

Question 29
Benchmark A
Spring 2003

29. The first 5 terms of a sequence are given in the table.

Term Number <i>(n)</i>	Term Value <i>(t)</i>
1	2
2	5
3	10
4	17
5	26

For this sequence, which of these represents the relationship between n , the number of the term, and t , its corresponding value?

- A. $t = n^2 + 1$
- B. $t = 2n + 1$
- C. $t = 3n - 1$
- D. $t = 2n^2 - 1$

Question 1
Benchmark A
Spring 2004

1. The table below contains the results of a biology experiment.

Record of Blooms

Week	1	2	3	4	5
Number of Blooms	3	9	27	81	<i>b</i>

Assuming the pattern shown in the table continues, what is the value of *b*?

- A. 108
- B. 130
- C. 162
- D. 243

Question 9
Benchmark A
Spring 2004

9. The table below shows values for *x* and *y*.

<i>x</i>	<i>y</i>
0	-1
1	0
2	3
3	8
4	15
5	24

Which of these equations represents the relationship between *x* and *y*?

- A. $y = x - 1$
- B. $y = x + 19$
- C. $y = x^2 - 1$
- D. $y = 2x^2 - 5$

Question 38
Benchmark A
Spring 2004

38. Maria is making a quilt. She has a large piece of fabric that is 0.02 millimeters thick. The fabric is cut in half and one piece is placed on top of the other to make a pile. The pile is cut in half, and then one half is placed on top of the other to make a higher pile.

Continuing this process, what would the thickness of the pile be after the 4th cut and piling?

- A. 0.0016 millimeters
- B. 0.08 millimeters
- C. 0.32 millimeters
- D. 16 millimeters

Question 27
Benchmark A
Spring 2005

27. The depth of a lake is measured at the same location and on the same day every year for a number of years. The table below shows the measurements.

Depth of Lake

Year	Depth (in feet)
1998	60
1999	55
2000	48
2001	39

If the pattern continued, what was the depth of the lake in 2002?

- A. 30 feet
- B. 29 feet
- C. 28 feet
- D. 25 feet

Question 7
Benchmark B
Spring 2005

7. Sheila collects the following statistics about baseball games played by the local Youth League team:

Youth League Statistics

Year	Number of Wins	Average Number of Spectators Per Game	Average Number of Sodas Sold Per Game	Average Number of Hot Dogs Sold Per Game
1997	1	100	50	70
1998	3	160	70	90
1999	5	220	110	110
2000	7	280	180	130

Which statistic shows a non-linear rate of increase over time?

- A. number of wins
- B. average number of spectators per game
- C. average number of sodas sold per game
- D. average number of hot dogs sold per game

Question 20
Benchmark C
Spring 2003

20. To solve a math problem, Penny is graphing the equations $y = x^2$ and $y = x^2 + 1$. To graph the equations, she created the tables shown below.

$y = x^2$		$y = x^2 + 1$	
x	y	x	y
-3		-3	
-2		-2	
-1		-1	
0		0	
1		1	
2		2	
3		3	

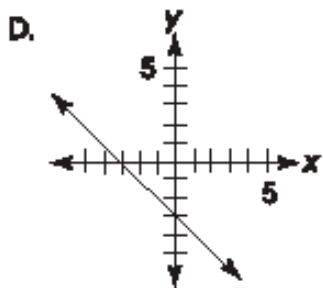
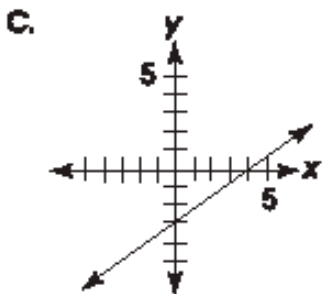
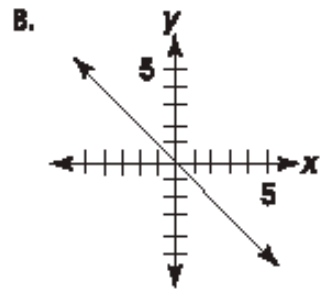
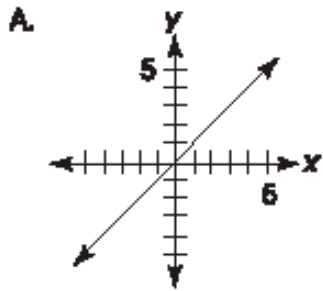
In your **Answer Document**, copy the tables above and find the y -values for each of the given x -values.

