



# Smarter Balanced Assessment Consortium:

Practice Test Scoring Guide  
High School Mathematics

10/06/2014

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## About the Practice Test Scoring Guides

The Smarter Balanced Mathematics Practice Test Scoring Guides provide details about the items, student response types, correct responses, and related scoring considerations for the Smarter Balanced Practice Test items. The items selected for the Practice Test are designed to reflect

- a broad coverage of claims and targets that closely mirror the summative blueprint.
- a range of student response types.
- a breadth of difficulty levels across the items, ranging from easier to more difficult items.
- a sample of performance tasks with open-ended response types that allow students to demonstrate knowledge related to critical thinking and application.

It is important to note that all student response types are not fully represented on every practice test, but a distribution can be observed across all the practice tests. The items presented are reflective of refinements and adjustments to language based on pilot test results and expert recommendations from both content and accessibility perspectives.

Within this guide, each item is presented with the following information<sup>1</sup>:

- Claim
- Domain
- Target<sup>2</sup>
- Depth of Knowledge (DOK)
- Common Core State Standards for Mathematical Content (CONTENT)
- Common Core State Standards for Mathematical Practice (MP)
- Answer key or exemplar
- Static presentation of the item
- Static presentation of student response field(s)
- Rubric and applicable score points for each item

The following items are representative of the kinds of items that students can expect to experience when taking the Computer Adaptive Test (CAT) portion of the summative assessment for high school. A separate document is available that provides a high school sample performance task and scoring guide.

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<sup>1</sup> Most of these terms (Claim, Domain, Target, DOK, etc.) are defined in various other Smarter Balanced documents, as well as the Common Core State Standards for Mathematics. Refer to the *Content Specifications for the Summative Assessment of the Common Core State Standards for Mathematics* for more information.

<sup>2</sup> When more than one target is presented, the first one listed is considered the primary target for the item.

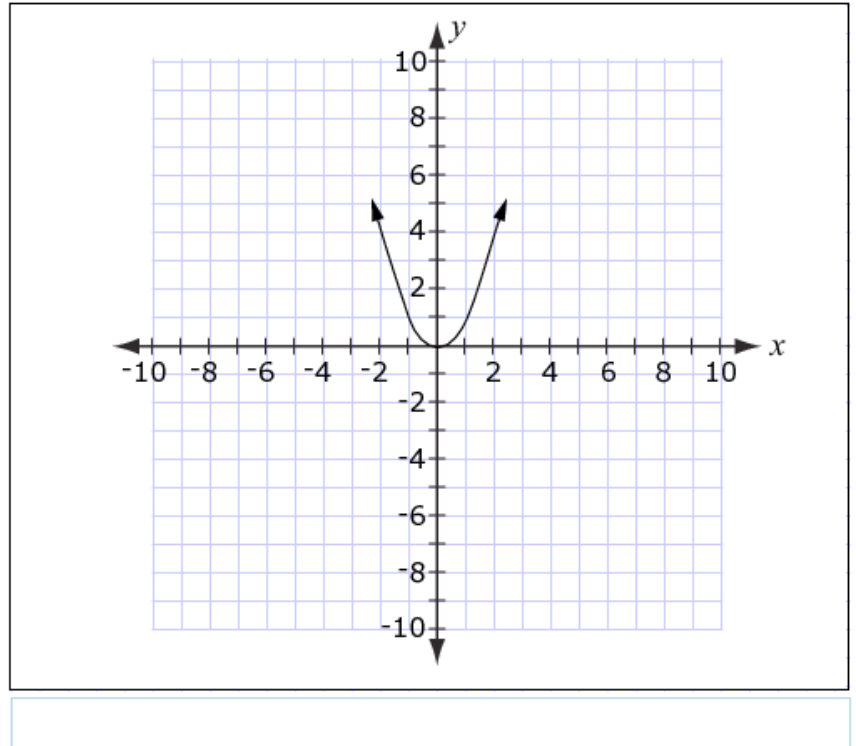
Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#1	1	F-IF, F-BF	M	2	HSF.IF.C, HSF.BF.B.3	N/A	See exemplar

**1969**



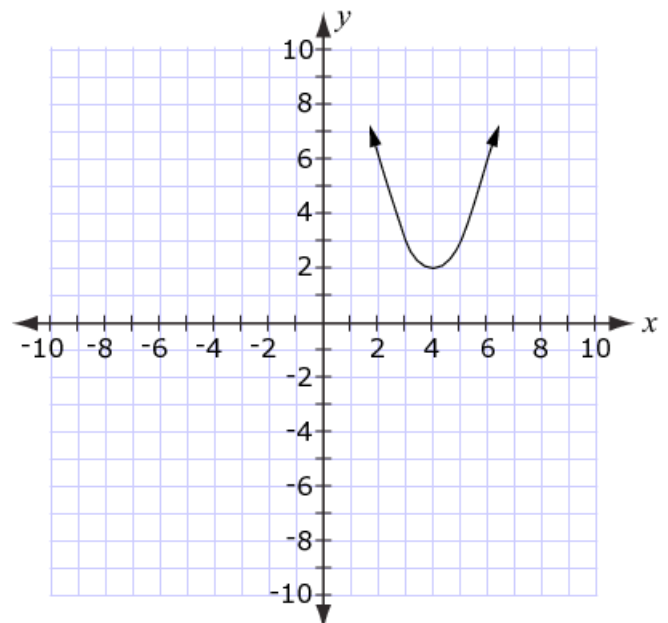
The graph of  $y = x^2$  is shown on the grid.

Drag the graph to show the graph of  $y = (x - 4)^2 + 2$ .



