

2006

FCAT

Florida Comprehensive Assessment Test®

Student Name _____

MATHEMATICS

SUNSHINE STATE STANDARDS

TEST BOOK

Released: August 2006

Last used: Summer 2006

GRADE
10

MATHEMATICS



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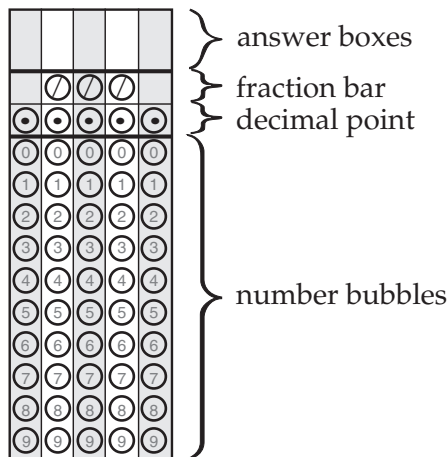
This symbol appears next to questions that require you to fill in your answer on a grid in your answer book. Answers may be gridded using several correct formats. You MUST fill in the bubbles accurately to receive credit for your answer.

Directions for Completing the Response Grid

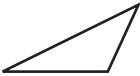




1. Work the problem and find an answer.
2. Write your answer in the answer boxes at the top of the grid.
 - Print your answer with the first digit in the left answer box, OR with the last digit in the right answer box.
 - Print only one digit or symbol in each answer box. Do NOT leave a blank answer box in the middle of an answer.
 - Be sure to write a decimal point or fraction bar in the answer box if it is part of the answer.
3. Fill in a bubble under each box in which you wrote your answer.
 - Fill in one and ONLY one bubble for each answer box. Do NOT fill in a bubble under an unused answer box.
 - Fill in each bubble by making a solid black mark that completely fills the circle.
 - You MUST fill in the bubbles accurately to receive credit for your answer.

Parts of a Response Grid

Response grids have these parts:








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
 $C = \pi d$ or $C = 2\pi r$

		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	$V = \pi r^2 h$	$S.A. = 2\pi r h + 2\pi r^2$
	Rectangular Prism	$V = lwh$	$S.A. = 2(lw) + 2(hw) + 2(lh)$

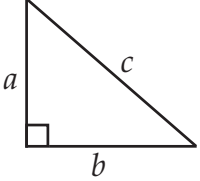
In the following formulas, n represents the number of sides.

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

Fold and Tear Carefully Along Dotted Line.
This FCAT Mathematics Reference Sheet is for use only on the SSS FCAT Mathematics Test.

Grades 9–10 FCAT Mathematics Reference Sheet

Fold and Tear Carefully Along Dotted Line.
This FCAT Mathematics Reference Sheet is for use only on the SSS FCAT Mathematics Test.

<p>Pythagorean theorem:</p>  $a^2 + b^2 = c^2$	<p>Distance between two points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$:</p> $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
<p>Slope-intercept form of an equation of a line:</p> $y = mx + b$ <p>where m = slope and b = the y-intercept.</p>	<p>Midpoint between two points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$:</p> $\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$
<p>Distance, rate, time formula:</p> $d = rt$ <p>where d = distance, r = rate, t = time.</p>	<p>Simple interest formula:</p> $I = prt$ <p>where p = principal, r = rate, t = time.</p>

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

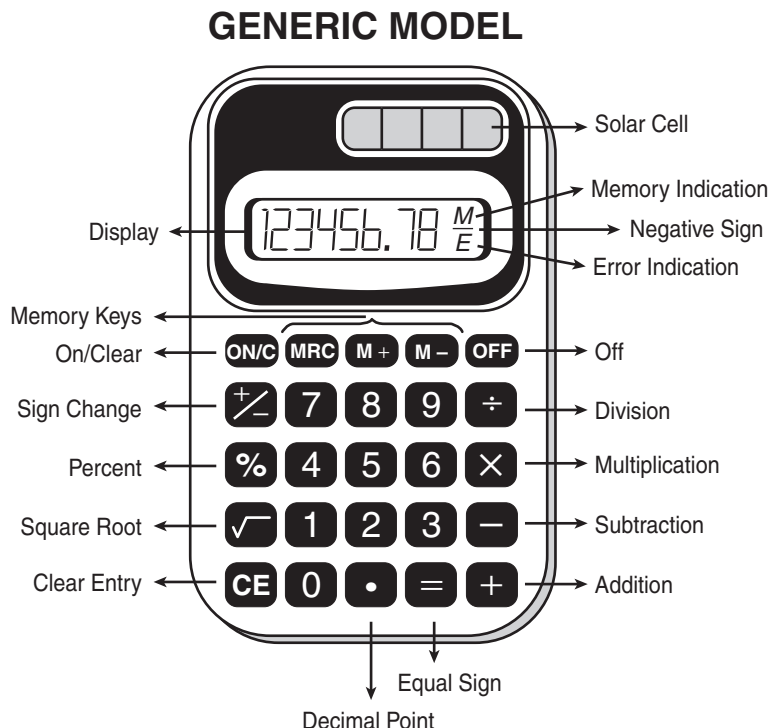
1 cup = 8 fluid ounces
 1 pint = 2 cups
 1 quart = 2 pints
 1 gallon = 4 quarts

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 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).

This is a picture of a generic calculator and its parts.



HELPFUL HINTS FOR TAKING THE FCAT MATHEMATICS SSS TEST

1. Read the problem very carefully. Then decide whether or not you need the calculator to help you solve the problem.
2. When starting a new problem, always clear your calculator by pressing the clear key.
3. If you see an **E** in the display, clear the error before you begin.
4. If you see an **M** in the display, clear the memory and the calculator before you begin.
5. If the number in the display is not one of the answer choices, check your work. Remember that when computing with certain types of fractions, you may have to round the number in the display.
6. Remember, your calculator will **NOT** automatically perform the algebraic order of operations.
7. Calculators might display an incorrect answer if you press the keys too quickly. When working with calculators, use careful and deliberate keystrokes, and always remember to check your answer to make sure that it is reasonable.
8. The negative sign may appear either to the left or to the right of the number.
9. Always check your answer to make sure that you have completed all of the necessary steps.

Use the space in the Test Book to do your work. If you change your answer, be sure to erase completely.

The correct answer for each multiple-choice question is circled. To the left of each answer choice is the percentage of students who chose that answer.

- 1 Tonja and Edward are participating in a jog-a-thon to raise money for charity. Tonja will raise \$20, plus \$2 for each lap she jogs. Edward will raise \$30, plus \$1.50 for each lap he jogs. The total amount of money each will raise can be calculated using the following expressions where n represents the number of laps run:

$$\text{Tonja: } 20 + 2n$$

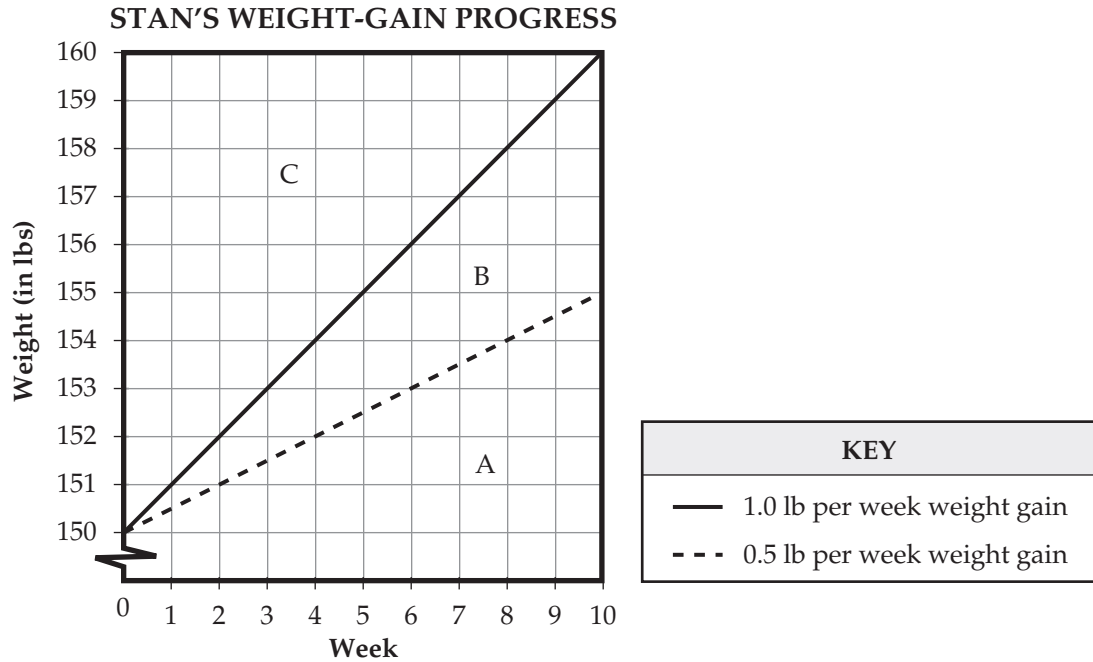
$$\text{Edward: } 30 + 1.50n$$

After how many laps will Tonja and Edward have raised the same amount of money?

- 3% A. 3
 8% B. 6.5
 10% C. 14.5
 79% **D. 20**

Benchmark	Content Focus	Content Difficulty
MA.D.2.4.2	equations	Moderate

- 2 Stan weighs 150 pounds (lbs) and would like to gain between 0.5 and 1.0 pound (lb) per week over the next 10 weeks. He plans to record his progress on the graph below. On the graph, the dotted line represents a weight-gain rate of exactly 0.5 pound per week, and the solid line represents a weight-gain rate of exactly 1.0 pound per week.

