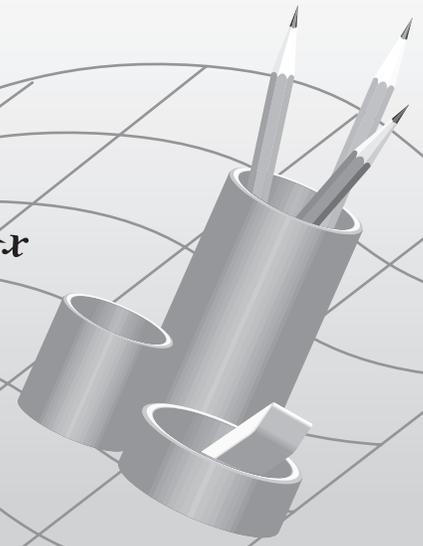
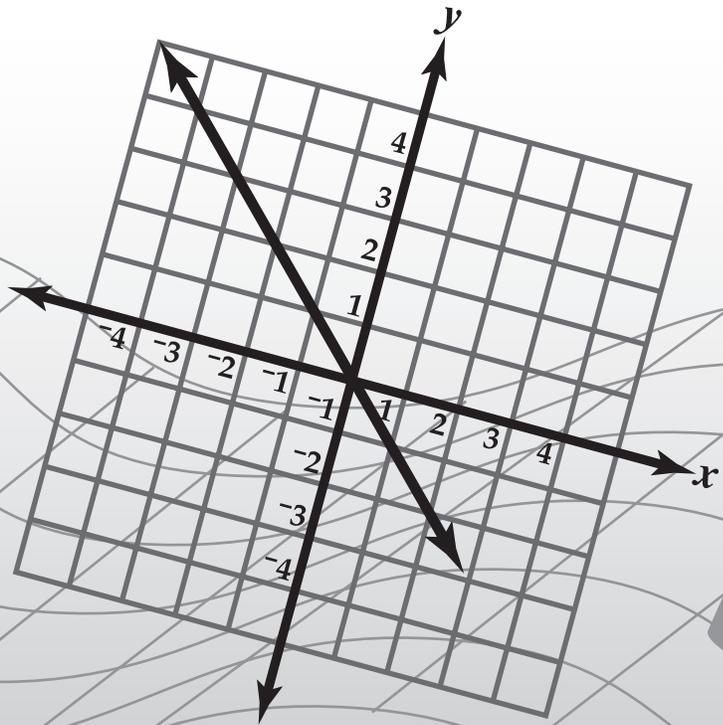
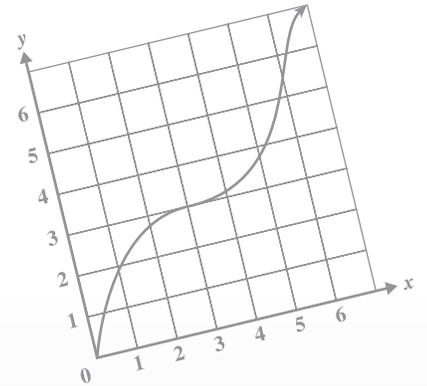




Maryland High School
Assessment

MARYLAND STATE DEPARTMENT OF
EDUCATION
Achievement Matters Most

$$2x - 4 = 3(x-1) - 10$$



ALGEBRA/ DATA ANALYSIS

Public Release 2006

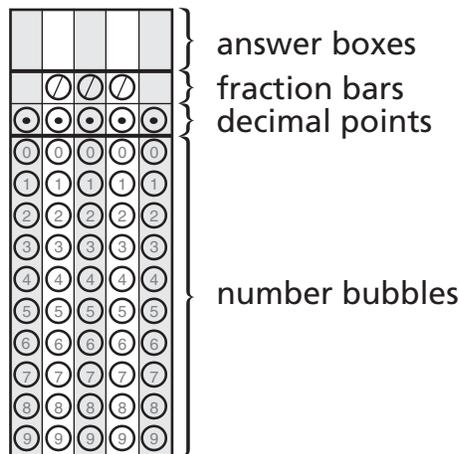
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Response Grid Items

Several items in this test require you to enter your answer on a special grid like the one shown below.