**Exemplar:** (shown at right)

**Rubric:** (1 point) Student drags the graph to its correct location.



Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#2	1	A-APR	F	1	HSA.APR.A.1	N/A	See exemplar

**1918**



Multiply and combine like terms to determine the product of these polynomials.

$$(2x - 3)(5x + 6)$$

← → ↶ ↷ ✖

1	2	3	x
4	5	6	+ - * ÷
7	8	9	< ≤ = ≥ >
0	.	-	$\frac{\square}{\square}$ $\square^\square$ $\square_\square$ $(\square)$ $\ \square\ $ $\sqrt{\square}$ $\sqrt[\square]{\square}$ $\pi$ $i$
<span>sin</span> <span>cos</span> <span>tan</span> <span>arcsin</span> <span>arccos</span> <span>arctan</span>			

**Key:**  $10x^2 - 3x - 18$  or its equivalent

**Rubric:** (1 point) Student enters a correct expression.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#3	1	A-SSE	D	1	HSA.SSE.A.2	7	See exemplar

## 1915



Determine whether each expression is equivalent to  $(x^3 + 8)$ . Select Yes or No for each expression.

	Yes	No
$(x + 8)^3$	<input type="checkbox"/>	<input type="checkbox"/>
$(x - 2)(x^2 + 2x + 4)$	<input type="checkbox"/>	<input type="checkbox"/>
$(x + 2)(x^2 - 2x + 4)$	<input type="checkbox"/>	<input type="checkbox"/>

**Exemplar:** (shown at right)

	Yes	No
$(x + 8)^3$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$(x - 2)(x^2 + 2x + 4)$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$(x + 2)(x^2 - 2x + 4)$	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Rubric:** (1 point) Student correctly classifies the expressions (NNY).

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#4	1	N-RN	B	2	HSN.RN.B.3	N/A	See exemplar

**1932**



Click on **two** numbers whose product is **irrational**.

Numbers	-5	$\frac{1}{3}$	$\frac{2}{3}$	$3\sqrt{2}$	$\sqrt{8}$
<div style="border: 1px solid black; height: 100%; width: 100%;"></div>					

**Exemplar:** (shown below)  
Other correct solutions are possible.

<b>Numbers</b>	-5	$\frac{1}{3}$	$\frac{2}{3}$	$3\sqrt{2}$	$\sqrt{8}$
----------------	----	---------------	---------------	-------------	------------

**Rubric:** (1 point) Student selects two numbers whose product is irrational.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#5	1	A-REI	I	2	HSA.REI.B.4	7	$\frac{5}{3}, -\frac{5}{3}$

**1929**



Solve the following equation for  $n$ .

$$18n^2 - 50 = 0$$

Enter one solution in the first box. If there are two solutions, enter the second solution in the second box.

← → ↶ ↷ ✖

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	i
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Key:**  $\frac{5}{3}, -\frac{5}{3}$

**Rubric:** (1 point) Student enters both correct solutions for  $n$ , in any order.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#6	2	G-SRT	D	2	HSG.SRT.C	8	See exemplar

**1997**



Suppose  $\angle A$  is an angle such that  $\cos A < \sin A$ .  
 Select **all** angle measures that are possible values for  $\angle A$ .

- 25°
- 35°
- 45°
- 55°
- 65°
- 75°

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student selects the last three angle measures.

- 25°
- 35°
- 45°
- 55°
- 65°
- 75°



Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#7	1	F-IF	K	2	HSF.IF.A.1, HSF.IF.A.2, HSF.IF.C	N/A	See exemplar

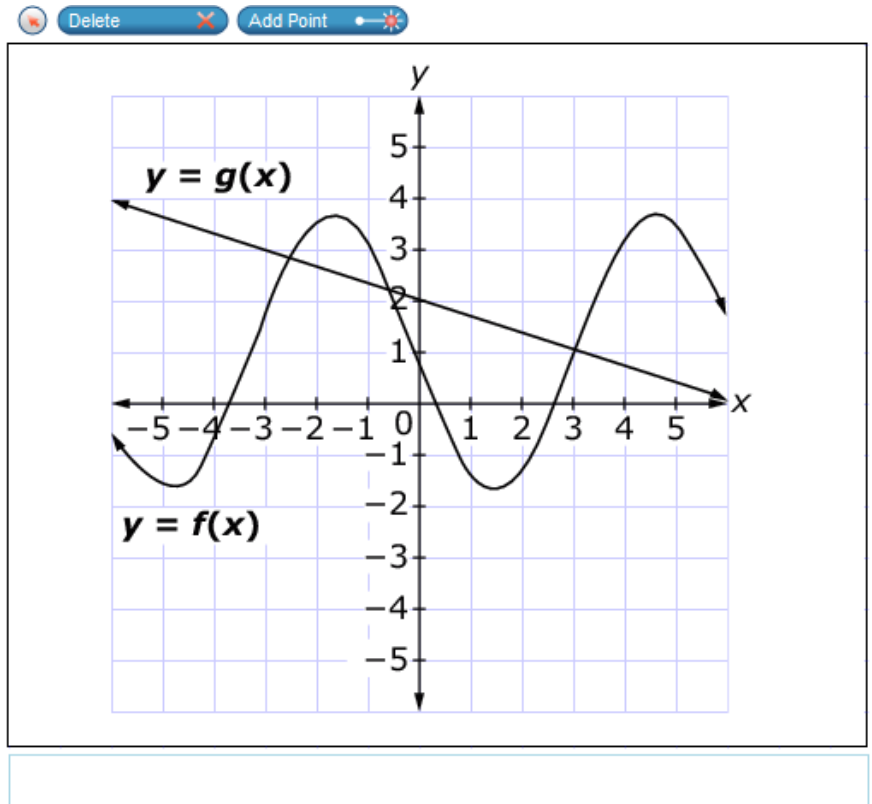
## 1948



The graphs of  $y = g(x)$  and  $y = f(x)$  are shown.

