivalent Perimeters – Cpalms Formative Assessment

Using Equivalent Expressions

Task

The students in Mr. Sanchez's class are converting distances measured in miles to kilometers. To estimate the number of kilometers, Abby takes the number of miles, doubles it, then subtracts 20% of the result. Renato first divides the number of miles by 5, then multiplies the result by 8.

a. Write an algebraic expression for each method.

b. Use your answer to part (a) to decide if the two methods give the same answer.

- Miles to Kilometers – Cpalms Problem Solving Task

Student Challenges in Standards

- Grade 8: EE.1.2 – Use square root and cube root symbols to represent solutions to the equations $x^2 = p$ and $x^3 = p$.
  - Challenges with representing those solutions whether perfect or not; $\sqrt{64}, 8, -8$ are ways to show $x^2 = 64$
  - Biggest misconception is taking half; ~~$x^2 = 22$ then $x = 11$~~
  - Square roots have 2 answers, cube roots have 1
- Grade 8: G.2.7 & G.2.8
  - Challenge using Pythagorean theorem to find a third side
  - Challenge with using Pythagorean theorem to find the distance between two points, even when given a graphic on x- y-plane
- Grade 8: SP.1.4
  - Clarifying – Use relative frequencies calculated by rows or columns to describe possible associations (conditional).

Associations from Two-Way Tables

Students at Beach Middle School were surveyed regarding whether they have a sibling and whether they have a pet.

Relative frequencies are shown in the two-way table below:

Beach Middle School Siblings and Pets

	Have a pet	Have no pet
Have a sibling	$\frac{10}{90}$	$\frac{80}{90}$
Have no sibling	$\frac{70}{75}$	$\frac{5}{75}$

1. Explain any association between having a pet and having a sibling. Use data from the able to support your answer.
2. What does 5/75 mean in the context of this problem?

- Siblings and Pets – Cpalms Formative Assessment

Associations from Two-Way Tables

The results are shown in the two-way table below:

Student Preference for Sport and Subject

	Prefer Math	Prefer Science
Prefer Team Sports	80	25
Prefer Individual Sports	40	45

1. In the table below, record the relative frequencies by row.

Student Preference for Sport and Subject – Relative Frequency Table

	Prefer Math	Prefer Science	Total
Prefer Team Sports	80/105 = .762	25/105 = .238	
Prefer Individual Sports	40/85 = .471	45/85 = .529	

- Two-Way Relative Frequency Table – Cpalms Formative Assessment

Progression of Slope through Middle Grades

Grade 6 teaches the concept of unit rate and the language of a ratio relationship, including independent and dependent variables on a coordinate plane.

- 6.RP.1.2 - Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.
- 6.EE.3.9 - Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

Progression of Slope through Middle Grades

Grade 7 teaches proportional relationships, constant of proportionality (unit rate), and what (x, y) and (1, r) mean.

- 7.RP.1.2 - Recognize and represent proportional relationships between quantities.
  - b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
  - c. Represent proportional relationships by equations.
  - d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation

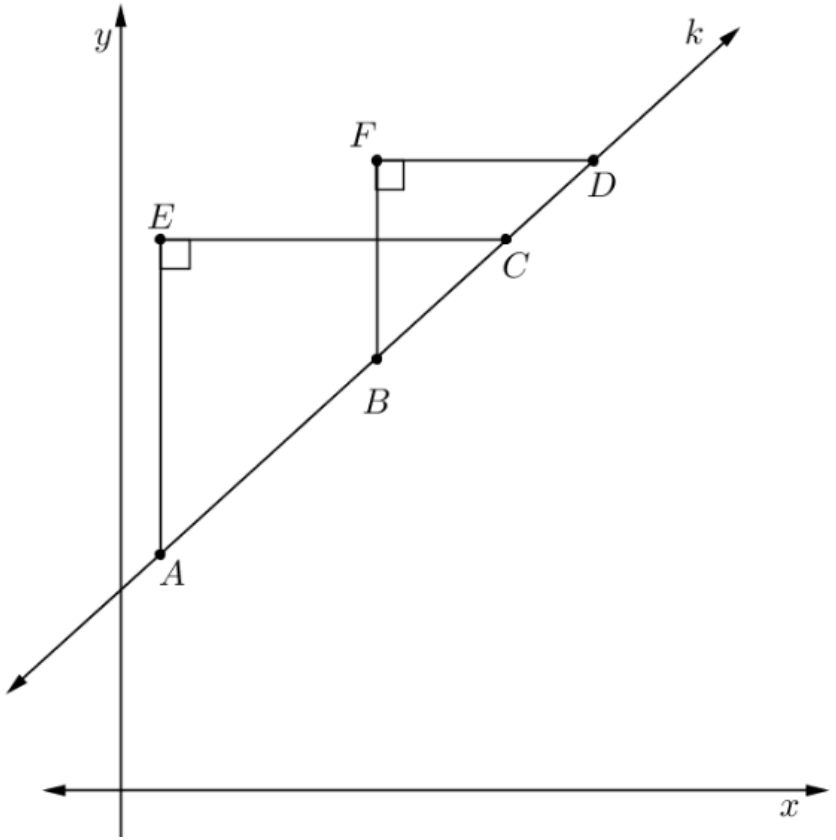
Progression of Slope through Middle Grades

Grade 8 teaches slope-intercept form, moving from proportional to linear equations, and rate of change / slope.