Use the grid provided to graph each equation using the pairs of x - and y -values.

Based on the graphs you have completed, analyze how the graphs differ and write a hypothesis to describe how adding a number to x^2 changes the graph of x^2 .

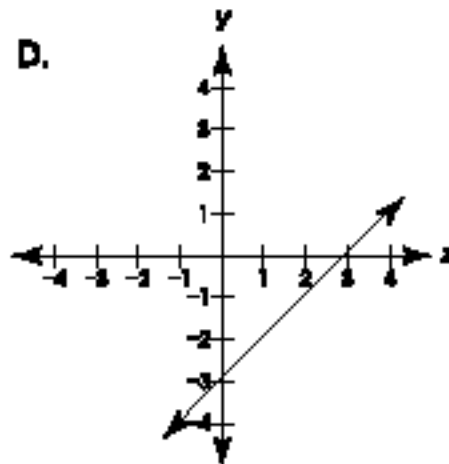
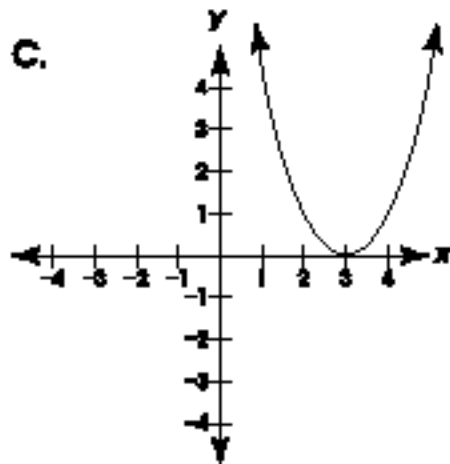
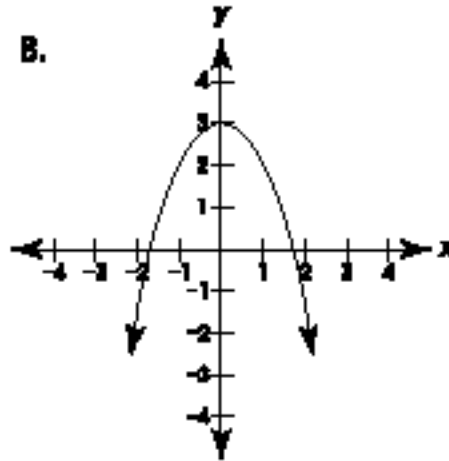
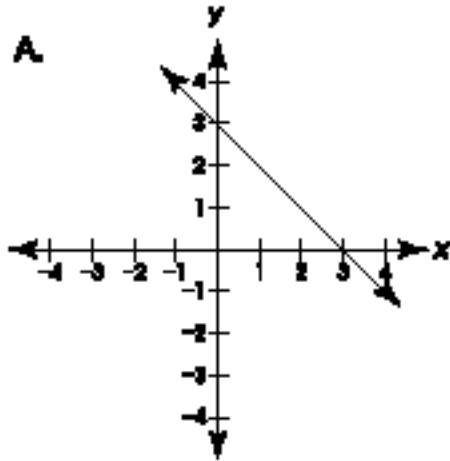
Question 27
Benchmark C
Spring 2004

27. Which of these represents the graph of the equation $-3x + 4y = -12$?



Question 8
Benchmark C
Spring 2005

8. Which graph represents the equation
 $y = -x^2 + 3$?



Question 3
Benchmark D
Spring 2003

3. At the beginning of the summer, Katie opened a new checking account with a \$60 deposit. Each week during the summer, she earned \$95 as a part-time lifeguard. Katie deposited 10% of these earnings into her account. Which of these equations represents the amount of money, m , Katie will have deposited in her checking account after w weeks?
- A. $m = 15.5w$
 - B. $m = w + 69.5$
 - C. $m = 95w + 60$
 - D. $m = 9.5w + 60$