Directions for Completing the Response Grids

- Find the answer to the problem.
- Write your answer in the boxes at the top of the grid.
 - You may start your answer at either end of the answer box. Print your answer with the first digit (or symbol) in the left answer box, or with the last digit in the right answer box.
 - Print no more than 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.
- Fill in the appropriate bubble under each box in which you wrote your answer.
 - Fill in only one bubble for each answer box used in your answer. Do **not** fill in a bubble under an unused answer box.
 - You must fill in the bubbles accurately to receive credit for your answer.



Examples of Valid Responses

The Response Grids below show valid ways to enter an answer of $\frac{3}{2}$.

		3	/	2	
	/	/	•		
•	•	•	•	•	•
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	•	2
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

3	/	2			
•	/	/			
•	•	•	•	•	•
0	0	0	0	0	0
1	1	1	1	1	1
2	2	•	2	2	2
•	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

1	.	5			
/	/	/			
•	•	•	•	•	•
0	0	0	0	0	0
•	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
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

	1	.	5	0	
/	/	/			
•	•	•	•	•	•
0	0	0	0	•	0
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
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Special Directions for Mixed Numbers, Decimals, Negative Numbers, and Percents

- Mixed numbers must be entered as decimals or improper fractions. For example, an answer of $1\frac{1}{2}$ should be entered as 1.5 or $\frac{3}{2}$.
- Decimal answers should be entered as accurately as possible unless otherwise indicated in the problem. Some answers may need to be rounded in order to fit in the Response Grid space.
- No Response Grid items have negative answers.
- Percents must be entered as decimals or fractions. For example, an answer of 50% should be entered as .5 or $\frac{1}{2}$.



Directions

Use the Response Grid in the Answer Book to complete Sample A.

Sample A

Diana earned the scores below on her science tests.

79, 98, 85, 91

What is the mean of these scores?

Sample B

Look at the pattern below.

0, 2, 4, 6, 8, . . .

If the pattern continues, what will be the next term?

- A 2
- B 8
- C 10
- D 14

Sample C

The sum of the angles of a triangle is 180 degrees. The measures of two angles of a triangle are x and $3x$. Which of these expressions represents the measure of the third angle?

F $180 + x + 3x$

G $180 - x + 3x$

H $180 - x - 3x$

J $180 + x - 3x$



1 The matrix below shows the supplies that are needed to build two different model trucks.

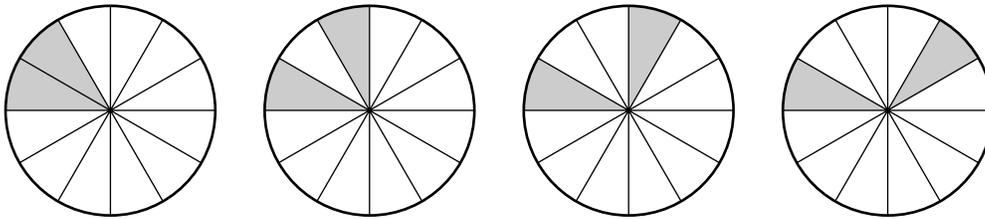
SUPPLIES NEEDED TO BUILD A MODEL

	Wheels	Sheets of Plastic	Cans of Paint	Bottles of Glue
Dump Truck	4	10	1	2
Fire Truck	8	22	2	3

How many sheets of plastic are needed to build 17 fire trucks?

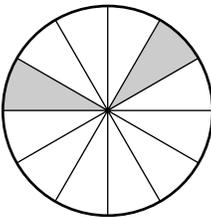
- A 170
- B 374
- C 544
- D 595

2 Look at the pattern below.

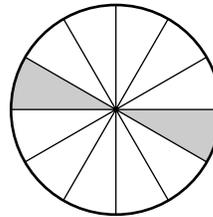


If this pattern continues, what will be the next figure?