Use the Add Point tool to add a point that will satisfy each given condition.

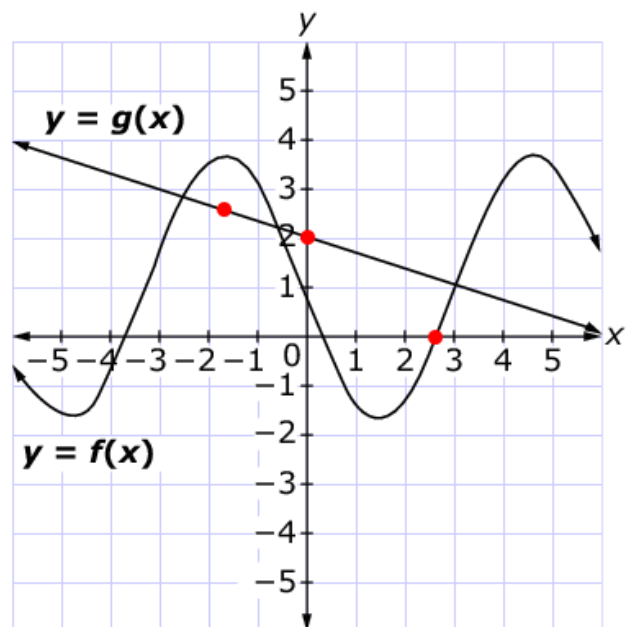
- A point on the graph of  $g$  where  $x = 0$
- A point on the graph of  $g$  where  $f(x) > g(x)$
- A point on the graph of  $f$  where  $f(x) = 0$



**Exemplar:** (shown at right)  
Other correct solutions are possible.

**Rubric:**  
(2 points) Student plots a correct point for each of the three conditions.

(1 point) Student plots a correct point for two of the three conditions.



Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#8	1	A-REI	H	2	HSA.REI.A.2	7	See exemplar

**1926**



Select **all** equations that have at least one integer solution.

- $\sqrt{4x} = 5$
- $\sqrt{3x} = 75$
- $\sqrt{x} = \frac{\sqrt{16}}{8}$
- $\sqrt{x} = x - 12$
- $\sqrt{10 - x} = x - 2$

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student selects the second and fourth options.

- $\sqrt{4x} = 5$
- $\sqrt{3x} = 75$
- $\sqrt{x} = \frac{\sqrt{16}}{8}$
- $\sqrt{x} = x - 12$
- $\sqrt{10 - x} = x - 2$

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#9	1	N-RN	A	2	HSN.RN.A.2	7	5

**1899**



Enter the value of  $x$  such that  $3^{\frac{4}{5}} \cdot 3^{\frac{3}{x}} = \sqrt[5]{3^7}$  is true.

← → ↶ ↷ ✖

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	$i$
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Key:** 5

**Rubric:** (1 point) Student enters the correct value  $x$ .

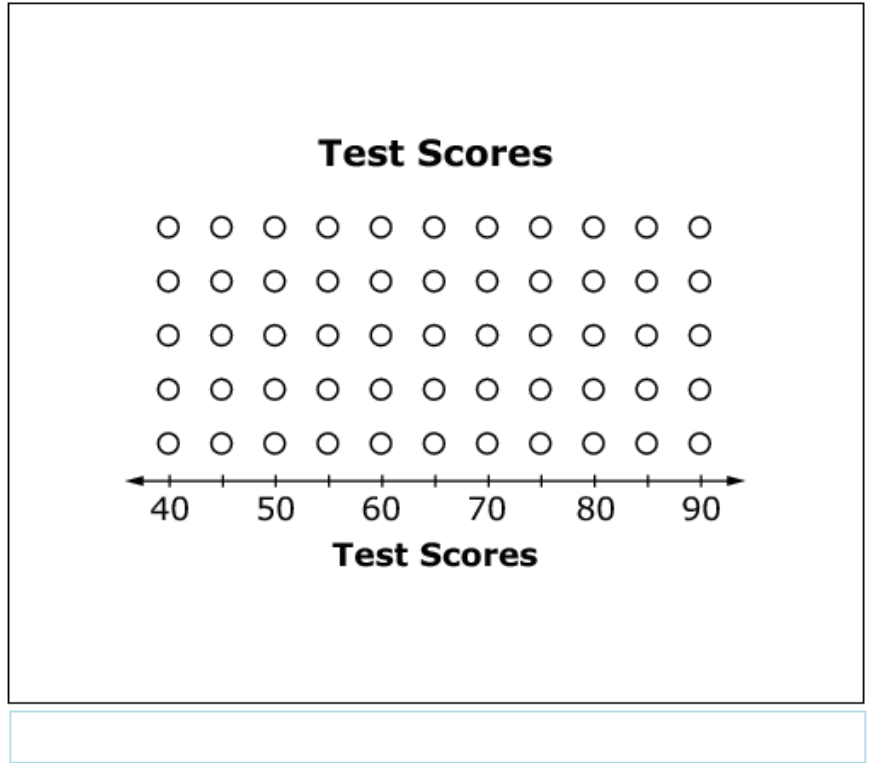
Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#10	1	S-ID	P	2	HSS.ID.A.1	N/A	See exemplar

