TASC Functions and Algebra for Test JKL

2018 Professional Development with w/ Chris Burns and Brett Mosier

What do you notice about the following…

6. The table gives selected values for the linear function $f(x)$.

x	$f(x)$
5	12
10	19
15	26
20	33

What do you notice about this question?

TEST ASSESSING SECONDARY COMPLETION™

TASC Mathematics Test Practice Items

6. The table gives selected values for the linear function $f(x)$.

x	$f(x)$
5	12
10	19
15	26
20	33

Which of these functions has the same slope as $f(x)$?

A. $g(x) = x + 7$

B. $h(x) = 2x + 2$

C. $q(x) = \frac{4}{5}x + 8$

D. $p(x) = \frac{7}{5}x + 5$

Pair/Share:

How familiar are you with the math topics on the TASC? Which topics have you taught?

Information about the TASC Mathematics Test (JKL)

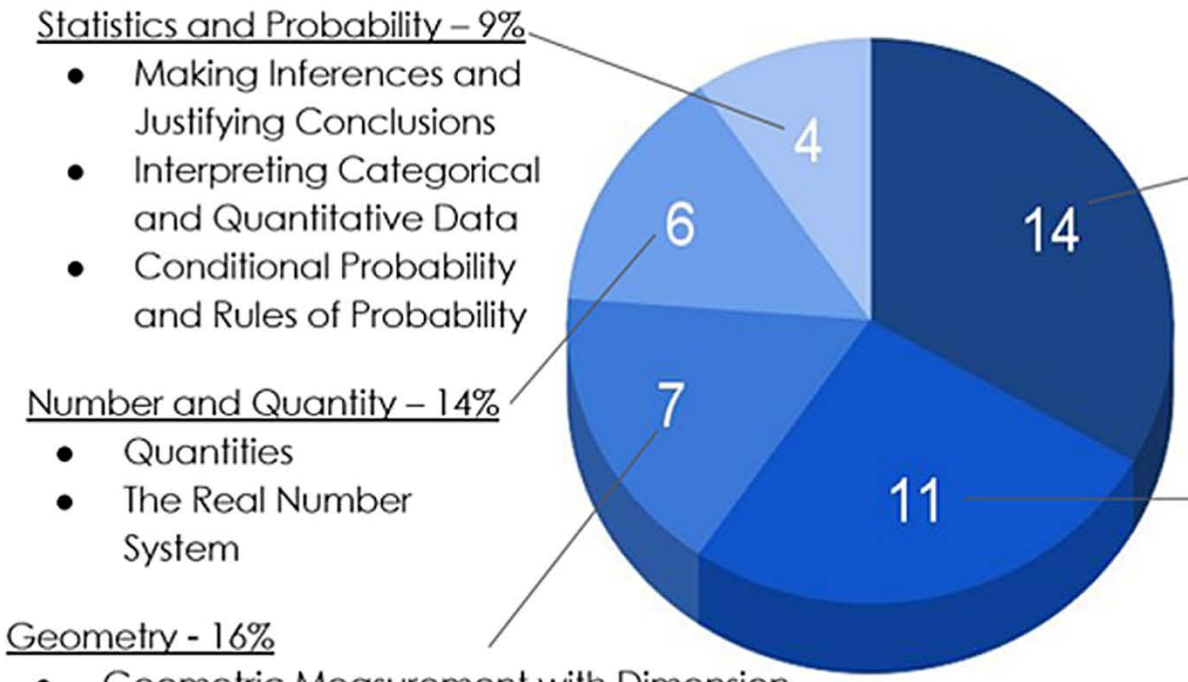
- TASC Math Item Specifications
- TASC Math Blueprint

TASC Mathematics Blueprint Overview (JKL)

Domain/ Reporting Category	Subdomain/Core Idea	Subdomain %	Domain %
Algebra	Arithmetic with Polynomials and Rational Expressions	6%	26%
	Reasoning with Equations and Inequalities	8%	
	Creating Equations	6%	
	Seeing Structure in Expressions	6%	
Geometry	Geometric Measurement with Dimension	6%	23%
	Modeling with Geometry	7%	
	Congruence	5%	
	Similarity, Right Triangles, and Trigonometry	5%	
Functions	Interpreting Functions	10%	26%
	Linear, Quadratic, and Exponential Models	8%	
	Building Functions	8%	
Number and Quantity	Quantities	10%	13%
	The Real Number System	3%	
Statistics and Probability	Making Inferences and Justifying Conclusions	3%	12%
	Interpreting Categorical and Quantitative Data	6%	
	Conditional Probability and Rules of Probability	3%	