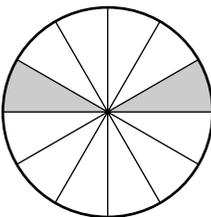
F



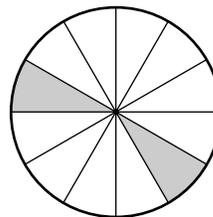
H



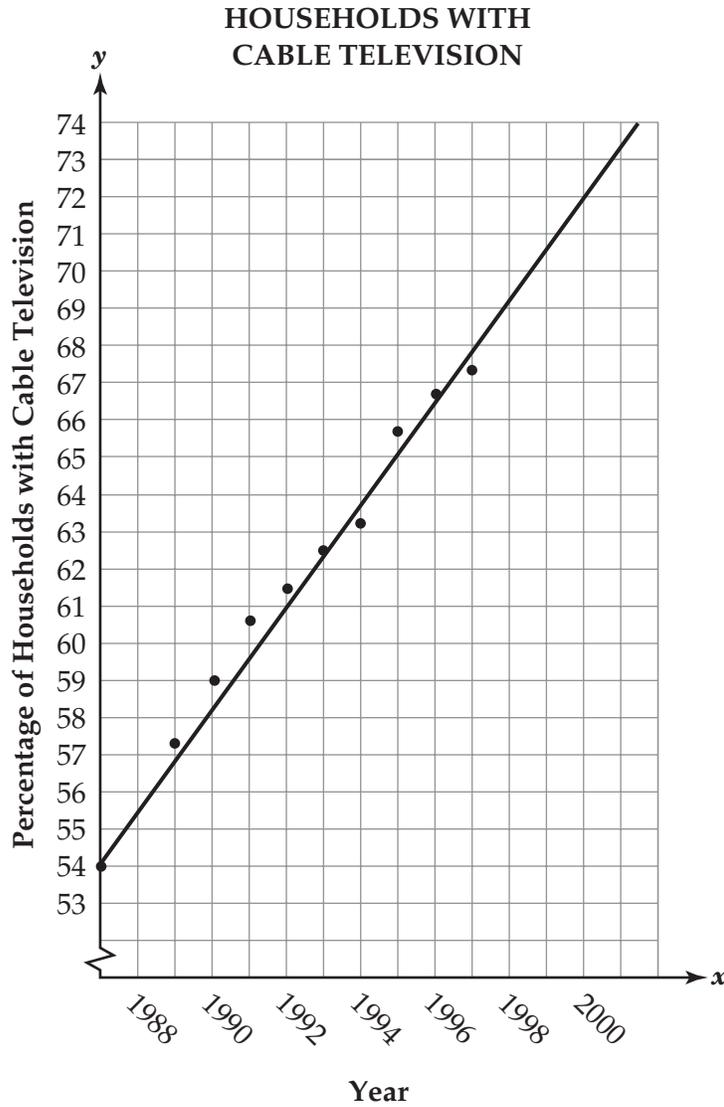
G



J



- 3 The graph below shows the percentage of television-owning households with cable television. The line of best fit is drawn.



Using the line of best fit, what percentage of television-owning households can be expected to have cable television in the year 2000?

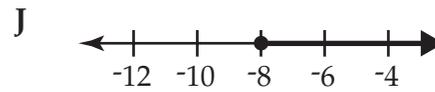
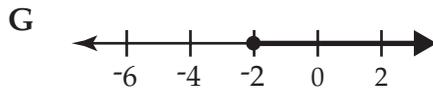
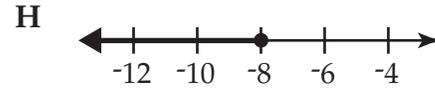
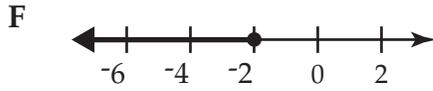
- A 69%
- B 71%
- C 72%
- D 73%



4 Look at the inequality below.

$$12 - 4x \leq 20$$

Which of these shows the solution to this inequality?



5 The 12th-grade class is conducting a survey to determine music preferences for the spring dance. The class decides to survey the first 150 students that enter the school on Monday. Which of these best describes why this type of sampling may give biased results?