**1951**



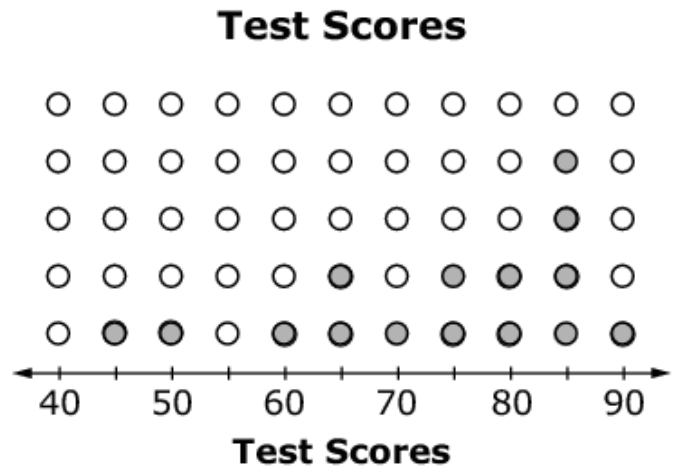
Click above the numbers to create a dot plot for the given test scores.

90, 45, 85, 70, 85, 50, 75, 85, 65, 75, 60, 85, 80, 65, 80



**Exemplar:** (shown at right)

**Rubric:** (1 point) Student creates the correct dot plot for the given data set.

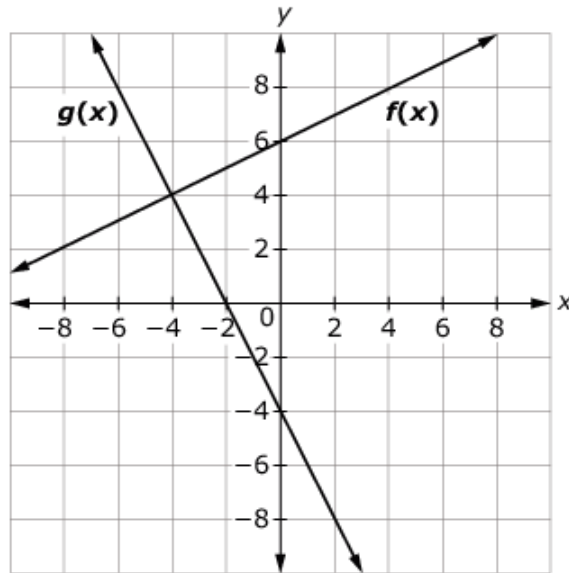


Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#11	1	A-REI	J	2	HSA.REI.D.11	N/A	-4.2 to -4

**1947**



This graph shows linear equations  $y = f(x)$  and  $y = g(x)$ .



Enter the solution to the equation  $f(x) - g(x) = 0$ .

←
→
↶
↷
✖

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	i
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Key:** -4.2 to -4

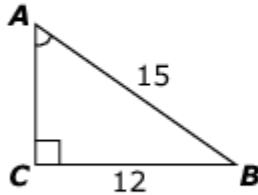
**Rubric:** (1 point) Student enters a value within the given range.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#12	1	G-SRT	0	2	HSG.SRT.C.8	N/A	53.13

**1930**



Consider this right triangle.



Enter the measure of  $\angle CAB$  to the nearest hundredth degree.

←
→
↶
↷
✖

1	2	3
4	5	6
7	8	9
0	.	-

**Key:** 53.13

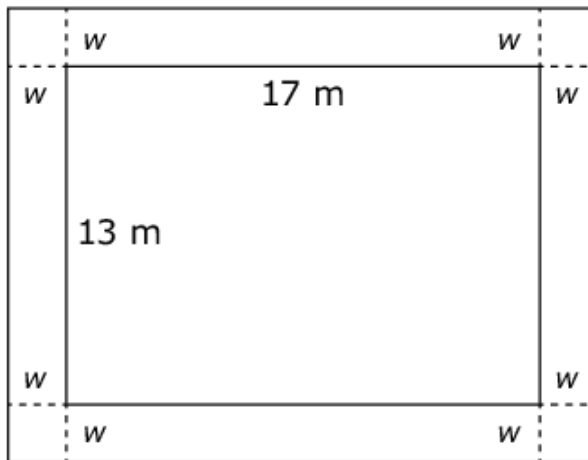
**Rubric:** (1 point) Student enters a correct angle measure.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#13	2	A-CED	A	2	HSA.CED.A	2, 7	See exemplar

**2028**



A rectangular garden measures 13 meters by 17 meters and has a cement walkway around its perimeter, as shown. The width of the walkway remains constant on all four sides. The garden and walkway have a combined area of 396 square meters.



**Part A**

Enter an equation that could be used to help determine the width,  $w$ , of the walkway in the first response box.

**Part B**

Determine the width, in meters, of the walkway. Enter your answer in the second response box.



← → ↶ ↷ ✕

1	2	3	$w$
4	5	6	+ - * ÷
7	8	9	< ≤ = ≥ >
0	.	-	$\frac{\square}{\square}$ $\square^\square$ $\square_\square$ $(\square)$ $\ \square\ $ $\sqrt{\square}$ $\sqrt[\square]{\square}$ $\pi$ $i$
sin cos tan arcsin arccos arctan			

(Item #13 continued)

**Exemplar:**

First response box:  $(17 + 2w)(13 + 2w) = 396$  or an equivalent equation

Second response box:  $\frac{5}{2}$  or  $w = \frac{5}{2}$  or equivalent values

**Rubric:**

(2 points) Student enters a correct equation in *Part A* **and** a correct width in *Part B*.