Question 14
Benchmark D
Spring 2003

14. To raise money, a school club is operating a dunking booth at the local fair. The club will pay \$120 to rent the booth. Each customer will pay \$1.50 to throw a ball at the dunking platform on which a person sits. Which inequality could be used to find the number of customers, c , required for the club to make a net profit of at least \$350?
- A. $1.5c - 120 \geq 350$
 - B. $1.5c + 120 \geq 350$
 - C. $1.5c - 120 \leq 350$
 - D. $1.5c + 120 \leq 350$

Question 12
Benchmark D
Spring 2004

12. Julie does not want to spend more than \$300 on ice skating. Her skates will cost \$42, her lessons will cost a total of \$56, and the practice time will cost \$7.50 per hour.

Which inequality should Julie use to determine the maximum number of hours, h , she can practice without spending more than \$300?

- A. $56 + 7.50h < 300$
- B. $42 + 7.50h < 300$
- C. $7.50h - 42 - 56 \leq 300$
- D. $42 + 56 + 7.50h \leq 300$

Question 26
Benchmark D
Spring 2005

26. For every lawn that she mows, Jane charges \$8 per hour for every hour that she works. For each lawn that he mows, Bob charges a fixed fee of \$20 and an additional \$5 for every hour that he works.

What is the fewest number of hours that both could work so that Jane's total pay for a lawn will be greater than Bob's?

- A. 1 hour
- B. 5 hours
- C. 6 hours
- D. 7 hours

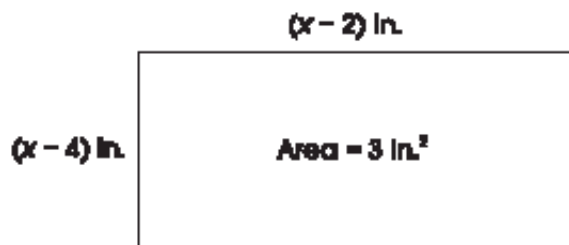
Question 11
Benchmark E
Spring 2003

11. Which pair of equations represents lines that are parallel and perpendicular, respectively, to the graph of $y = -\frac{3}{4}x + 4$?

- A. $y = \frac{3}{4}x + 3$ and $y = -\frac{3}{4}x + 5$
- B. $y = \frac{3}{4}x + 6$ and $y = -\frac{4}{3}x + 2$
- C. $y = -\frac{3}{4}x + 5$ and $y = \frac{3}{4}x + 4$
- D. $y = -\frac{3}{4}x + 8$ and $y = \frac{4}{3}x + 1$