- A The sample size is too small.
- B Students are randomly selected.
- C Not all students have the same chance to be surveyed.
- D Every other student entering the school should be surveyed.



- 6** **BCR** A cereal company awards a prize to anyone who collects all 5 different game pieces. Each game piece has an equal chance of being placed in a box of cereal. Each box of cereal contains only 1 game piece.

Complete the following in the Answer Book:

- Design a simulation of at least 30 trials that can be used to estimate how many boxes of cereal a person needs to buy to collect all 5 different game pieces. Describe how to collect and interpret the data so that you have confidence in the estimation.

- 7** Christine has a mean score of 18 points per game in her first four basketball games of the season. How many points must she score in her next game to raise her mean score to 20 points per game?

- A 20
- B 22
- C 25
- D 28



8 Harry works cleaning houses. He charges \$15 per hour plus a \$10 travel fee to clean each house. Which of these tables shows the total amount (c) charged, in dollars, to clean a house for h hours?

F

HARRY'S CHARGES

Hours Spent Cleaning (h)	Amount Charged (c)
3	\$45
5	\$65
7	\$85
9	\$105

H

HARRY'S CHARGES

Hours Spent Cleaning (h)	Amount Charged (c)
3	\$55
5	\$85
7	\$115
9	\$145

G

HARRY'S CHARGES

Hours Spent Cleaning (h)	Amount Charged (c)
3	\$45
5	\$75
7	\$105
9	\$135

J

HARRY'S CHARGES

Hours Spent Cleaning (h)	Amount Charged (c)
3	\$75
5	\$125
7	\$175
9	\$225



9 The table below shows the possible scores for a game and the number of times each score occurred.

GAME SCORES

Score	Frequency
10	9
8	11
7	6
5	7
0	7

Using the information in the table, predict how many times a score of “7” would occur in 100 tries.

- A 12
- B 15
- C 18
- D 22



- 10** A store owner surveyed customers to determine color preferences of bathroom tile. The results of the survey are shown below.

COLOR PREFERENCE

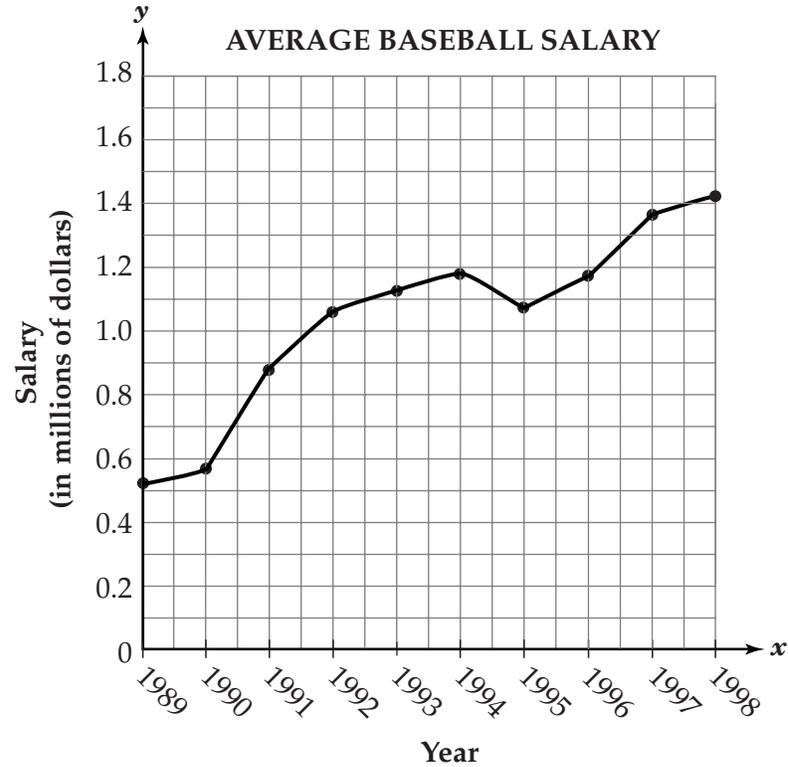
Color	Number of People
pink	76
teal	35
yellow	31
white	215
beige	293
Total	650

Which of these is the best conclusion based on the results of the survey?