- 8.EE.2.5 - Graph proportional relationships, interpreting the unit rate as the slope of the graph.
- 8.EE.2.6 - Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.
- 8.F.2.4 - Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function.

Line *k* contains points *A, B, C,* and *D. EA* represents the difference between the *y*-coordinates and *EC* represents the difference between the *x*-coordinates of points *A* and *C*. Likewise, *FB,* represents the difference between the *y*-coordinates and *FD* represents the difference between the *x*-coordinates of points *B* and *D*.

Use similar triangles to explain why the slope of line *k* is the same whether the slope is calculated using points *A* and *C* or points *B* and *D*.



Slope Triangles – Cpalms Formative Assessment

https://www.cpalms.org/Public/PreviewResourceAssessment/Preview/66702

Getting Started

Review what it means for two triangles to be similar. Then review the AA Similarity Criterion and the consequences of similarity (e.g., corresponding angles are congruent and corresponding sides are proportional). Provide a general outline for the explanation of why the slope of line k is the same whether the slope is calculated using points A and B or points C and D.

1. Show that $\Delta CEA \sim \Delta DFB$,
2. Use the similarity to deduce that $\frac{EA}{EC} = \frac{FB}{FD}$, and
3. Show how the slope can be calculated using points A and B and points C and D.
4. Conclude the slopes are the same given the proportionality of the sides.

https://www.cpalms.org/Public/PreviewResourceAssessment/Preview/66702

Got It

Examples of Student Work at this Level

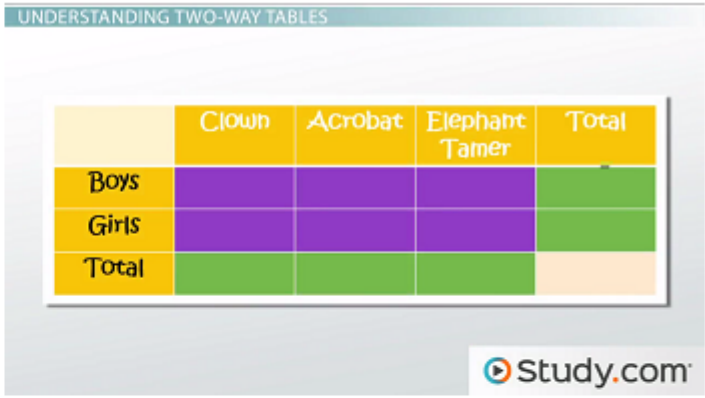
The student explains that since $\angle E$ and $\angle F$ are both right angles, they are congruent. Since $\overleftrightarrow{EA}$ and $\overleftrightarrow{FB}$ are both vertical, they are parallel which means that $\angle EAB$ is congruent to $\angle FBD$ (by the Corresponding Angles Theorem). Since two angles of ΔCEA are congruent to two angles of ΔDFB, $\Delta CEA \sim \Delta DFB$ (by the AA Similarity Theorem). Since these triangles are similar, corresponding sides are proportional so that $\frac{EA}{EC} = \frac{FB}{FD}$. But both $\frac{EA}{EC} = \frac{FB}{FD}$ represent the slope of line k. Since these ratios are equal, the slope of line k can be calculated using either one.

Statistics Resources to Consider

- https://study.com/academy/lesson/joint-marginal-conditional-frequencies-definitions-differences-examples.html

The middle cells are the joint frequency numbers. When analyzing data in a two-way frequency table, you will be looking for **joint relative frequency**, which is the ratio of the frequency in a particular category and the total number of data values. The purple cells on this table are all joint frequency numbers.

This is called joint frequency because you are joining one variable from the row and one variable from the column. In this example, the row variables are the careers and the column variables are the genders. Therefore, the number of girls that prefer a clown career would be considered a joint frequency.



A two-way table

The numbers in the column on the very right and on the row on the very bottom are the marginal frequency numbers. When analyzing data in a two-way frequency table, you will be looking for **marginal relative frequency**, which is the ratio of the sum of the joint relative frequency in a row or column and the total number of data values. When you think of marginal frequency, think of the margins on an English paper. The margins are the areas on the edges of the paper, the marginal frequency numbers are the numbers on the edges of a table. On this table, the marginal frequency numbers are in the green cells.

Conditional relative frequency numbers are the ratio of a joint relative frequency and related marginal relative frequency. For example, let's say you wanted to find the percentage of people that selected clown as a career, given those people are girls. You would then find the number of girls that selected clown and divide by the total number of girls in the survey. This is a similar set up to conditional probability, where the limitation, or condition, is preceded by the word given. Let's look at some examples to help you find the different relative frequencies in a two-way table.

Statistics Resources to Consider

- https://locus.statisticseducation.org/professional-development

The LOCUS assessments are based on the GAISE framework and aligned to the Common Core State Standards. The items and resources can be viewed according to grade level or by components of the statistical problem solving process. Even if your state claims it is not a common core state, it is likely that standards have been informed by, or even directly copied from, the Common Core State Standards.

Browse questions by grade level

- Grade 6
- Grade 7
- Grade 8
- High School (Grades 9-12)

Browse questions by component

- Formulate Questions
- Collect Data
- Analyze Data
- Interpret Results

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