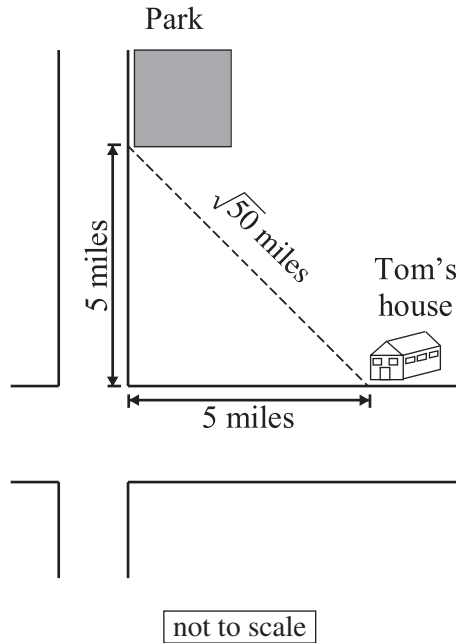


If Stan gains between 0.5 and 1.0 pound per week, which region on the graph will contain all possible points that could represent Stan's weight-gain progress?

- 4% F. region A
- 60% **G.** region B
- 10% H. region C
- 25% I. regions A and B combined

Benchmark	Content Focus	Content Difficulty
MA.D.2.4.2	graphing systems of equations/inequalities	Low

- 3 Tom used the Pythagorean theorem to calculate the direct distance from his house to the park. He found the distance to be $\sqrt{50}$ miles.

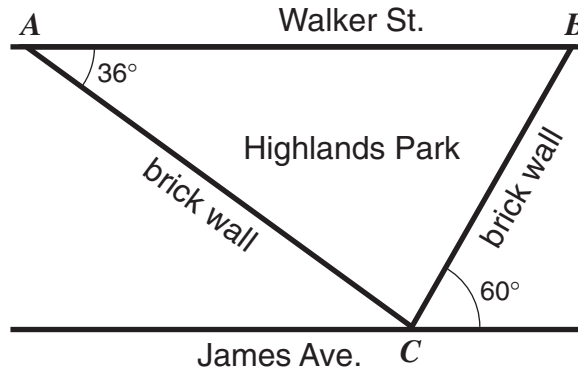


Which of the following is equivalent to $\sqrt{50}$?

- 67% **A.** $5\sqrt{2}$
- 6% **B.** 10
- 8% **C.** 25
- 19% **D.** $25\sqrt{2}$

Benchmark	Content Focus	Content Difficulty
MA.A.1.4.4	equivalent forms of numbers	Low


- 4 Highlands Park is located between two parallel streets: Walker Street and James Avenue. The park faces Walker Street and is bordered by two brick walls that intersect James Avenue at point C , as shown below.



What is the measure of $\angle ACB$, the angle formed by the park's two brick walls?

- 18% F. 96°
- 59% **G.** 84°
- 18% H. 60°
- 5% I. 36°

Benchmark	Content Focus	Content Difficulty
MA.C.2.4.1	supplementary angles	Moderate

- 5**  In 1995, there was a total of 7.2 million acres of pine forests in Florida. All of the forests were either natural or planted by people. Given that 4.4 million acres of these pine forests were planted by people, how many millions of acres of these pine forests were natural?

Example of a Correct Gridded Response:

		2	.	8
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	•	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	•	8
9	9	9	9	9

Acceptable Gridded Response(s)
2.8

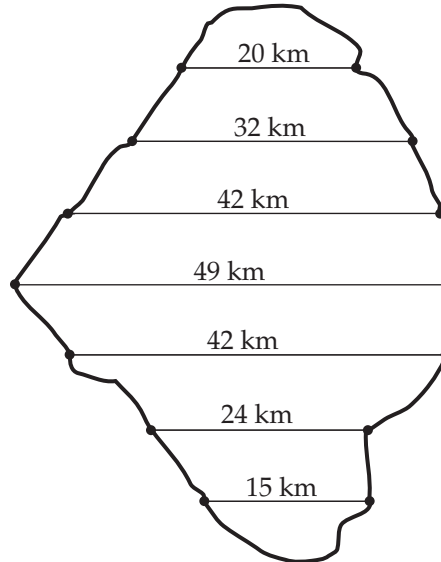
Benchmark	Content Focus	Content Difficulty
MA.A.3.4.3	solving real-world problems	Low

Percentage of Students Answering Correctly
89

- 6 To determine the mean width of Lake Okeechobee, 7 line segments were drawn at even intervals across the map below.



LAKE OKEECHOBEE



Using the lengths of these 7 line segments, what is the mean width, in kilometers, of Lake Okeechobee?

Example of a Correct Gridded Response:

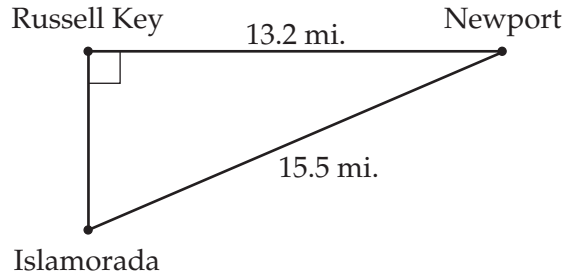
			3	2
	/	/	/	
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	•
3	3	3	•	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
32

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.2	mean	Low

Percentage of Students Answering Correctly
59

- 7** Abdul plans schedules for several biologists who are researching the manatee. One biologist must travel from Newport to Russell Key. Later the biologist has a meeting in Islamorada. Abdul must use the map below to find the distance from Russell Key to Islamorada to determine how much time the biologist can spend on Russell Key.



What is the distance in miles (mi.) from Russell Key to Islamorada?

Example of a Correct Gridded Response:

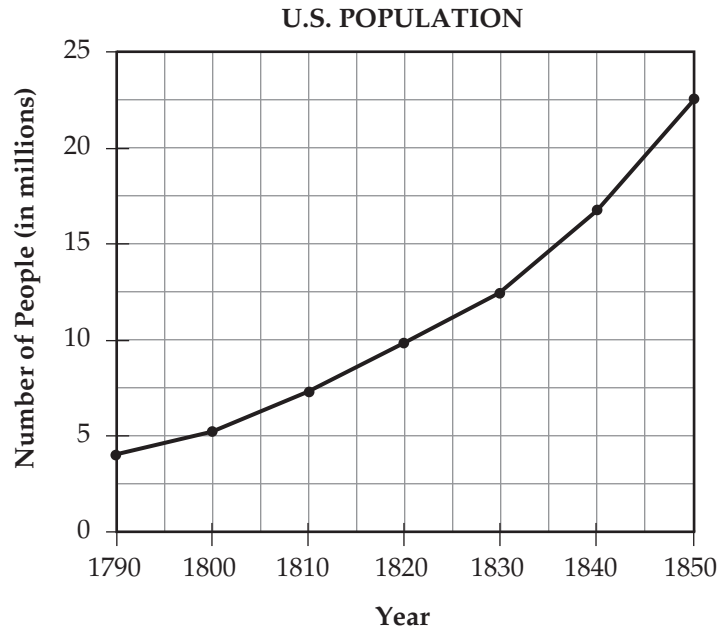
			8	.	1
	7	7	7		
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Acceptable Gridded Response(s)
8.1-8.13

Benchmark	Content Focus	Content Difficulty
MA.C.3.4.1	Pythagorean theorem	Low

Percentage of Students Answering Correctly
41

- 8 In 1790, the United States had a population of approximately 4,000,000 people, as shown on the graph below.

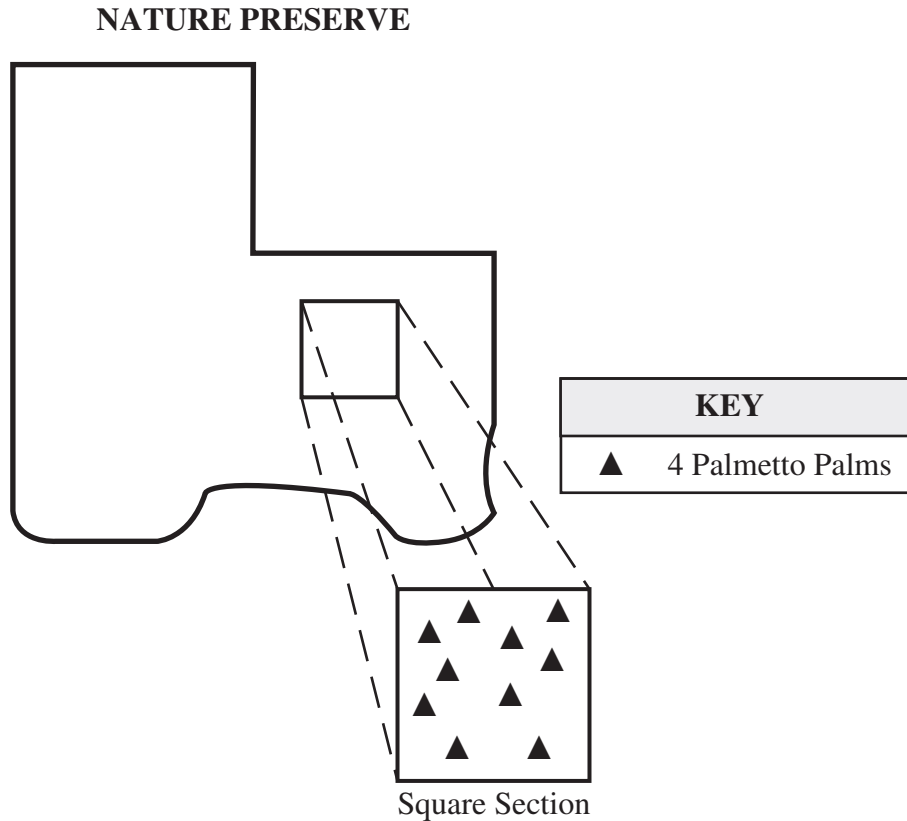


According to the graph, in what year had the population grown to approximately twice that number?