- F The store owner should only order white tile.
- G The store owner should only order beige and pink tile.
- H The store owner should order more cases of beige and white tile than any other color.
- J The store owner should order more cases of yellow and teal tile than any other color.



11 The graph below shows the average professional baseball salary from 1989 through 1998.



Based on the graph, between which two years did the average salary have a negative rate of change?

- A 1989 to 1990
- B 1992 to 1993
- C 1993 to 1994
- D 1994 to 1995



12 The table below shows a relationship between x and y .
ECR

x	y
1	1
2	4
3	9
4	16

Complete the following in the Answer Book:

- What are the values of y when x is 10 and x is 11?
- What is the relationship between the x -values and the y -values? Use mathematics to explain the relationship. Use words, symbols, or both in your explanation.
- Fill in the boxes to the right of the table in the Answer Book by finding the difference between the y -values of each of the successive terms. Describe the pattern that exists between the differences that you found.

x	y	Difference in y -values
1	1	<input type="text"/>
2	4	<input type="text"/>
3	9	<input type="text"/>
4	16	<input type="text"/>

- What is the difference between the y -values when x is 10 and when x is 11? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.



Directions

Use the Response Grids in the Answer Book to complete Numbers 13 through 15.

13 Julie is a member of a swim club. The swim club charges a monthly fee of \$15 plus \$0.50 per hour to use the pool. Julie spent \$35 in August to use the pool. How many hours did Julie use the pool in August?

14 A reporter surveyed 300 randomly selected people of all ages about their opinion of a new song. The results are shown in the table below.

SURVEY RESULTS

Age Group	Liked It	Did Not Like It	No Opinion
Younger than 25	55	30	15
25–46	50	30	20
Older than 46	32	60	8

What is the probability that a person who had no opinion of the new song was older than 46?

15 Information about fees for two health clubs is shown in the table below.

HEALTH CLUB PLANS

	Initial Membership Fee	Monthly Fee
Arnold’s Gym	\$200	\$25
Better Body Club	\$100	\$45

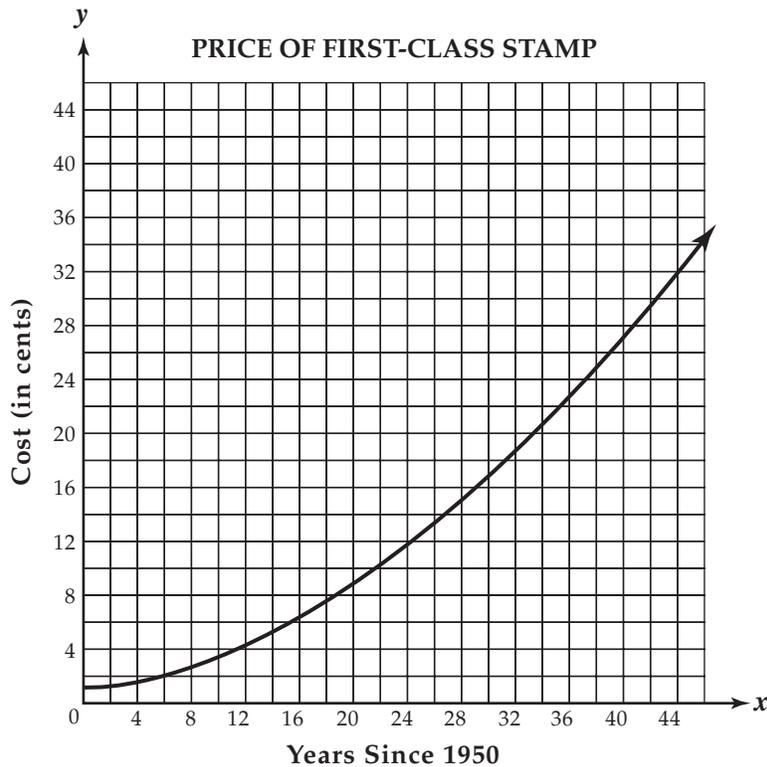
For what number of months is the total cost the same for both health clubs?