Analyzing TASC ORT Math Assessments 4 & 5

(Out of 42 unique questions)



Statistics and Probability – 9%

- Making Inferences and Justifying Conclusions
- Interpreting Categorical and Quantitative Data
- Conditional Probability and Rules of Probability

Number and Quantity – 14%

- Quantities
- The Real Number System

Geometry - 16%

- Geometric Measurement with Dimension
- Modeling with Geometry
- Congruence
- Similarity, Right Triangles, and Trigonometry

Functions - 33%

- Interpreting Functions
- Linear, Quadratic, and, Exponential Models
- Building Functions

Algebra – 26%

- Arithmetic with Polynomials and Rational Expressions
- Reasoning with Equations and Inequalities
- Creating Equations
- Seeing Structure in Expressions

Equations from TASC ORT 4 & 5

What do you notice? What do you wonder?

- $P = R - C$
- $p(t) = -t^2 + 2t - 2$
- $E = 0.08d + 250$
- $p(x) = 2^x$
- $q(x) = x^2$
- $f(x) = 250x + 6000$
- $A = 1.25x + 9.50$
- $x - 2y = 10$
- $3x + 4y = -40$
- $C = 10b + 25$
- $f(x) = \frac{x+3}{x-7}$
- $B(t) = (1.05)^t$
- $P(t) = 12.5t + 35$
- $J + 5 = A$
- $J + A = 59$
- $y = -44x + 1{,}000$
- $r + b < 200$
- $b < \frac{1}{2}r$
- $y = -2x^2 + 9$
- $y = 4x + 3$
- $A = 0.25m + 500$
- $f(x) = x^3 + x^2 - 2x$
- $y \leq \frac{1}{2}x - 1$

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The table below shows the projected item numbers by item type in the 2018 forms. Research and data may necessitate minor adjustments to these numbers.

MATHEMATICS

Item Type	Total Items Per Form	Testing Times (Minutes)
Multiple-Choice	39	59
Gridded-Response	12	24
Autoscored Technology-Enhanced	4	12

TASC TEST MATH

In the Mathematics test there are number, quantity, algebra, functions, and geometry questions, as well as some that cover statistics and probability. Most are word problems and involve real-life situations, or ask examinees to interpret information presented in diagrams, charts, graphs, and tables. Section 1 of the Mathematics test allows examinees to use a calculator. A calculator is not used in Section 2. Examinees will also be given a page of mathematic formulas to use during the test.

CONTENT TYPES

Numbers and Quantities

- Provides an opportunity for the examinee to demonstrate understanding of how quantities change with respect to one another.
- Provides evidence of the examinee's ability to use units to solve problems.
- Requires the examinee to understand the properties of rational irrational numbers.

Algebra

- Offers multiple-choice, gridded-response, constructed-response, technology-enhanced items that require the examinee to apply algebraic to solve a linear equation, and learn how to use these functions to model life situations in basic courses.
- Demonstrates evidence that the examinee can apply algebraic including distributive property.
- Computes algebraic expressions; specifically adding, subtracting, multiplying polynomials.
- Requires the examinee to isolate a particular quantity of interest.

Functions

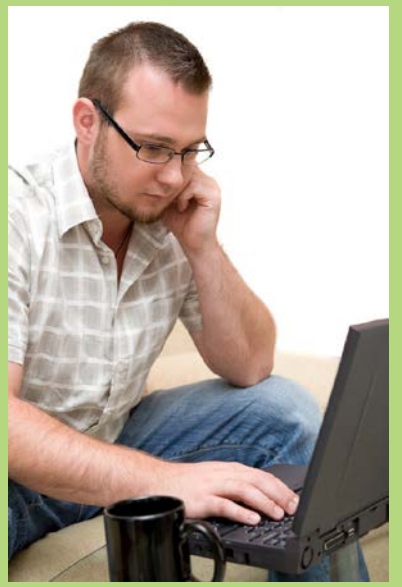
- Offers multiple-choice, gridded-response, constructed-response, technology-enhanced items that will provide evidence regarding examinee's ability to analyze and represent constraints by using a system of equations.
- Requires the examinee to identify the system of equations that models the contextual situation by interpreting keywords and phrases.