- 3% A. 1797
- 12% B. 1808
- 70% **C. 1813**
- 15% D. 1822

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.1	line graphs	Moderate

- 9 An environmental group needed to determine the number of palmetto palms in a nature preserve. The group used a map of the preserve and counted the number of palmetto palms within a square section.

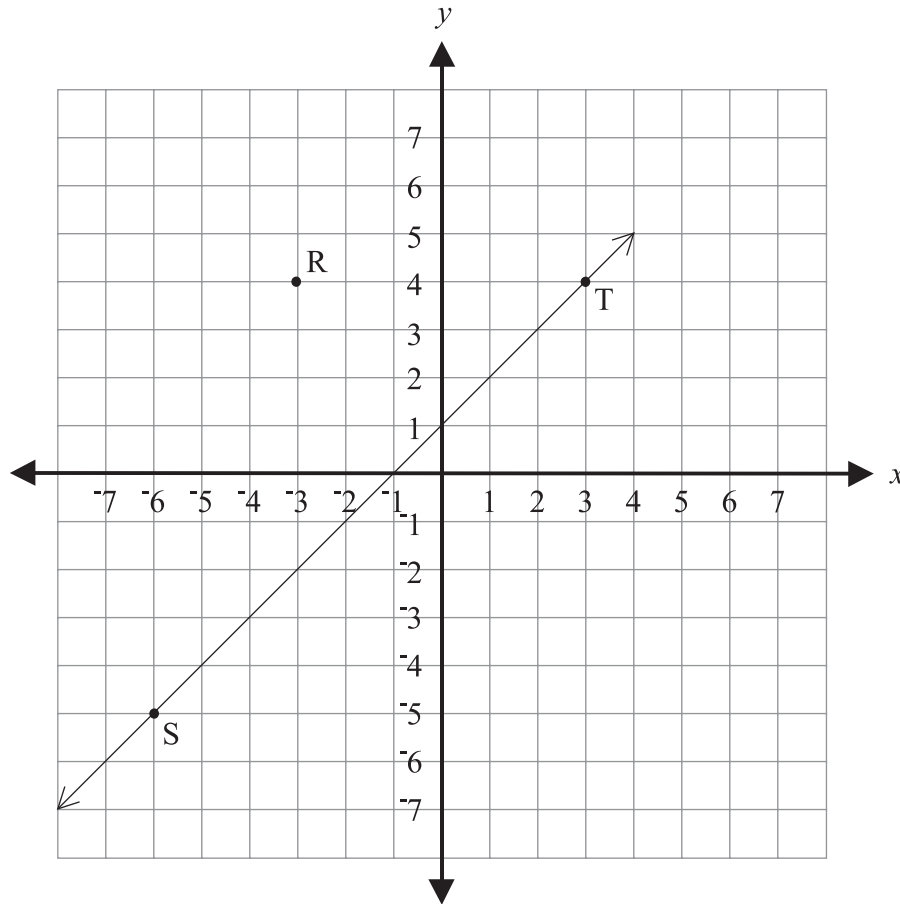


Assuming that the number of palmetto palms within the square section is representative of the entire nature preserve, which is closest to the number of palmetto palms within the entire nature preserve?

- 27% F. 40
- 9% G. 150
- 46% **H.** 650
- 18% I. 1000

Benchmark	Content Focus	Content Difficulty
MA.A.4.4.1	number estimate	High

- 10 Robert is making a landscape drawing for his backyard on the coordinate grid below. He is drawing a path. One side of the path represented by \overleftrightarrow{ST} is already drawn. He wants to draw the other side of the path through point R and point Q so that \overleftrightarrow{QR} will be parallel to \overleftrightarrow{ST} .



Which of the following coordinates for point Q would make \overleftrightarrow{QR} parallel to \overleftrightarrow{ST} ?

- 18% A. (-6, 2)
- 67% **B. (-7, 0)**
- 7% C. (6, 2)
- 7% D. (7, 0)

Benchmark	Content Focus	Content Difficulty
MA.C.3.4.2	parallelism	Moderate

- 11** An artist sells earrings from a booth at a fair. Rent for the booth is \$250. The artist makes \$6 from each pair of earrings sold. The profit in dollars, P , can be found using the following equation, where n is the number of pairs of earrings sold.

$$P = 6n - 250$$

How many pairs of earrings must the artist sell to earn a profit of \$500?

Example of a Correct Gridded Response:

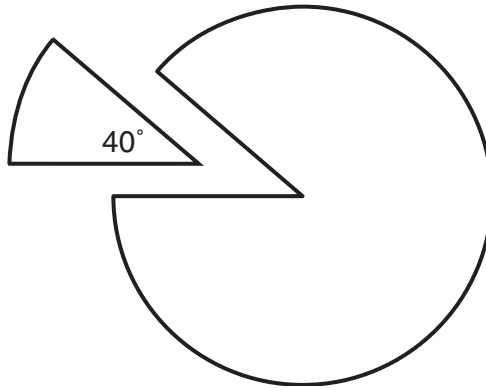
			1	2	5
	/	/	/		
•	•	•	•	•	•
0	0	0	0	0	0
1	1	•	1	1	
2	2	2	•	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	•	
6	6	6	6	6	
7	7	7	7	7	
8	8	8	8	8	
9	9	9	9	9	

Acceptable Gridded Response(s)
125

Benchmark	Content Focus	Content Difficulty
MA.D.2.4.2	equations	Moderate

Percentage of Students Answering Correctly
72

- 12 A jeweler made earrings by cutting wedges from silver disks. Each wedge cut from a disk made a 40° angle at the center of the disk.



If the weight of each uncut disk was 2.7 grams, how many grams did each wedge weigh?

Example of a Correct Gridded Response:

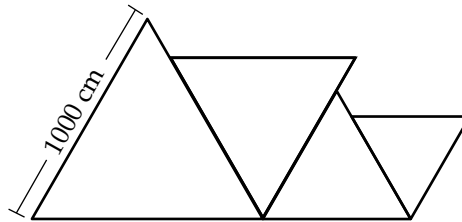
	0	.	2	7
	/	/	/	
•	•	•	•	•
0	•	0	0	0
1	1	1	1	1
2	2	2	•	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	•
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
0.27-0.3

Benchmark	Content Focus	Content Difficulty
MA.C.1.4.1	properties of circles	Moderate

Percentage of Students Answering Correctly
34

- 13** Byron is painting a mural showing a series of equilateral triangles. The first triangle will have sides 1000 centimeters (cm) long. The sides of each subsequent triangle will be 20% smaller than the triangle before. Byron's sketch of the mural is shown below.



What will be the length, in centimeters, of one side of the fourth triangle?

Example of a Correct Gridded Response:

		5	1	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
512

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	graphic pattern	Moderate

Percentage of Students Answering Correctly
36

- 14 Julio’s music appreciation class is studying examples of classical music used in films. Each student is randomly assigned to report on 2 of the selections listed in the table.



CLASSICAL MUSIC IN FILMS

Film Title	Composer	Selection
<i>A Clockwork Orange</i>	Beethoven	Symphony No. 9 “Choral”
<i>A Room with a View</i>	Puccini	Gianni Schicchi
<i>Amadeus</i>	Mozart	Piano Concerto No. 20
<i>Apocalypse Now</i>	Wagner	Ride of the Valkyries
<i>Au Revoir les Enfants</i>	Schubert	Moment Musical No. 2

From the music selections above, how many combinations of 2 are possible?

Example of a Correct Gridded Response:

			1	0
	/	/	/	
•	•	•	•	•
0	0	0	0	•
1	1	1	•	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
10

Benchmark	Content Focus	Content Difficulty
MA.E.2.4.1	combinations	Low

Percentage of Students Answering Correctly
47

15 In music a certain “A note” has a frequency of 440 hertz (vibrations per second). This is called the first harmonic. The second harmonic of that “A note” is 880 hertz, and the third harmonic is 1,320 hertz. According to this pattern, what is the frequency of the fifth harmonic?

- 3% F. 880 hertz
- 22% G. 1,760 hertz
- 64% **H.** 2,200 hertz
- 10% I. 2,640 hertz

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	numerical pattern	Moderate

- 16** In a survey, people were asked to choose a favorite art activity. The information in the table below shows some of the results of the survey.

FAVORITE ART ACTIVITIES OF SOME PEOPLE
(in millions)

Age	Pottery	Needle-work	Photography	Painting	Creative Writing
18–24	2.2	4.3	2.7	4.6	3.4
25–34	4.2	10.2	6.2	4.2	3.0
35–44	4.0	10.0	5.2	4.0	3.2
45–54	2.5	7.2	3.6	2.2	1.9
Total	12.9	31.7	17.7	15.0	11.5

According to the information in the table, which of the following statements is true?

- 23% A. More people aged 25 to 34 chose needlework than the total number of people who chose creative writing.
- 16% B. Two times as many people aged 45 to 54 chose photography as chose needlework.
- 40% **C.** Less than sixteen percent of the people represented in the table chose pottery.
- 20% D. Fifteen percent of the people represented in the table chose painting.