- 16** Erin used the equation below to model the price (y) of postage stamps, in cents, between 1950 and 1995. In Erin’s model, x represents the number of years since 1950.

$$y = 0.014x^2 + 0.09x + 1.28$$

The graph below models the price of postage stamps, in cents, between 1950 and 1995.

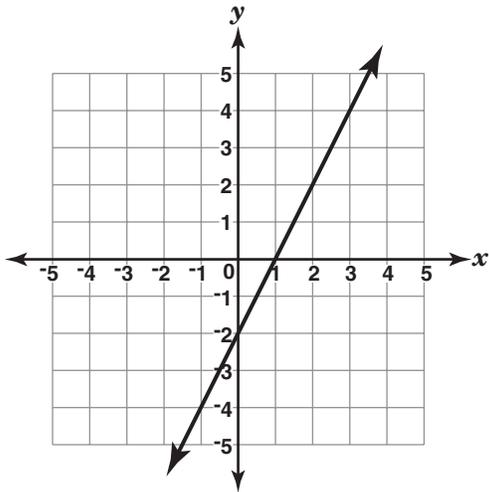


Complete the following in the Answer Book:

- According to the model, when was the price of a postage stamp 29¢? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- According to the model, what was the cost of postage stamps in 1970? Express your answer to the nearest cent. Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.



17 Look at the graph below.



What is the slope of the line?

- A -2
- B $-\frac{1}{2}$
- C $\frac{1}{2}$
- D 2

18 The table below shows a relationship between x and y .

x	y
1	1
2	8
3	15
4	22
5	29
6	36

Which of these equations represents this relationship?

- F $y = 6x + 7$
- G $y = 6x - 7$
- H $y = 7x + 6$
- J $y = 7x - 6$

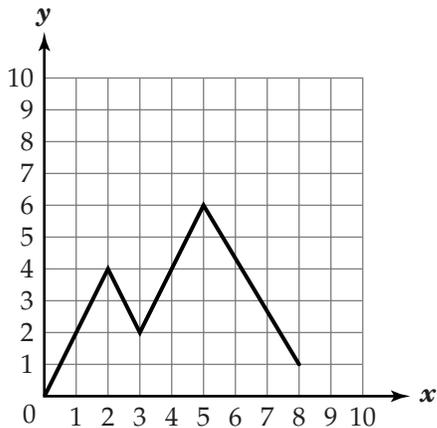


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Session **2**

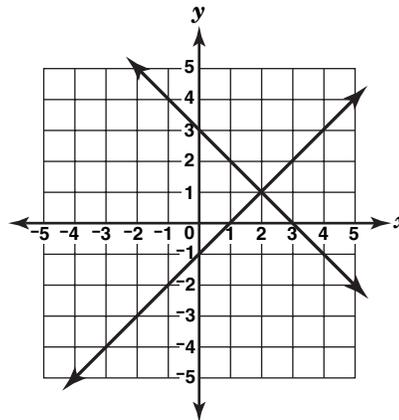
19 Look at the function that is graphed below.



What is the domain of this function?

- A $0 \leq x \leq 5$
- B $0 \leq x \leq 8$
- C $0 \leq y \leq 1$
- D $0 \leq y \leq 6$

20 Look at the graph below.



Which of these statements describes the relationship between the two lines?

- F They intersect at the point (2, 1).
- G They intersect at the point (1, 2).
- H They intersect at the point (1, 0).
- J They intersect at the point (0, 3).



- 21** Art's swimming pool contains 20,000 gallons of water. He drains the pool at a rate of 5 gallons per minute. Which of these equations represents the number of gallons of water (g) remaining in the pool after m minutes?