Geometry

- Provides evidence regarding the examinee's ability to recognize and use geometric formulas to compute quantities of interest.
- Offers multiple-choice, gridded-response, constructed-response, and technology-enhanced items that require the examinee to apply proportional reasoning skills in a geometric context.
- Analyzes graphs to determine distances and areas that depend on the scale and units of measure.

Statistics and Probability

- Demonstrates evidence that the examinee can determine the subset representing the possible outcomes of a question, as well as the subset that describes the event of interest.
- Allows the examinee to focus on selecting the proper subset of the sample space that meets the criteria using quantitative reasoning skills.



Content Structure

Procedural Skills

- Selecting and applying procedures correctly

Conceptual skills

- Recognizing and applying math concepts and principles

Application and Problem Solving

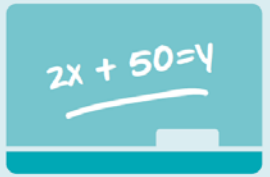
- Using strategies to solve problems and judge the reasonableness of solutions

INTRODUCING….

THE CUNY HSE CURRICULUM FRAMEWORK

SECTION 4

Math: Problem-Solving in Functions and Algebra



Contents

Core Principles of CUNY Framework

- **CORE PRINCIPLE #1** Implement a Content-Based Approach
- **CORE PRINCIPLE #2** Provide Scaffolded Instruction
- **CORE PRINCIPLE #3** Stimulate Active Learning
- **CORE PRINCIPLE #4** Facilitate and Plan for Collaborative Learning
- **CORE PRINCIPLE #5** Make Time For and Encourage Metacognition and Self-Regulated Learning
- **CORE PRINCIPLE #6** Problem-Solving Strategies are Integrated into Content Learning

Basic Structure of a Math Lesson Plan

Here is the basic structure that each of the lessons and teacher supports in the math section follow.

1 Launch

Math lessons begin with a launch, which prepares students for the core problem of the day. The launch can be a discussion, writing assignment, open-ended question, photograph, video, or anything else that helps get students thinking about the context of the problem to come. It should be accessible enough that every student feels comfortable contributing.

2 Problem-Posing

Teacher engages students in a task. This might just be giving out the core problem. It might be giving students the situation—without the actual math problem/question—and asking them to create a visual representation of the situation. It might be giving students a problem and a list of problem-solving strategies and asking students to circle all of the strategies they think might be helpful in making sense of the problem.

3 Student Work

Student have the opportunity to work on their own at first, and then in groups. The first phase of the student work is their engaging with the problem. The second phase is having students work out how they are going to explain what they did to the rest of the class. I learned a great process for this from Billy Wharton, a New York City teacher. Billy gives students pieces of newsprint/butcher paper to work on and has them fold the paper in half. On one half, they do all of their work—this is the messy side. On the other half, they rewrite and add labels to their process so that it will be clear to others during their presentation. Many students will need to do this several times before they get better at it.

4 Student Presentations and Debrief

Students present their reasoning and problem-solving process to their classmates and analyze each other's work.

5 Teacher Summary

This is an opportunity for teachers to make explicit connections to the mathematical content objectives for the day and student work on the core problem. This is when teachers might introduce vocabulary and formal notation (*"You know that relationship you noticed? Well, in mathematics there is a name for it…"*). It is also a moment where a teacher might speak to particular mathematical habits of mind they saw that they want to celebrate.