Benchmark	Content Focus	Content Difficulty
MA.E.3.4.1	interpretation of data	High

- 17** The number of shoppers at a Fort Myers flea market ranges from an average of 55,000 per weekend during the tourist season to an average of 18,000 on a summer weekend.

What is the percent of decrease, to the nearest whole number, in the number of shoppers at the flea market from the tourist season to a summer weekend?

- 8% **F.** 18%
- 53% **G.** 33%
- 9% **H.** 55%
- 30% **I.** 67%

Benchmark	Content Focus	Content Difficulty
MA.A.3.4.3	percent of increase/decrease	Moderate

- 19** Brian works for a caterer who prepares and serves barbecued beef. The amount of beef is prepared according to the following table.



BARBECUED BEEF PLANNING CHART

Number of Guests	Pounds of Beef
10	8
20	16
30	24
40	32

Based on the pattern in the table, how many pounds of beef should be prepared for 225 guests?

Example of a Correct Gridded Response:

		1	8	0
	⊘	⊘	⊘	
⊙	⊙	⊙	⊙	⊙
0	0	0	0	●
1	1	●	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	●	8
9	9	9	9	9

Acceptable Gridded Response(s)
180

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	numerical pattern	Moderate

Percentage of Students Answering Correctly
50

- 20** The manager of a computer help center made a table to track customer calls. The table below shows the number of telephone calls and the duration of the calls in minutes, t .



DURATION OF CUSTOMER CALLS

Call Duration (t minutes)	Number of Calls
$t < 4$	120
$4 \leq t < 8$	225
$8 \leq t < 12$	210
$12 \leq t < 16$	150
$16 \leq t < 20$	30
$20 \leq t < 24$	15

What **percent** of the telephone calls received during this one-day period lasted less than 16 minutes?


Example of a Correct Gridded Response:

			9	4
	/	/	/	
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	●
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	●	9

Acceptable Gridded Response(s)
94

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.1	interpretation of chart/graph	Moderate

Percentage of Students Answering Correctly
23

- 21**  A toy company manufactured 12,000 model racecars. Alisha, who works in the quality control group, chose 250 of the model racecars at random and had them checked for defects. Of the 250 racecars, 212 were found to have NO defects. Assuming this ratio held true for all 12,000 model racecars, how many of the racecars had defects?

Example of a Correct Gridded Response:

	1	8	2	4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	0	0	0	0
1	<input checked="" type="checkbox"/>	1	1	1
2	2	2	<input checked="" type="checkbox"/>	2
3	3	3	3	3
4	4	4	4	<input checked="" type="checkbox"/>
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	<input checked="" type="checkbox"/>	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
1824

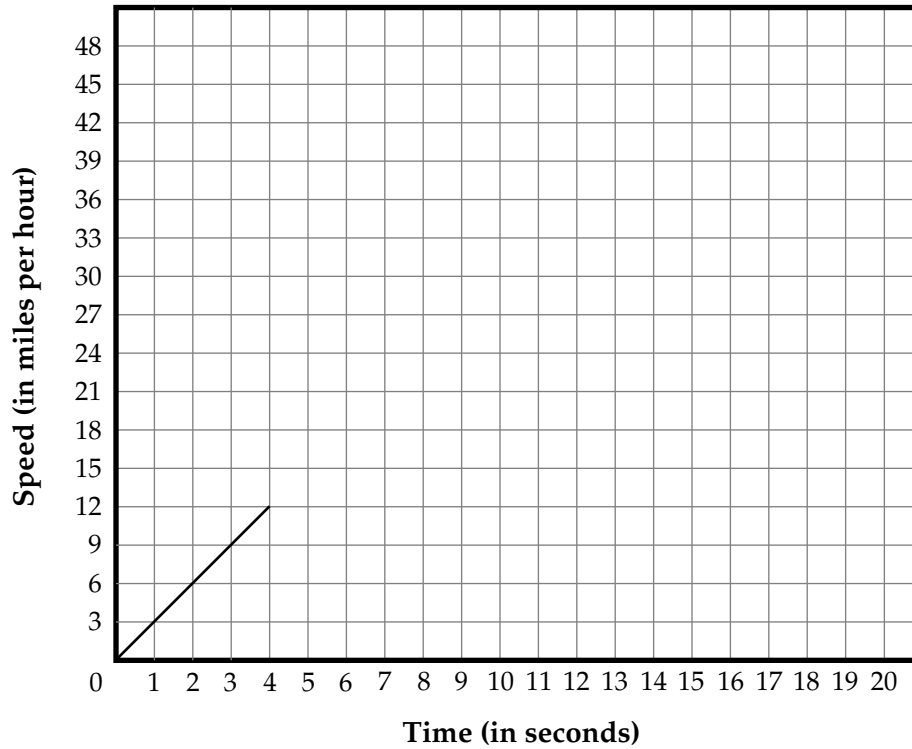
Benchmark	Content Focus	Content Difficulty
MA.A.3.4.3	solving real-world problems	Moderate

Percentage of Students Answering Correctly
48

- 22** An automobile testing organization is verifying the acceleration characteristics of a car. The car will accelerate at a rate of 3 miles per hour per second from 0 miles per hour (mph) to 45 mph. The graph below shows the beginning of the ideal acceleration plot.



CAR ACCELERATION



If the rate of acceleration remains constant, how many seconds will it take the car to reach its final test speed?

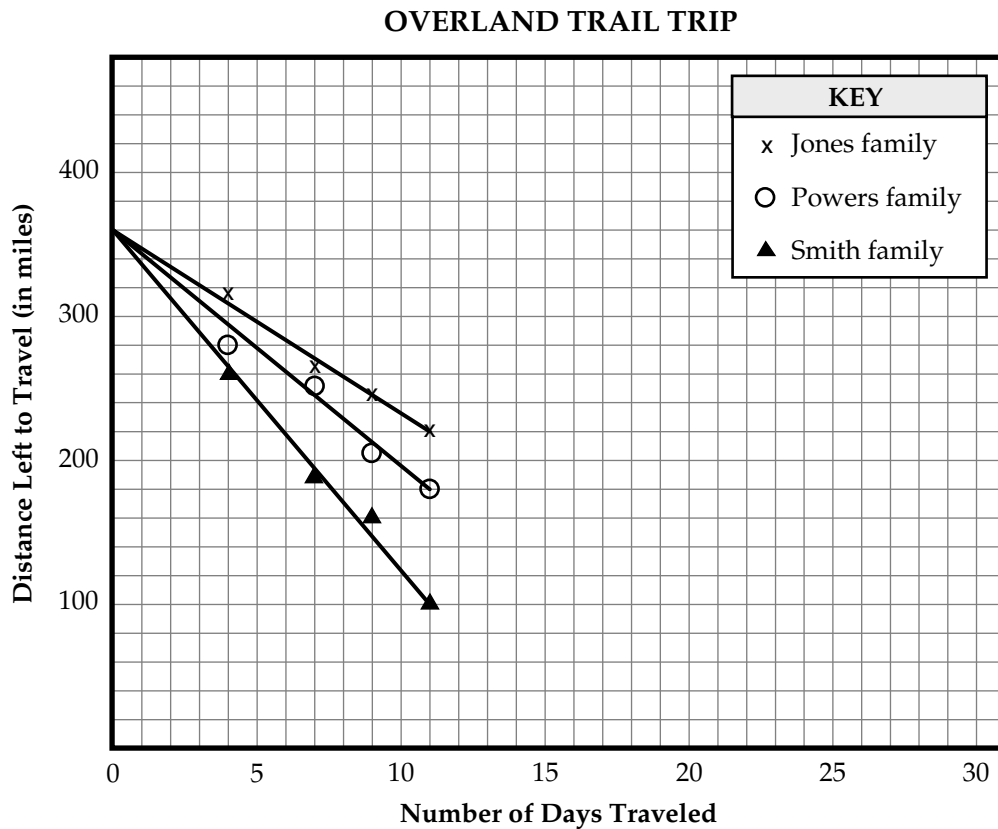
Example of a Correct Gridded Response:

			1	5
/	/	/		
•	•	•	•	•
0	0	0	0	0
1	1	1	•	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	•
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
15

Benchmark	Content Focus	Content Difficulty
MA.C.3.4.2	slope	Moderate
Percentage of Students Answering Correctly		
58		

- 23 Three families are traveling west on the Overland Trail. They are taking the same path the pioneer families did in the 1850s. The families started together 360 miles from their final destination. The graph below shows the line of best fit for the distance each family has left to travel at the end of the first 11 days.



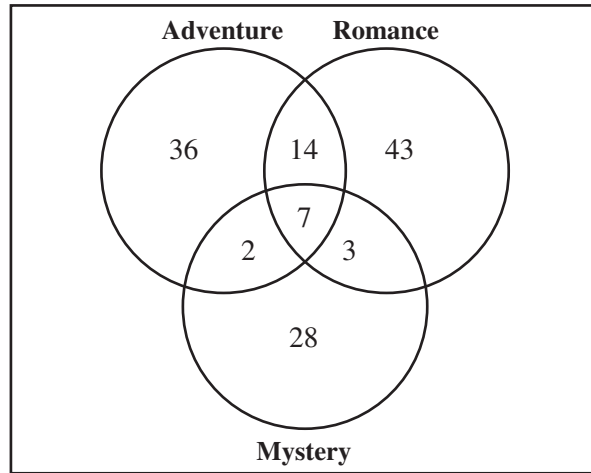
If each family continues to travel at the same rate, approximately what total number of miles will the Jones family have left to travel at the end of the fifteenth day?