A $g = 20,000 - 5m$

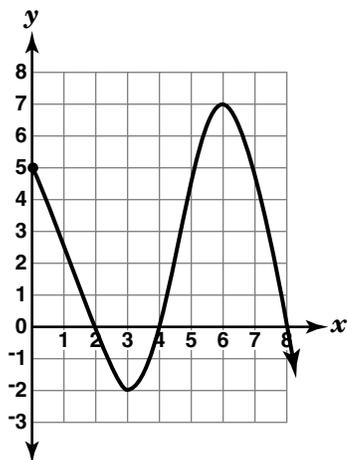
B $g = 20,000 + 5m$

C $g = \frac{20,000}{5m}$

D $g = \frac{5m}{20,000}$



22 Look at the function that is graphed below.



What is the maximum value of this function?

- F 5
- G 6
- H 7
- J 8

23 Carmen bought n books for a total cost of $13n - 5$ dollars. Which expression represents the cost of each book?

- A $n(13n - 5)$
- B $n + (13n - 5)$
- C $(13n - 5) \div n; n \neq 0$
- D $(13n - 5) - n$



- 24** The table below shows the relationship between the average temperature in March and the date in April when the cherry trees bloom in Washington, D.C.

ECR

CHERRY TREE BLOOMS

Average Temp. ($^{\circ}\text{C}$)	Date in April
1.5	28
2.6	19
3.2	11
4.0	21
4.0	14
4.1	17
4.7	14
4.9	14
5.0	6
5.1	11
5.4	8
6.2	3

Complete the following in the Answer Book:

(If you choose to draw a graph to help write the equation, use the grid provided in the Answer Book.)

- Write an equation of a line of best fit for the data.
- According to your equation, what would be the date in April of the bloom if the average March temperature were 3.5°C ? Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.
- Suppose the average March temperature is 14°C . Is it appropriate to use your equation to predict the date in April when the cherry trees will bloom in Washington, D.C.? Use mathematics to justify your answer.



Directions

Use the Response Grids in the Answer Book to complete Numbers 25 through 27.

- 25** Paloma conducts a survey to determine the type of candy that students prefer. The survey results are shown in the table below.

SURVEY RESULTS

Type of Candy	Number of Students
Chocolate Chews	21
Fruit Bursts	15
Mint Cremes	23
Peanut Buddies	16

Based on the survey results, what is the probability that a randomly selected student prefers Fruit Bursts?

- 26** The matrices below show where Willings High School students went after graduating in the years 1998 to 2000. These students either went to work (W), to a technical college (T), or to a university (U).

WILLINGS HIGH SCHOOL GRADUATES

	1998		1999		2000	
	Female	Male	Female	Male	Female	Male
W	$\left[\begin{array}{c} 110 \\ 80 \\ 205 \end{array} \right]$	$\left[\begin{array}{c} 135 \\ 160 \\ 214 \end{array} \right]$	W	$\left[\begin{array}{c} 90 \\ 125 \\ 220 \end{array} \right]$	125	175
T			T		85	125
U			U		130	200
					240	220

What is the total number of females who went to a university?



27 Look at the pattern below.

21, 19.8, 18.6, 17.4, 16.2, . . .

If this pattern continues, what will be the tenth term?

28 **BCR** The student government wants to determine if students get better grades in morning or afternoon classes. They randomly surveyed 20 students that take math class in the morning and 20 students that take math class in the afternoon. The survey results are shown in the stem-and-leaf plots below.

MORNING GRADES			AFTERNOON GRADES	
Stem	Leaf		Stem	Leaf
9	2 3 4 5 6 6 8 9 9		9	0 0 4
8	0 0 1 1 3		8	0 1 4 9
7	2 6 6 6 9		7	3 6 9 9 9
6		KEY	6	2 2 5 6 6 7 8
5	4	5 4 = 54	5	9

Complete the following in the Answer Book:

- What are the mean, median, and mode for each class?
- Based on the data, do students get better grades in the morning classes? Use measures of central tendency to justify your answer.



29 Russ worked a total of 135 hours during the month of July. He earned \$3,600. Russ earned \$25 per hour each weekday that he worked. He earned \$40 per hour each Saturday that he worked. Let x represent the number of weekday hours worked and y represent the number of Saturday hours worked. Which system of equations represents this situation?