(1 point) Student enters a correct equation in *Part A* **or** a correct width in *Part B*.



Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#14	3	G-SRT	A	3	HSG.SRT.A	3	See exemplar

**2029**



The radius of sphere Y is twice the radius of sphere X. A student claims that the volume of sphere Y must be exactly twice the volume of sphere X.

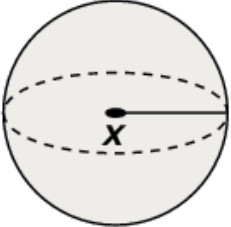
**Part A:** Drag numbers into the boxes to create one example to evaluate the student's claim.

**Part B:** Decide whether the student's claim is true, false, or cannot be determined. Select the correct option.

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

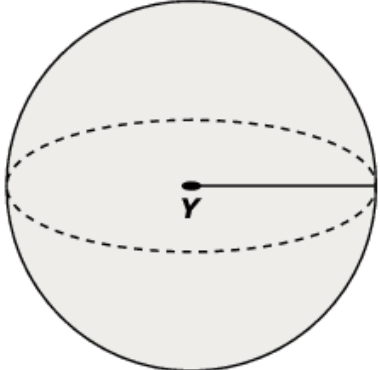
Delete

**Part A:**



Radius =  in

Volume =  $\frac{4}{3}\pi$   in<sup>3</sup>



Radius =  in

Volume =  $\frac{4}{3}\pi$   in<sup>3</sup>

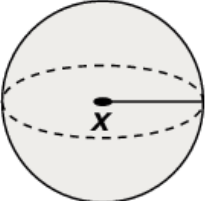
**Part B:**

True   
  False   
  Cannot be determined

**Exemplar:** (shown at right)  
Other correct examples are possible.

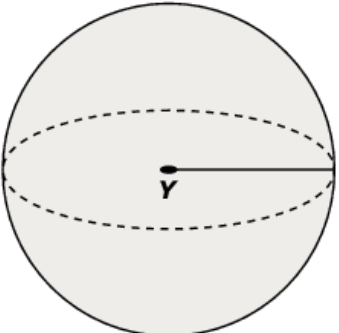
**Rubric:** (1 point) Student creates a correct example and determines that the claim is false.

**Part A:**



Radius =  in

Volume =  $\frac{4}{3}\pi$   in<sup>3</sup>



Radius =  in

Volume =  $\frac{4}{3}\pi$   in<sup>3</sup>

**Part B:**

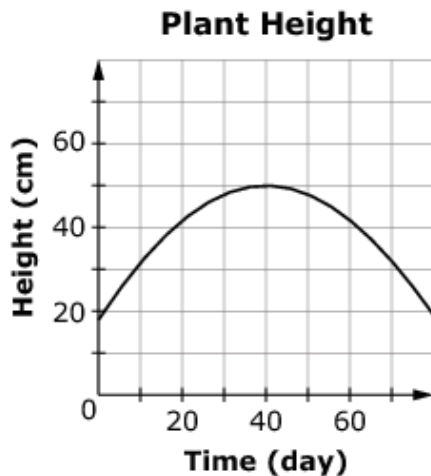
True   
  False   
  Cannot be determined

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#15	1	F-IF	L	2	HSF.IF.B.6	2	1 to 1.4

**1950**



The height of a plant, in centimeters, is modeled as a function of time, in days. Consider this graph of the function.



Enter the average rate of change for the height of the plant, measured in centimeters per day, between day 0 and day 20.

←
→
↶
↷
✕

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	i
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Key:** 1 to 1.4, inclusive

**Rubric:** (1 point) Student enters a rate of change for the height of the plant, within the stated range.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#16	3	A-REI	C	3	HSA.REI.A	7	D

**1998**

Which statement is correct about the values of  $x$  and  $y$  in the following equation?

$$7x + xy = xy + 21$$

- (A) The equation is true for all ordered pairs  $(x, y)$ .
- (B) There are no  $(x, y)$  pairs for which this equation is true.
- (C) For each value of  $x$ , there is one and only one value of  $y$  that makes the equation true.
- (D) For each value of  $y$ , there is one and only one value of  $x$  that makes the equation true.

**Key:** D

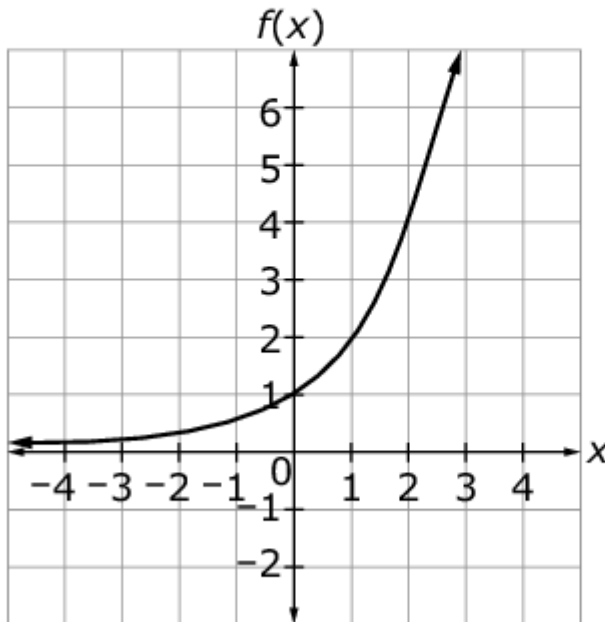
**Rubric:** (1 point) Student selects the correct statement.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#17	1	A-REI	J	2	HSA.REI.D.10	N/A	64

**1968**



The graph of an exponential function  $f$  passes through  $(0, 1)$  and  $(2, 4)$ , as shown.