- 12% A. 115 miles
- 18% B. 140 miles
- 18% C. 150 miles
- 52% **D. 170 miles**

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.2	rate	Moderate

- 24 The Venn diagram below shows the types of novels the literature club members read during their summer break.

LITERATURE CLUB SUMMER READING



Which of the following is NOT supported by the information in the Venn diagram?

- 14% F. 21 members read both an adventure novel and a romance novel
- 22% G. 64 members read only an adventure novel or a mystery novel
- 48% **H.** 26 members read all three types of novels
- 14% I. 67 members read a romance novel

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.1	Venn diagrams	High

- 25 Mrs. Hana gave a 50-point quiz to her first period geography class. The scores for the class are shown in the stem-and-leaf plot shown below.

Stem	Leaf
1	9
2	7 9
3	5 5 5 6 9
4	7 7 8 9
5	0

KEY
4 7 = 47

What was the **median** score for the class?

- 6% **A.** 6
- 20% **B.** 35
- 61% **C.** 36
- 12% **D.** 38

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.2	median	Low

- 26** Matt’s mathematics class is playing “Guess My Rule.” The teacher writes this table of values on the chalkboard, and the class finds an equation that fits the values in the table. Which of these equations describes the relationship between the values in the table?

Table of Values

x	y
-3	-11
0	-2
2	4
5	13

- 7% **F.** $y = 2x - 2$
 11% **G.** $y = -2x - 2$
 15% **H.** $y = -3x - 2$
 68% **I.** $y = 3x - 2$

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	generalizing relationships	Moderate

- 27 Alyssa determined that the approximate error in the area of the square she was measuring was given by the expression $2|-0.1|$.



What is the decimal form of $2|-0.1|$?

Example of a Correct Gridded Response:

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

Acceptable Gridded Response(s)
0.2

Benchmark	Content Focus	Content Difficulty
MA.A.1.4.4	equivalent forms of numbers	Low

Percentage of Students Answering Correctly
72

- 28** The volume of a cube with an edge length of u units is u^3 cubic units. If the length of each edge is doubled, how many times larger is the volume of the new cube than the volume of the original cube?



Example of a Correct Gridded Response:

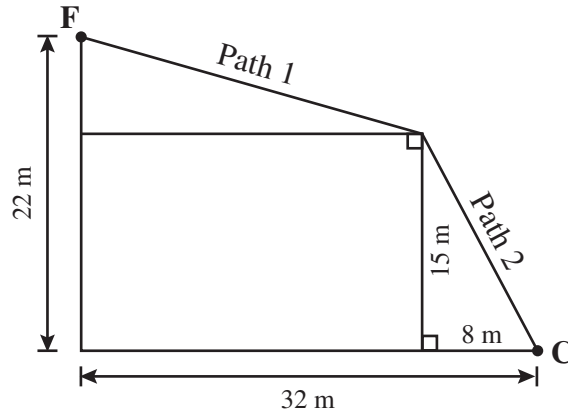
				8
⊗	⊗	⊗	⊗	
●	●	●	●	●
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	●
9	9	9	9	9

Acceptable Gridded Response(s)
8

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.2	changing measurement parameters	Moderate

Percentage of Students Answering Correctly
21

- 29 Fernando followed two diagonal paths, Paths 1 and 2, to get from his house, F , to a neighborhood corner store, C , as shown below.



What is the total distance of the two paths, in meters (m), from F to C ?

Example of a Correct Gridded Response:

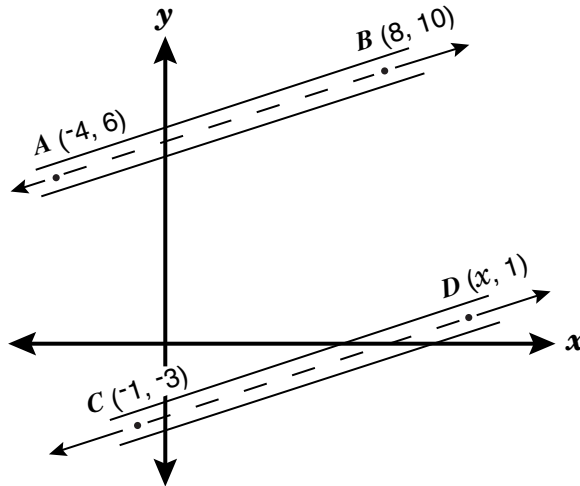
			4	2
/	/	/		
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
42

Benchmark	Content Focus	Content Difficulty
MA.C.2.4.1	Pythagorean theorem	Moderate

Percentage of Students Answering Correctly
38

- 30 An airport designer drew a plan for two runways on a rectangular coordinate system. Line AB represents the centerline of the first runway and line CD represents the centerline of the second runway.



If the designer chose a y -coordinate of 1 for point D , what must be the x -coordinate for the two runways to be parallel?

Example of a Correct Gridded Response:

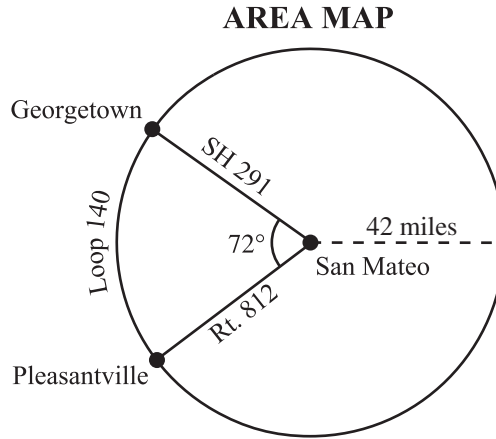
			1	1
	/	/	/	
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
11

Benchmark	Content Focus	Content Difficulty
MA.C.3.4.2	parallelism	Moderate

Percentage of Students Answering Correctly
26

- 31 Sandra wants to use the map shown below to determine the driving distance from her home in Georgetown to her workplace in Pleasantville using Loop 140.



She has the following information to make her calculations.

- Loop 140 is circular with a radius of 42 miles and the center at San Mateo.
- SH 291 and Rt. 812 intersect at San Mateo.

According to the map, how many miles must Sandra drive going counterclockwise from Georgetown to Pleasantville on Loop 140?

Example of a Correct Gridded Response:

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

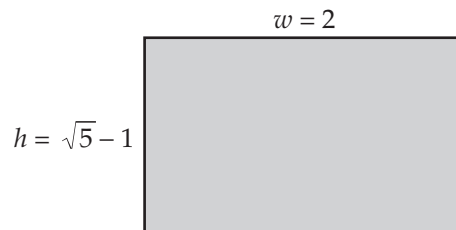
Acceptable Gridded Response(s)
52.7-53

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.2	arc lengths	Moderate

Percentage of Students Answering Correctly
14

- 32 The “Golden Rectangle” of the ancient Greeks was considered to have the most pleasing proportion of any rectangle. The ratio of width (w) to height (h) of the rectangle is expressed in the following proportion and is shown in the drawing below.

$$\frac{w}{h} = \frac{2}{\sqrt{5} - 1}$$

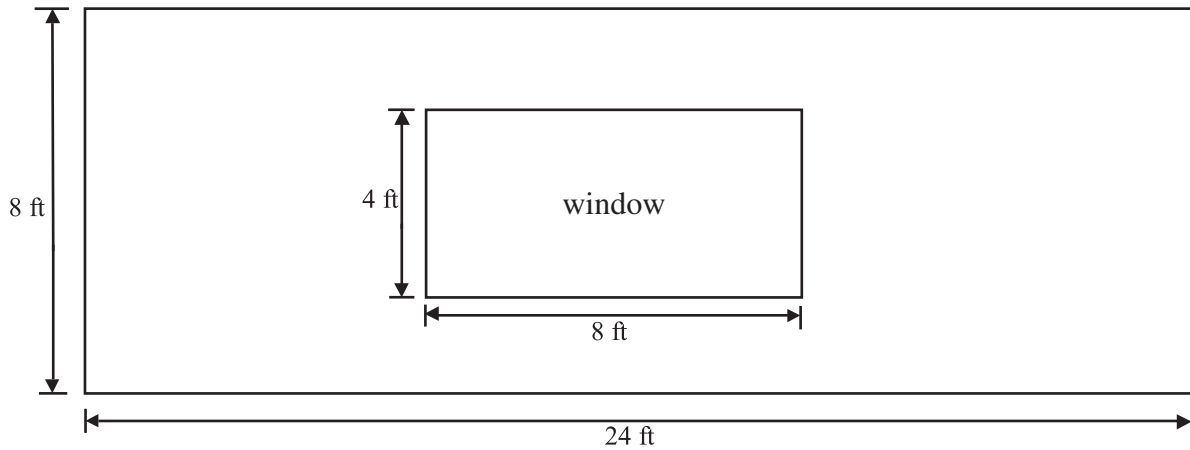


Jason is planning to paint a rectangular mural using the proportions of the “Golden Rectangle.” If the mural is 15 meters wide, how high should it be?

- 11% A. 1.6 meters
- 57% **B.** 9.3 meters
- 22% C. 16.5 meters
- 8% D. 24.2 meters

Benchmark	Content Focus	Content Difficulty
MA.C.3.4.1	similarity	Moderate

- 33** Mrs. Bickhart decided to apply wallpaper on one wall of her living room. A diagram of the rectangular wall with its window is shown below.

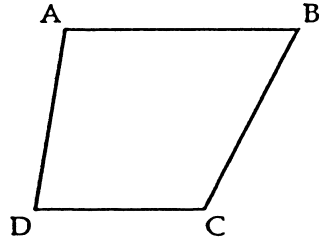


A roll of wallpaper covers approximately 30 square feet. What is the minimum number of rolls she will have to buy in order to cover the entire wall excluding the window?