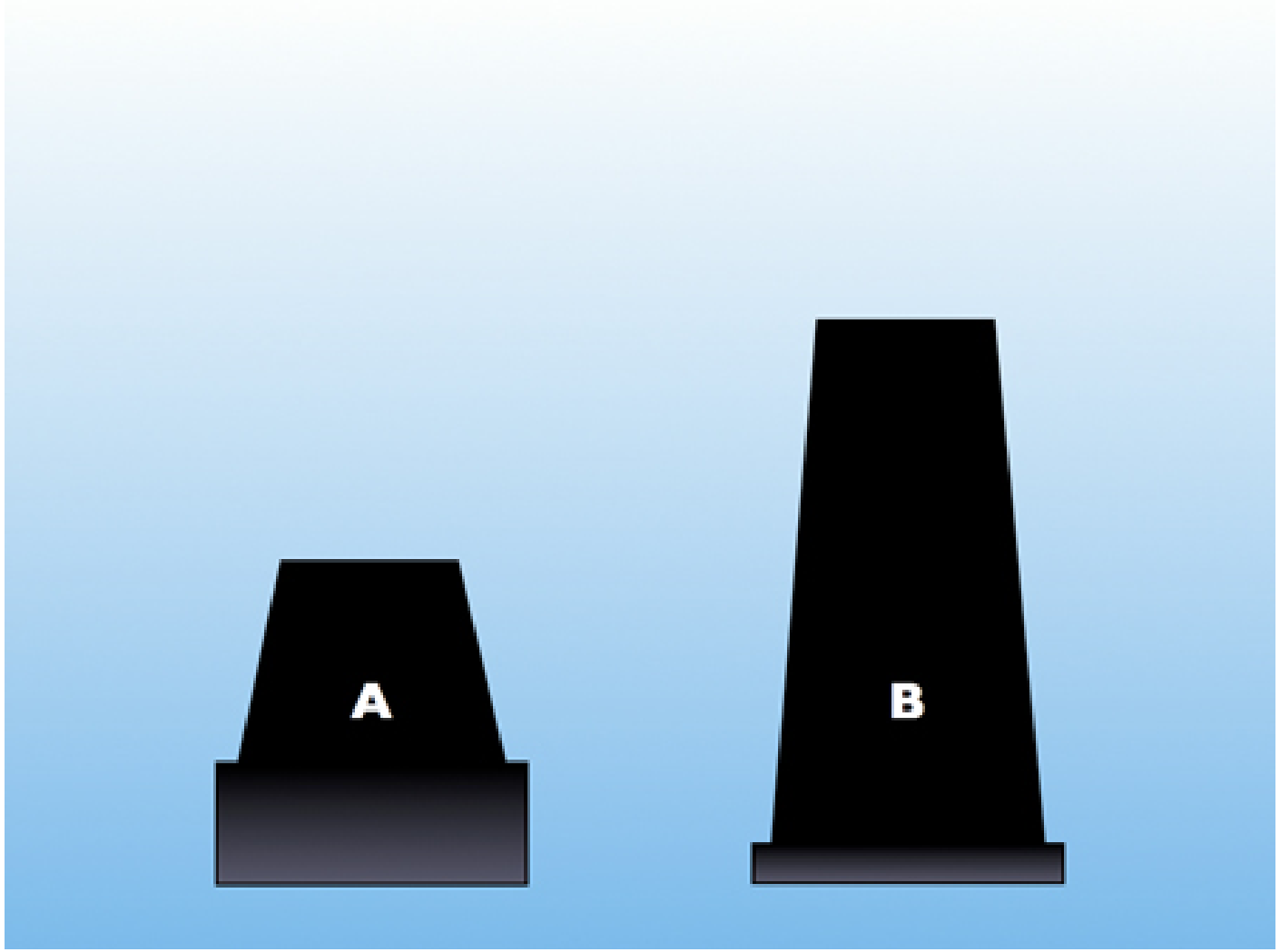
6 Reflection

Students are given time to look back over the day's class. It is a moment for students to consider what they did and be explicit about what they learned. Whatever form the reflection takes, teachers can use this reflection as a final formative assessment for day.

Linear fun……

About how many Styrofoam cups would it take to stack to my head?

Let’s Compare Two Different Cups…….



HMMMMMMMMMMMMMM. . . . . .

- WHICH CUP WILL BE TALLER AFTER 3 CUPS?
- WHICH WILL BE TALLER AFTER 100 CUPS?
- WHEN WILL BOTH CUPS REACH THE SAME SIZE?