What is the value of  $f(6)$ ?

← → ↶ ↷ ✖

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	$i$
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Key:** 64

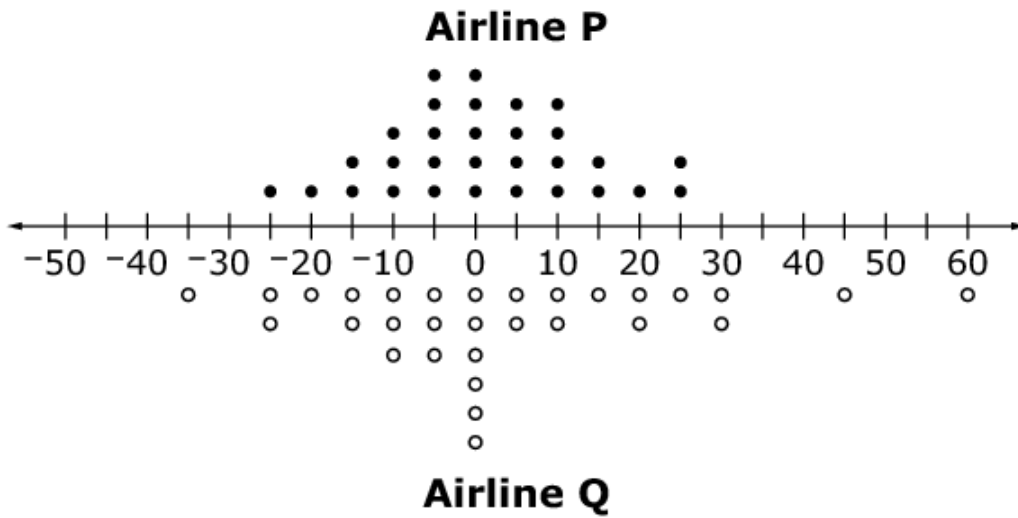
**Rubric:** (1 point) Student enters the correct value of  $f(6)$ .

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#18	4	S-ID	B	3	HSS.ID.A	2, 3	See exemplar

**2055**



The dot plots below compare the number of minutes 30 flights made by two airlines arrived before or after their scheduled arrival times.



- Negative numbers represent the minutes the flight arrived before its scheduled time.
- Positive numbers represent the minutes the flight arrived after its scheduled time.
- Zero indicates the flight arrived at its scheduled time.

Assuming you want to arrive as close to the scheduled time as possible, from which airline should you buy your ticket? Use the ideas of center and spread to justify your choice.

(Item #18 continued)

**Exemplar:**

I would buy the ticket from Airline P. Both airlines are likely to have an on-time arrival since they both have median values at 0. However, Airline Q has a much greater range in arrival times. Airline Q could arrive anywhere from 35 minutes early to 60 minutes late. For Airline P, the flights arrived within 10 minutes on either side of the scheduled arrival time about  $\frac{2}{3}$  of the time, and for Airline Q, that number was only about  $\frac{1}{2}$ . For these reasons, I think Airline P is the better choice.

**Rubric:**

(2 points) Student chooses Airline P and clearly explains that both airlines have the same center but that Airline P has a smaller spread.

(1 point) Student states that either airline could be chosen because they have the same median, but does not address the issue of spread; **OR** The student states that both airlines have the same median and chooses Airline P, but does not justify the choice based on spread; **OR** The student explains that Airline P would be the better choice based on the smaller spread, but does not identify that both airlines have the same median.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#19	3	N-RN	E	3	HSN.RN.B	3, 8	D

**2005**



Ashley claims that when you multiply two different **square roots** together, the product is always **rational**. For example,  $\sqrt{2} \cdot \sqrt{18} = \sqrt{36} = 6$  and  $\sqrt{3} \cdot \sqrt{27} = \sqrt{81} = 9$ .

She also claims that when you multiply two different **cube roots** together, the product is always **irrational**. For example,  $\sqrt[3]{2} \cdot \sqrt[3]{18} = \sqrt[3]{36} \approx 3.3019$  and  $\sqrt[3]{3} \cdot \sqrt[3]{27} = \sqrt[3]{81} \approx 4.3267$ .

Which statement correctly classifies Ashley's claims and provides appropriate reasoning?

- (A) Ashley is correct because her examples support both claims.
- (B) Ashley is correct about the product of square roots always being rational, but the product of cube roots can sometimes be rational.
- (C) Ashley is incorrect about the product of square roots always being rational, but she is correct that the product of cube roots is always irrational.
- (D) Ashley is incorrect because sometimes the product of square roots can be irrational and sometimes the product of cube roots can be rational.

**Key:** D

**Rubric:** (1 point) Student selects the correct statement.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#20	1	A-CED	G	2	HSA.CED.A.1	2	See exemplar

**1922**



Jim can paint a house in 12 hours. Alex can paint the same house in 8 hours.

Enter an equation that can be used to find the time in hours,  $t$ , it would take Jim and Alex to paint the house together.