- 16% F. 2 rolls
- 19% G. 5 rolls
- 57% **H.** 6 rolls
- 9% I. 7 rolls

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.1	area	Moderate

- 34 In the figure below, \overline{AB} is parallel to \overline{DC} .

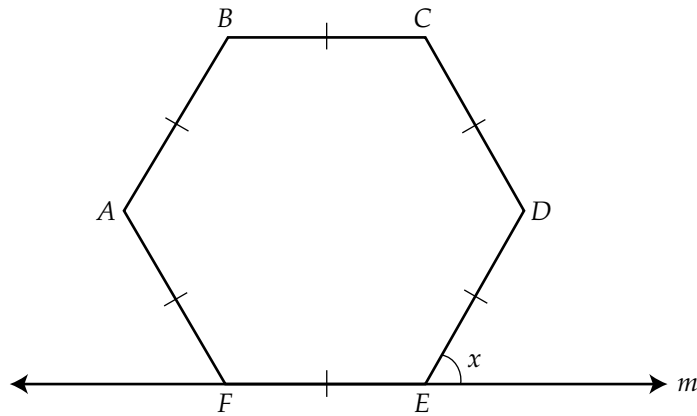


Which of the following statements about the figure **must** be true?

- 18% A. $\angle DAB + \angle ABC = 180^\circ$
- 35% **B.** $\angle DAB + \angle CDA = 180^\circ$
- 34% C. $\overline{AB} \cong \overline{DC}$
- 13% D. $\overline{AD} \cong \overline{BC}$

Benchmark	Content Focus	Content Difficulty
MA.C.2.4.1	properties of polygons	Moderate

- 35 Figure $ABCDEF$ below is a regular hexagon with line m passing through side FE .



What is the measure of $\angle x$?

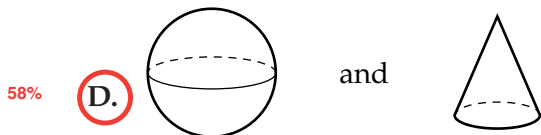
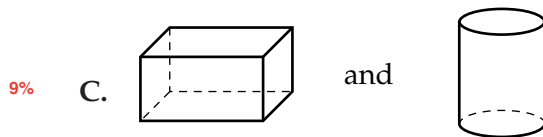
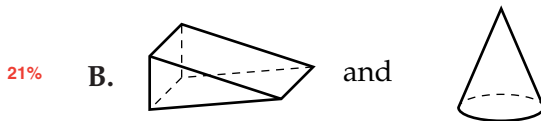
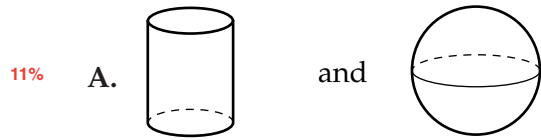
- 18% F. 75°
- 57% **G.** 60°
- 6% H. 51°
- 19% I. 45°

Benchmark	Content Focus	Content Difficulty
MA.C.1.4.1	interior angles of a polygon	Moderate

- 36 When a plane intersects a solid three-dimensional figure, the plane of intersection is called a cross section. Two cross sections are shown below.



The cross sections above could NOT have come from which of these pairs of solid figures?



Benchmark	Content Focus	Content Difficulty
MA.C.2.4.2	identify planar cross sections	Low

- 38 The chart below shows the density of some common substances. *Density* is the mass of a substance per unit of volume.



DENSITY OF COMMON SUBSTANCES

Substance	Density (in grams per cubic centimeter)
Water	1.0
Sugar	1.6
Table salt	2.2
Quartz	2.6
Aluminum	2.7

What is the density of table salt, in **milligrams** per cubic centimeter?

Example of a Correct Gridded Response:

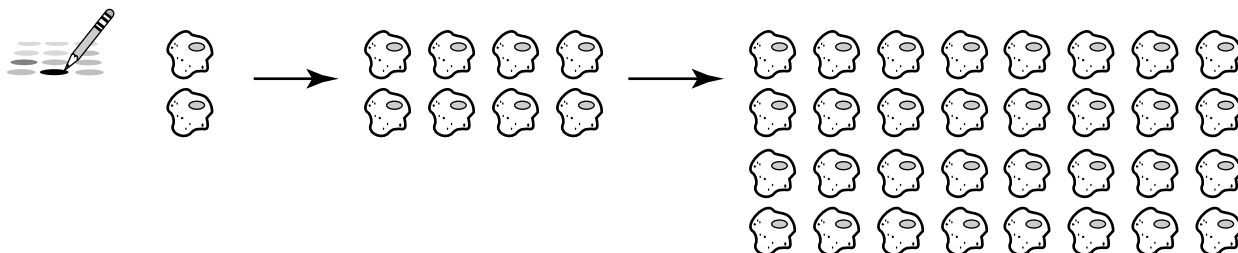
	2	2	0	0
	/	/	/	
•	•	•	•	•
0	0	0	•	•
1	1	1	1	1
2	•	•	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
2200

Benchmark	Content Focus	Content Difficulty
MA.B.2.4.2	volume conversion	Moderate

Percentage of Students Answering Correctly
54

39 Some cells reproduce every 40 minutes at the rate shown in the picture below.



2 cells at
0 minutes

8 cells at
40 minutes

32 cells at
80 minutes

How many cells would there be at 160 minutes?

Example of a
Correct Gridded Response:

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

Acceptable Gridded Response(s)
512

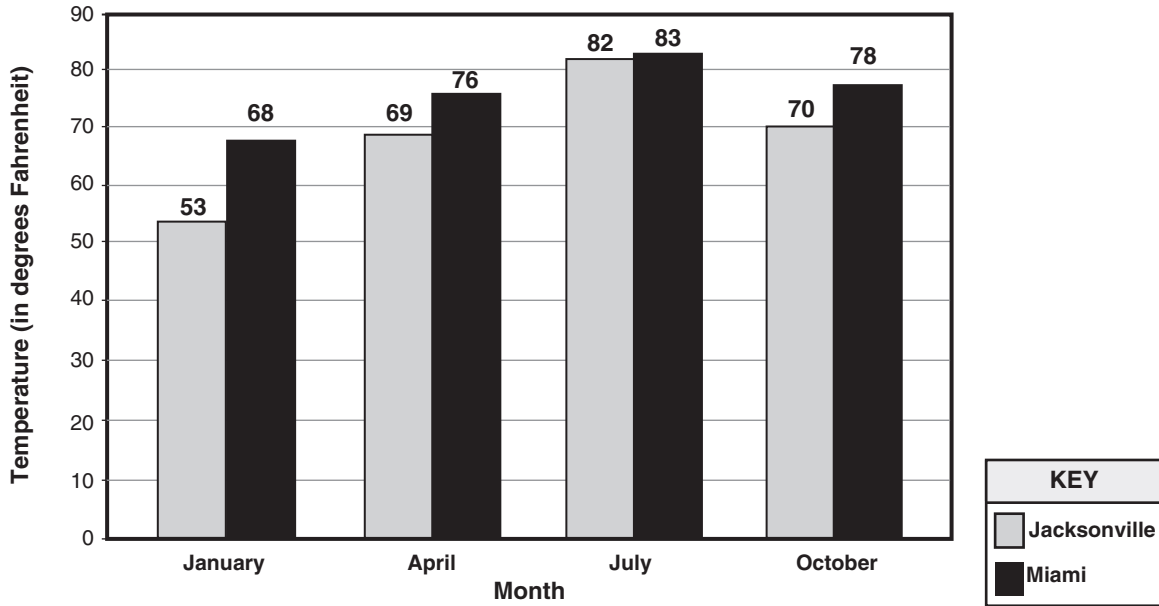
Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	number sequences	High

Percentage of Students Answering Correctly
42

- 40 The bar graph below compares the average daily temperatures of Jacksonville and Miami for four different months.

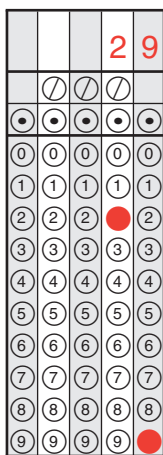


AVERAGE DAILY TEMPERATURES FOR JACKSONVILLE AND MIAMI



What is the difference, in degrees Fahrenheit, between the highest and lowest average temperatures for Jacksonville according to the bar graph?