A $x + y = 135$
 $25x + 40y = 3,600$

B $x + y = 135$
 $40x + 25y = 3,600$

C $x + y = 3,600$
 $25x + 40y = 135$

D $x + y = 3,600$
 $40x + 25y = 135$

30 Inés wants to conduct a survey to determine how many customers see the advertisement for her store. Which of these methods provides Inés with the most representative sample of her customers?

F Survey customers who live near her store.

G Survey customers who shop at her store on weekends.

H Survey customers who shop at her store early in the morning.

J Survey customers who shop at her store at different times throughout the week.



- 31** The formula below can be used to find the actual air temperature (t) when the wind speed is 20 miles per hour.

$$t = \frac{2}{3}w + 26$$

(w = wind-chill temperature)

What is the actual air temperature if the wind-chill temperature is -12° ?

- A -57°
- B -21°
- C 18°
- D 41°

- 32** Look at the bowling scores in the table below.

WEEKLY BOWLING SCORES

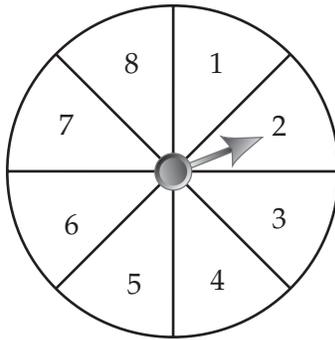
Week	1	2	3	4	5	6	7	8	9	10
Score	123	154	117	121	163	135	111	132	109	149

Which of these is the range of the bowling scores?

- F 10
- G 26
- H 34
- J 54



33 The spinner below has 8 equal sections.



What is the probability of spinning a number less than 3?

- A $\frac{1}{4}$
- B $\frac{3}{4}$
- C $\frac{1}{8}$
- D $\frac{3}{8}$



- 34** The table below shows the number of tulips that are in bloom in Tara's garden at the end of each day.

**TULIPS IN BLOOM
IN TARA'S GARDEN**

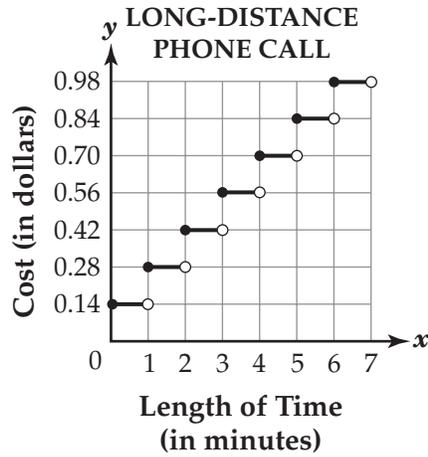
End of Day	Number of Tulips
1	1
2	4
3	7
4	10
5	13

If this pattern continues, how many tulips will be in bloom at the end of day 8?

- A 16
- B 19
- C 22
- D 25



- 35** The graph below shows the cost of a long-distance telephone call for various lengths of time.

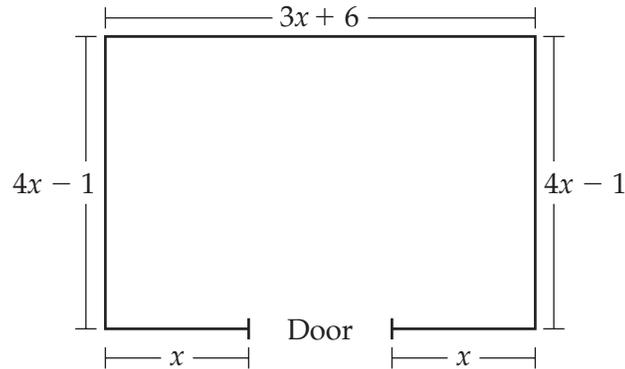


What is the cost of a $5\frac{1}{2}$ -minute long-distance telephone call?

- F \$0.56
- G \$0.77
- H \$0.84
- J \$0.98



36 A rectangular room is shown below.



Which expression represents the width of the door?

- A $(3x + 6) - x - x$
- B $(4x - 1) - x - x$
- C $(4x - 1) - (3x + 6)$
- D $(3x + 6) + (4x - 1) + (4x - 1) + x + x$





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