← → ↶ ↷ ✖

1	2	3	$t$
4	5	6	+ - * ÷
7	8	9	< ≤ = ≥ >
0	.	-	$\frac{\square}{\square}$ $\square^\square$ $\square_\square$ $(\square)$ $\square$ $\sqrt{\square}$ $\sqrt[\square]{\square}$ $\pi$ $i$
sin cos tan arcsin arccos arctan			

**Exemplar:**  $2t + 3t = 24$  or  $\frac{1}{12} + \frac{1}{8} = \frac{1}{t}$  or  $\frac{t}{12} + \frac{t}{8} = 1$  or equivalent equation

**Rubric:** (1 point) Student enters a correct equation that can be used to find the time.

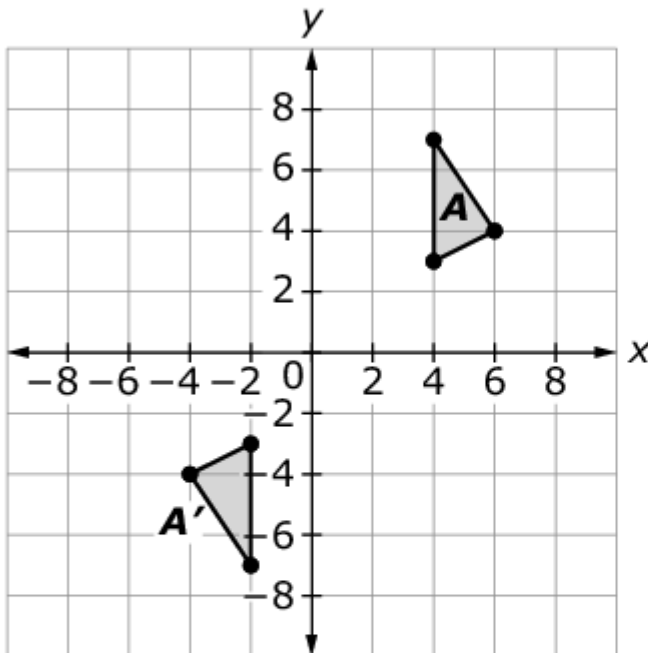


Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#21	3	G-CO	B	3	HSG.CO.A	2, 3	See exemplar

## 2065



José and Tina are studying geometric transformations.



José is able to move triangle  $A$  to triangle  $A'$  using the following sequence of basic transformations:

1. Reflection across the  $x$ -axis
2. Reflection across the  $y$ -axis
3. Translation two units to the right

Tina claims that the same three transformations, done in any order, will always produce the same result. Explain why Tina's claim is incorrect.

(Item #21 continued)

**Exemplar:** Tina is incorrect because some orders of basic transformations do not produce the same results. Suppose we move triangle  $A$  2 units to the right first. The point  $(4, 3)$  is then  $(6, 3)$ . Then, we take the reflection across the  $x$ -axis, which makes that point  $(6, -3)$ . A reflection of  $(6, -3)$  across the  $y$ -axis gives us  $(-6, -3)$ , which is not one of the vertices of triangle  $A'$ . Therefore, the basic transformations done in any order do not produce the same result.

**Rubric:** (1 point) Student correctly explains why Tina's claim is incorrect.

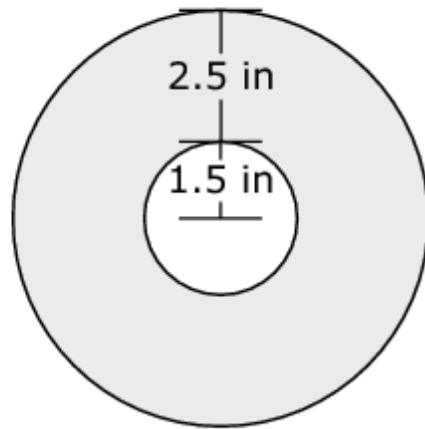
Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#22	4	G-MG	A	3	HSG.MG.A	2, 4	202-206

## 2032

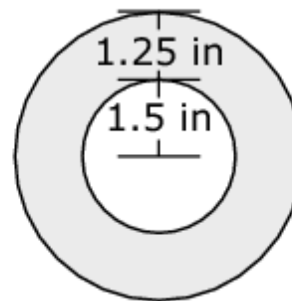


The diagram shows the end view of a roll of paper towels when it is full and the end view of the roll after some of the paper towels have been used.

**Full Roll of Paper Towels**



**Partial Roll of Paper Towels**



When the full roll of paper towels is unrolled, it has a length of 528 inches of paper towels of uniform width and thickness. Enter the length, in inches, of the paper towels remaining on the partial roll.

← → ↶ ↷ ✖

1	2	3
4	5	6
7	8	9
0	.	-

**Key:** 202 – 206, inclusive

**Rubric:** (1 point) Student enters a length within the given range.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#23	2	S-CP	A	2	HSS.CP.A	1, 2, 6	See exemplar



## 1927

At a local fair, the price of admission includes the opportunity for a person to spin a wheel for free ride tickets.

- Each spin of the wheel is a random event.
- The result from each spin of the wheel is independent of the results of previous spins.
- Each spin of the wheel awards tickets according to the probabilities shown below.

### Spin the Wheel

1 ticket	35%
2 tickets	25%
3 tickets	20%
5 tickets	15%
10 tickets	5%

Let  $X$  be the number of tickets a person wins based on 2 spins. There are 13 possible values for  $X$ .

Some values of  $X$  are more common than others. For example, winning only 2 tickets in 2 spins is a somewhat common occurrence with probability 0.1225. It means the person wins 1 ticket on the first spin and 1 ticket on the second spin ( $0.35 \cdot 0.35$ ). A list of the possible values of  $X$  and the corresponding probabilities for most values of  $X$  is shown below.

Fill in the three missing probability values in the table.