Example of a Correct Gridded Response:

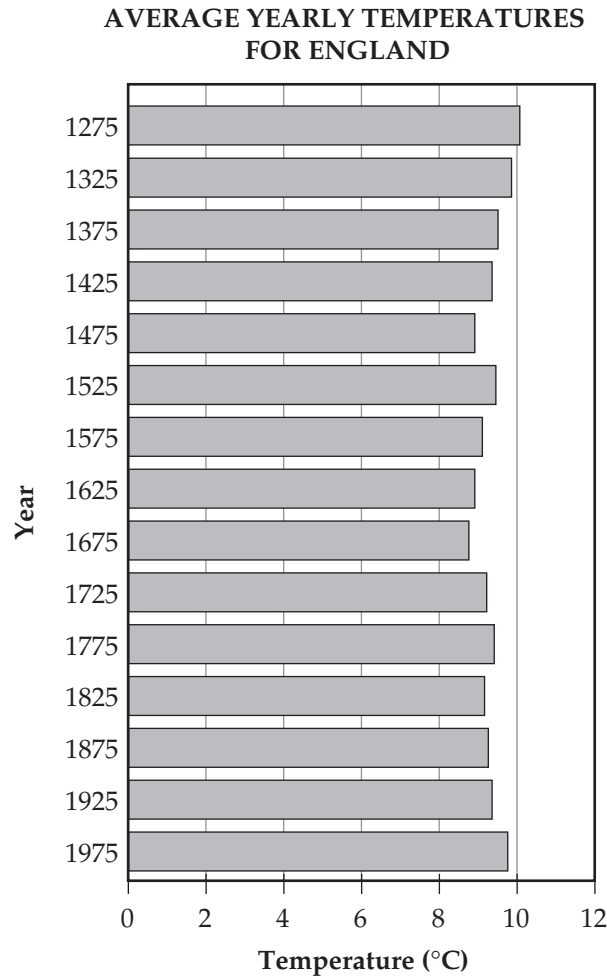


Acceptable Gridded Response(s)
29

Benchmark	Content Focus	Content Difficulty
MA.E.1.4.1	bar graphs	Moderate

Percentage of Students Answering Correctly
73

- 41 The bar graph below shows the average yearly temperatures in degrees Celsius for England from the year 1275 to the year 1975, in increments of 50 years.



Based on the information in the graph, which of the following statements is a valid conclusion?

- 30% **F.** Summer temperatures in England decreased from 1275 to 1375.
- 11% **G.** England’s average yearly temperature was lower in 1700 than in 1725.
- 7% **H.** It is likely that temperatures in England will not exceed 9°C in 2025.
- 53% **I.** It is likely that England’s average yearly temperature will not drop below 8°C in 2025.

Benchmark	Content Focus	Content Difficulty
MA.E.3.4.1	evaluating hypothesis	High

- 42 The table below shows the boiling points in degrees Celsius for some different elements.

BOILING POINTS OF SOME ELEMENTS

Element	Boiling Point (in °C)
Chlorine	-34.6
Helium	-269.0
Hydrogen	-252.9
Nitrogen	-195.8
Oxygen	-183.0

Which of the following elements have boiling points that are lower than -190°C ?

- 34% A. chlorine and oxygen
- 2% B. oxygen and nitrogen
- 3% C. chlorine, helium, and hydrogen
- 62% **D.** helium, hydrogen, and nitrogen

Benchmark	Content Focus	Content Difficulty
MA.A.1.4.2	relative size of number	Low

43 In this function table, what is the value of y when $x = 3$?

- 18% **F.** 2
- 36% **G.** 4
- 27% **H.** 5
- 18% **I.** 7

x	y
0	1
1	0
2	1
3	_____
4	9
5	16

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	functions	Moderate

- 44 A formula for computing a value r is

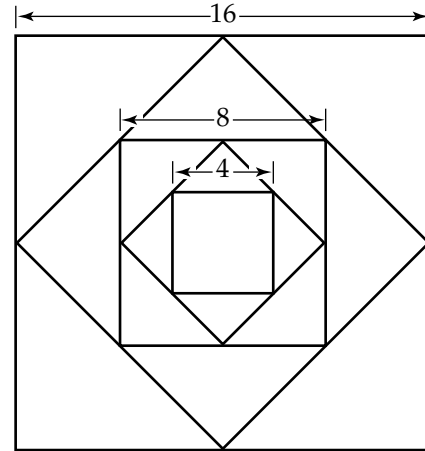
$$r = \frac{mx + my}{wz}, \text{ where } m, x, y, w, \text{ and } z \text{ are positive integers.}$$

An increase in which variable would result in a corresponding decrease in r ?

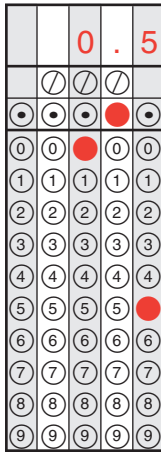
- 23% A. m
- 6% B. x
- 8% C. y
- 63% **D. z**

Benchmark	Content Focus	Content Difficulty
MA.A.3.4.1	inverse operations	High

- 45** An artist created this pattern by inscribing squares. The midpoints of each square have been connected to form a smaller square. The side length of the first square is 16 units, the side length of the third square is 8 units, and the side length of the fifth square is 4 units. If this pattern is continued, what will be the side length in units of the eleventh square?



Example of a Correct Gridded Response:

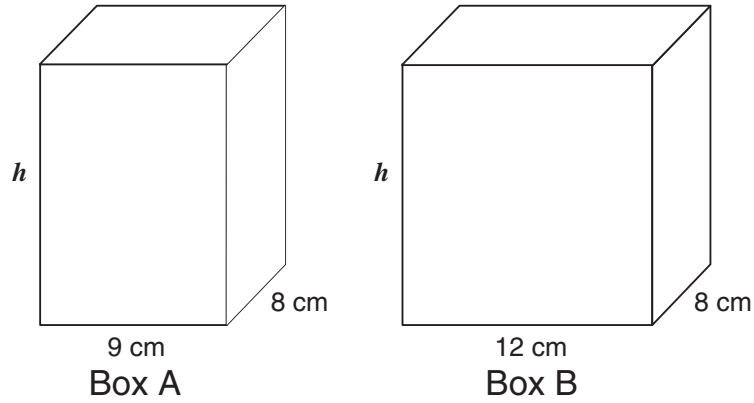


Acceptable Gridded Response(s)
0.5

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.1	graphic pattern	Moderate

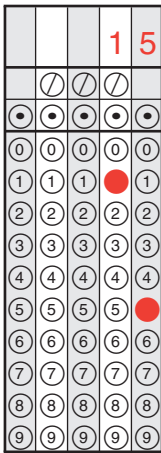
Percentage of Students Answering Correctly
33

- 46 Two rectangular boxes have the same height and the same length, but different widths, as shown in the figure below.



The difference in the volumes of Box B and Box A is 360 cubic centimeters. What is h , the height of each box in **centimeters (cm)**?

Example of a Correct Gridded Response:

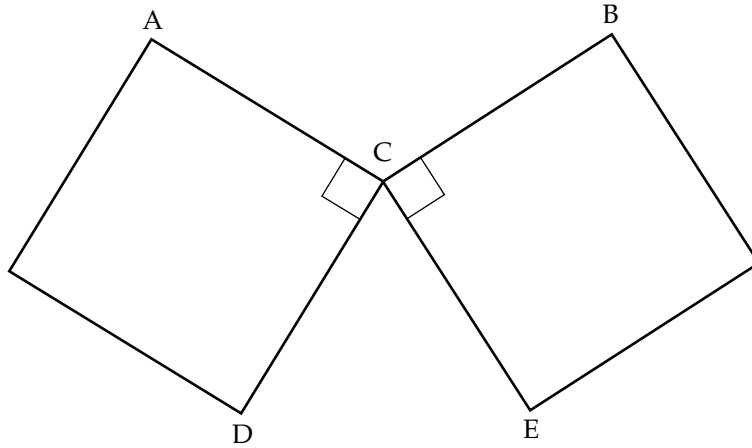


Acceptable Gridded Response(s)
15

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.1	volume	High

Percentage of Students Answering Correctly
36

- 47 The two squares below intersect at point C.



What is the sum of the measures of $\angle ACB$ and $\angle DCE$, in degrees?

Example of a Correct Gridded Response:

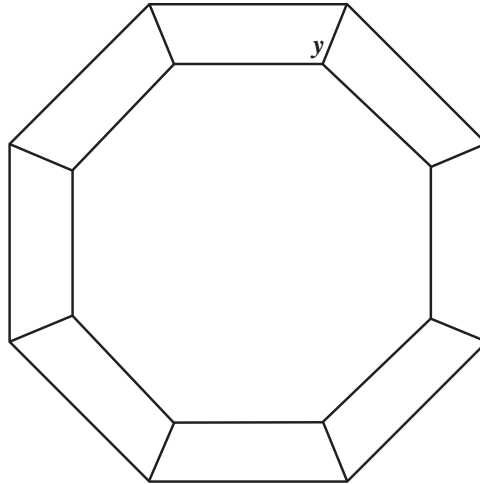
		1	8	0
	/	/	/	
•	•	•	•	•
0	0	0	0	•
1	1	•	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	•	8
9	9	9	9	9

Acceptable Gridded Response(s)
180

Benchmark	Content Focus	Content Difficulty
MA.C.1.4.1	properties of polygons	Moderate

Percentage of Students Answering Correctly
56

- 48 Mr. Soto drew a design for a quilting pattern. The design is made up of 8 congruent isosceles trapezoids as shown below.



Mr. Soto's Design

What is the measure, in degrees, of angle y ?

Example of a Correct Gridded Response:

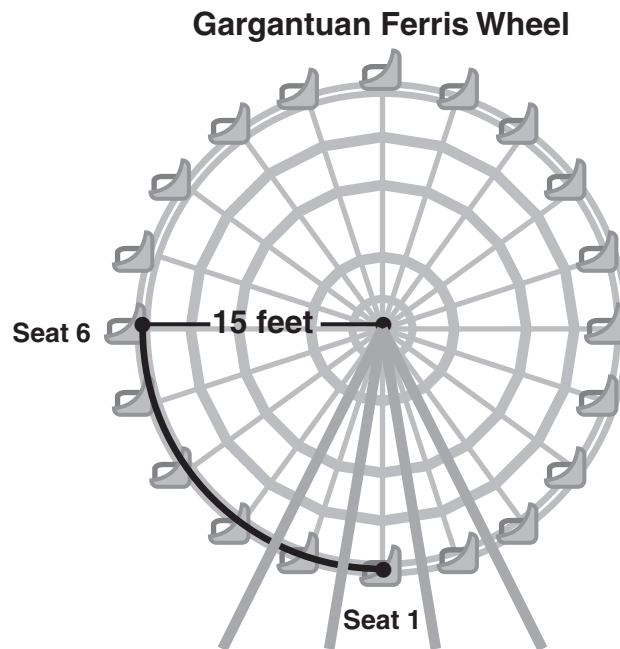
1	1	2	.	5
/	/	/		
•	•	•	•	•
0	0	0	0	0
•	•	1	1	1
2	2	•	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	•
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
112.5

Benchmark	Content Focus	Content Difficulty
MA.C.2.4.1	angle relationships in geometric figures	High

Percentage of Students Answering Correctly
9

- 49 Julie works at the amusement park with the maintenance crew. She needs to replace a string of burned-out lights along the arc shown between seat 1 and seat 6. The arc makes up $\frac{1}{4}$ of the Gargantuan Ferris Wheel.