$X$	Probability
2	0.1225
3	0.1750
4	<input type="text"/>
5	0.1000
6	0.1450
7	0.0750
8	0.0600
10	<input type="text"/>
11	0.0350
12	0.0250
13	<input type="text"/>
15	0.0150
20	0.0025

(Item #23 continued)

**Exemplar:**

<b>X</b>	<b>Probability</b>
2	0.1225
3	0.1750
4	0.2025
5	0.1000
6	0.1450
7	0.0750
8	0.0600
10	0.0225
11	0.0350
12	0.0250
13	0.02
15	0.0150
20	0.0025

**Rubric:**

- (3 points) Student enters three correct probabilities.
- (2 points) Student enters two out of three correct probabilities.
- (1 point) Student enters one out of three correct probabilities.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#24	1	F-BF	N	2	HSF.BF.A.2	7	B

**1933**



Consider this function given in recursive form.

$$f(1) = -3$$

$$f(n) = 3f(n - 1); n \geq 2$$

Select the equivalent explicit function for  $n \geq 1$ .

- Ⓐ  $f(n) = -3(n)$
- Ⓑ  $f(n) = -1(3)^n$
- Ⓒ  $f(n) = -3(n - 1)$
- Ⓓ  $f(n) = -1(3)^{(n-1)}$

**Key:** B

**Rubric:** (1 point) Student selects the correct function.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#25	4	G	E	2	8.G.B.7	2, 4, 7	8

**2008**



Samantha invented a new outdoor game. The game requires attaching a rope between the tops of two poles of different heights. Read the instructions Samantha created. Use all the given information to determine the maximum allowable distance between the base of pole A and the base of pole B.

### Game Instructions

Materials needed: Pole A, Pole B, 10 feet of rope

#### Setup:

- Place pole A perpendicular to the ground so that its height is 3 feet.
- Place pole B perpendicular to the ground so that its height is 7 feet.
- The length of the rope must extend at least 6 inches past the top of each pole for proper assembly.
- Attach the rope to the top of the two poles.

Enter the **maximum** distance between the base of pole A and the base of pole B to the nearest whole foot.

←
→
↶
↷
✖

1	2	3
4	5	6
7	8	9
0	.	-

**Key:** 8

**Rubric:** (1 point) Student enters the maximum distance between the two poles, to the nearest whole foot.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#26	3	A-REI	D	2	HSA.REI.A	7	See exemplar

**1999**



Determine values of  $c$  and  $d$  for which the equation  $\sqrt{3x + 1} - \sqrt{cx + d} = 0$  has no solution.

Enter a value for  $c$  in the first response box.

Enter a value for  $d$  in the second response box.

← → ↶ ↷ ✖

1	2	3	+	-	*	÷					
4	5	6	<	≤	=	≥	>				
7	8	9	$\frac{\square}{\square}$	$\square^\square$	$\square_\square$	( )		$\sqrt{\square}$	$\sqrt[\square]{\square}$	$\pi$	$i$
0	.	-	sin	cos	tan	arcsin	arccos	arctan			

**Exemplar:** 3 in the first response box, -2 in the second response box  
Other correct solutions are possible.

**Rubric:** (1 point) Student enters two correct values in the appropriate response boxes.

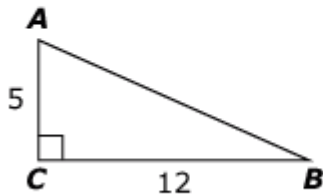


Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#27	1	G-SRT	0	1	HSG.SRT.C.8	N/A	See exemplar

**1936**



Consider this right triangle.



Determine if each expression is equivalent to the length of  $\overline{AC}$ . Select Yes or No for each expression.

	Yes	No
$13\sin(B)$	<input type="checkbox"/>	<input type="checkbox"/>
$13\cos(A)$	<input type="checkbox"/>	<input type="checkbox"/>
$12\tan(A)$	<input type="checkbox"/>	<input type="checkbox"/>
$12\tan(B)$	<input type="checkbox"/>	<input type="checkbox"/>

**Exemplar:** (shown at right)

**Rubric:** (1 point) Student correctly identifies each expression equal to the length of  $\overline{AC}$  (YYNY).

	Yes	No
$13\sin(B)$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$13\cos(A)$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$12\tan(A)$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
$12\tan(B)$	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#28	1	N-Q	C	1	HSN.Q.A.1	N/A	C

## 1956



Given the formula  $K = \frac{1}{2}mv^2$ , where

- $K$  represents kinetic energy,
- $m$  represents mass and has units of kilograms ( $kg$ ), and
- $v$  represents velocity and has units of meters per second ( $m/s$ ).

Select an appropriate measurement unit for kinetic energy.

- (A)  $\frac{kgm}{s^2}$
- (B)  $\frac{kgm^2}{s}$
- (C)  $\frac{kgm^2}{s^2}$
- (D)  $\frac{kg^2m^2}{s^2}$

**Key:** C

**Rubric:** (1 point) Student selects an appropriate measurement unit for kinetic energy.

Item	Claim	Domain	Target	DOK	CONTENT	MP	Key
#29	4	N-Q	C	3	HSN.Q.A.2	1, 2	See exemplar

**2006**



There is a traffic jam on a highway. From an aerial view, a reporter is trying to estimate the number of vehicles stuck in the traffic jam.

Select **all** information that will help the reporter make a reasonable estimate of the number of vehicles in the traffic jam.

- the cause of the traffic jam
- the average length of a vehicle
- the number of lanes on the highway
- the average distance between vehicles
- the average number of people in each vehicle
- the distance from the beginning to the end of the traffic jam

**Exemplar:** (shown at right)

- the cause of the traffic jam
- the average length of a vehicle
- the number of lanes on the highway
- the average distance between vehicles
- the average number of people in each vehicle
- the distance from the beginning to the end of the traffic jam

**Rubric:** (1 point) Student selects the correct options.