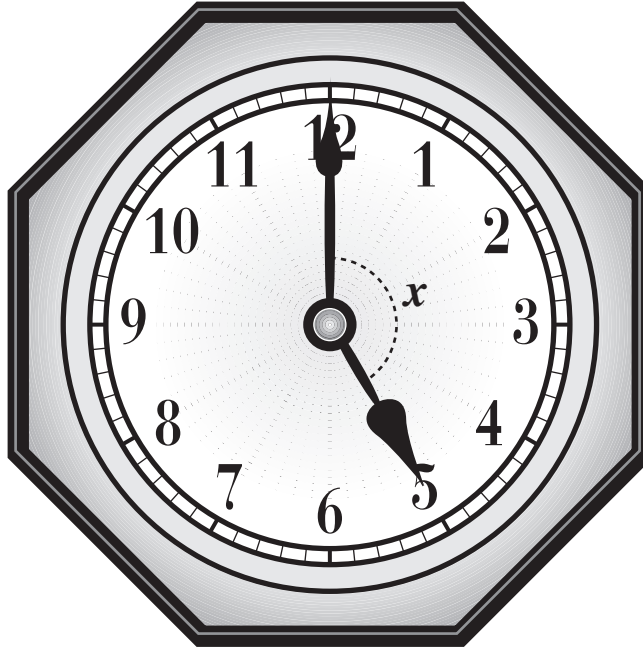


The 20 seats of the Ferris wheel are equally spaced, and the supports from the center of the Ferris wheel to each seat are 15 feet in length. How long, to the nearest foot, does the string of replacement lights need to be?

- 35% **F.** 24 feet
- 26% **G.** 30 feet
- 14% **H.** 47 feet
- 23% **I.** 90 feet

Benchmark	Content Focus	Content Difficulty
MA.B.2.4.1	indirect measurement	Moderate

- 50 The clock shown has hands positioned at 5 o'clock.



What is the degree measure of angle x ?

- 6% A. 36°
- 10% B. 72°
- 82% **C. 150°**
- 2% D. 210°

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.2	angle measures	Low

- 51** Fred has an account with a photocopy shop. He is charged \$0.05 per copy for one-sided copies and \$0.08 per copy for two-sided copies. The table below shows the number of copies the shop made for Fred during a three-day period.

**COPIES MADE DURING
A THREE-DAY PERIOD**

Day	One-Sided	Two-Sided
Monday	215	145
Tuesday	175	126
Wednesday	203	125

Fred used the following expression to calculate the amount he was charged for copies during the three-day period.

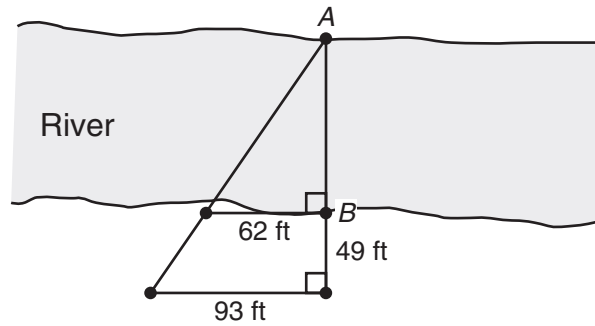
$$(215 \times 0.05 + 145 \times 0.08) + (175 \times 0.05 + 126 \times 0.08) + (203 \times 0.05 + 125 \times 0.08)$$

Which of the following expressions is equivalent to the expression above?

- 27% **F.** $(215)(145 + 0.05)(0.08) + (175)(126 + 0.05)(0.08) + (203)(125 + 0.05)(0.08)$
- 18% **G.** $(215 + 145)(0.05)(0.08) + (175 + 126)(0.05)(0.08) + (203 + 125)(0.05)(0.08)$
- 48% **H.** $(215 + 175 + 203)(0.05) + (145 + 126 + 125)(0.08)$
- 6% **I.** $(215 + 145 + 175 + 126 + 203 + 125)(0.13)$

Benchmark	Content Focus	Content Difficulty
MA.A.3.4.2	equivalent expressions	Low

- 52** An engineer wanted to approximate the width of a river. She placed markers at point *A* and point *B* to represent the average width of the river. She also placed 3 other markers along the riverbank and measured the distances shown in the diagram below.



Based on this diagram, what was the width of the river, in feet (ft), from point *A* to point *B*?

Example of a Correct Gridded Response:

			9	8
	/	/	/	
•	•	•	•	•
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	•
9	9	9	•	9

Acceptable Gridded Response(s)
98

Benchmark	Content Focus	Content Difficulty
MA.C.2.4.1	similarity	Moderate

Percentage of Students Answering Correctly
17

- 53** Keith is in charge of receiving shipments at a warehouse. He receives 3 types of crates in each shipment. Keith uses the following equation to determine u , the number of units received each day.



$$u = 20x + 15y + 30z$$

In the equation above, the variables represent the following:

- x = the number of crates that contain 20 units,
- y = the number of crates that contain 15 units, and
- z = the number of crates that contain 30 units.

If Keith received a shipment of 20 type- x crates, 5 type- y crates, and 6 type- z crates in 1 day, how many total units did he receive that day?

Example of a Correct Gridded Response:

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

Acceptable Gridded Response(s)
655

Benchmark	Content Focus	Content Difficulty
MA.D.2.4.2	equations	Low

Percentage of Students Answering Correctly
63

- 54** Max works at a factory that manufactures fiberglass tanks. He needs to make a right circular cylindrical fiberglass tank that has a diameter of 6 meters and a height of 8 meters. What will be the volume, in cubic meters, of this cylinder?



Example of a Correct Gridded Response:

2	2	6	.	0
	/	/	/	
•	•	•	•	•
0	0	0	0	•
1	1	1	1	1
•	•	•	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	•	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Acceptable Gridded Response(s)
226.0-226.8

Benchmark	Content Focus	Content Difficulty
MA.B.1.4.1	volume	Low

Percentage of Students Answering Correctly
48

55 Last year 4 local bands played at Beach High School’s spring break concert. Each band was paid \$100, and the remaining \$2725 in ticket sales went to the school’s recreation fund. If 6 bands will have to be paid \$100 each this year and tickets are still \$5 each, how many tickets will have to be sold this year in order to raise the same amount of money as last year for the school’s recreation fund?

- 14% A. 425
- 27% B. 545
- 10% C. 625
- 48% **D. 665**

Benchmark	Content Focus	Content Difficulty
MA.D.1.4.2	changing cost parameters	High

56 Tonya is an office manager for a law firm. She spent \$166.25 on office supplies for three lawyers, her assistant Bill, and herself. Office policy requires that the cost of supplies be divided equally among all five employees. Both Tonya's and Bill's supplies are charged to Tonya's office account. How much money is charged to her account?

23% F. \$33.25

6% G. \$41.60

64% **H.** \$66.50

6% I. \$83.20

Benchmark	Content Focus	Content Difficulty
MA.A.3.4.3	solving real-world problems involving fractions/decimals	Moderate

57 Mr. Martin is holding a trivia contest. The 13 students who are participating randomly draw cards that are numbered with consecutive integers from 1 to 13.

- The student who draws number 1 will be the host.
- The students who draw the other odd numbers will be on the Red Team.
- The students who draw the even numbers will be on the Blue Team.

One student has already drawn a card and is on the Blue Team. If Carlos is the next student to draw a card, what is the probability that he will be on the Red Team?

- 5% **A.** $\frac{1}{13}$
- 17% **B.** $\frac{1}{12}$
- 16% **C.** $\frac{6}{13}$
- 61% **D.** $\frac{6}{12}$

Benchmark	Content Focus	Content Difficulty
MA.E.2.4.1	single event probability	Moderate

- 58** There is a proportional relationship between the size of a projected image on a screen and the distance of the screen from the projector.

An image that is projected onto a screen 10 feet away is a rectangle with dimensions of 2 feet by 3 feet. If the screen is moved to a distance of 15 feet from the projector, what will be the dimensions of the larger image projected onto the screen?

- 45% **F.** 3 feet by 4.5 feet
- 27% **G.** 4 feet by 6 feet
- 12% **H.** 4.5 feet by 6.75 feet
- 14% **I.** 7 feet by 8 feet

Benchmark	Content Focus	Content Difficulty
MA.B.2.4.1	indirect measurement	Moderate

MATHEMATICS



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SUNSHINE STATE STANDARDS
TEST BOOK

Released: August 2006
Last used: Summer 2006

GRADE
10

MATHEMATICS



FLORIDA DEPARTMENT OF EDUCATION
www.fldoe.org

Assessment and School Performance
Florida Department of Education
Tallahassee, Florida

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