Question 35
Benchmark E
Spring 2003

35. The area of the rectangle illustrated below is 3 square inches.

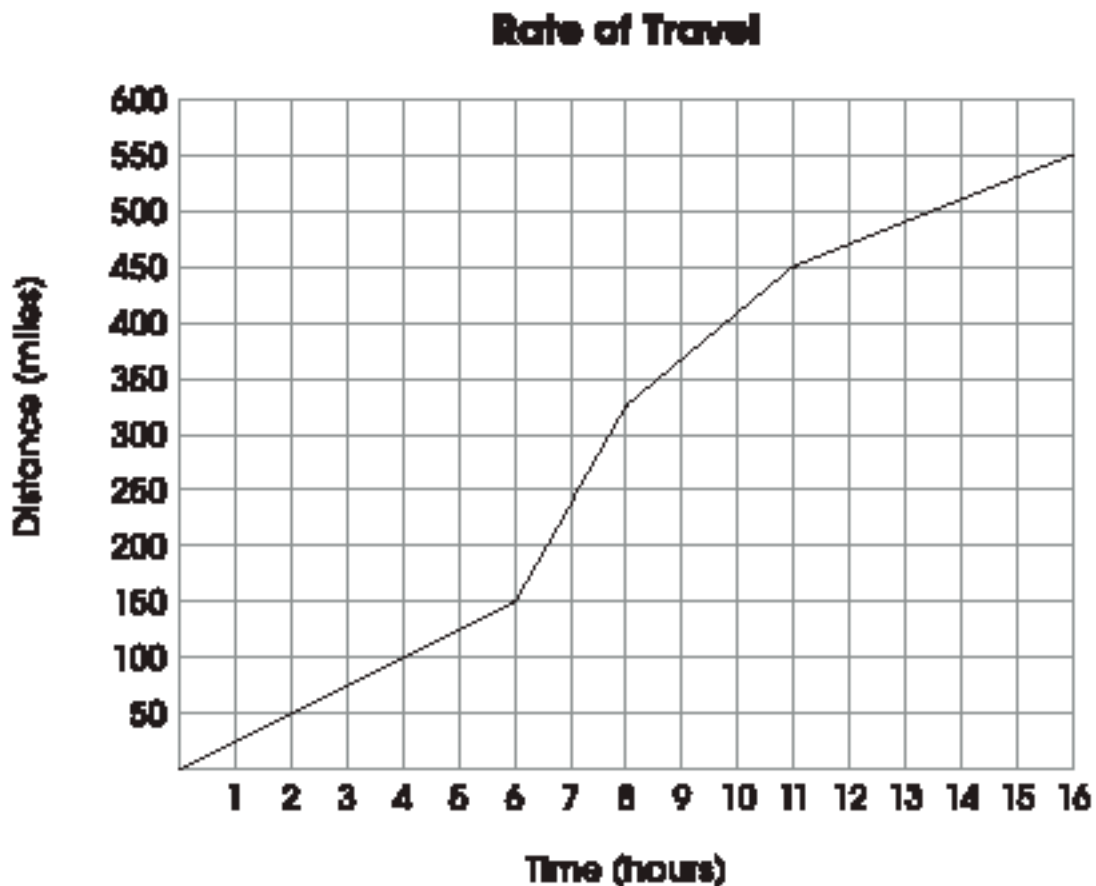


Marisa used the equation $(x - 2)(x - 4) = 3$ to determine the values for x to be 1 and 5.

In your **Answer Document**, show whether Marisa's solutions are correct for the problem situation. Support your answers by showing work or providing an explanation.

Question 7
Benchmark E
Spring 2004

7. Travis went on a long trip. The graph below represents the relationship between distance and time.

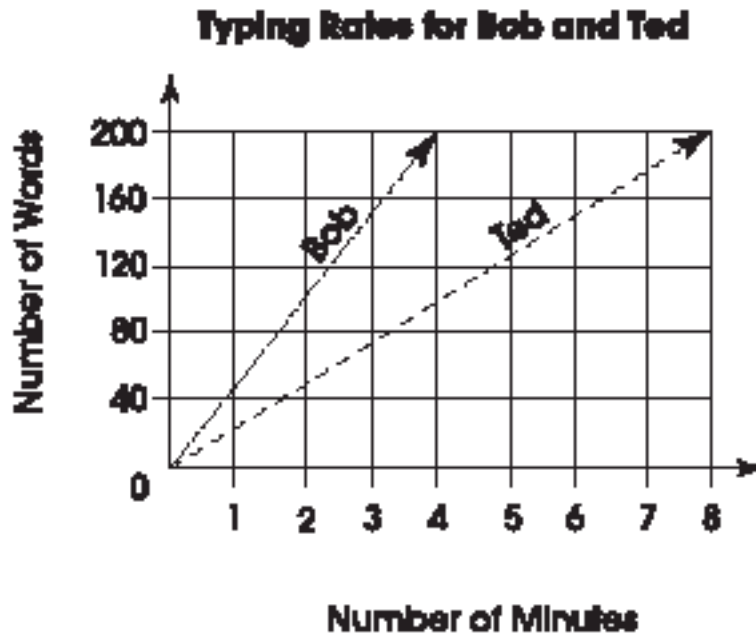


During what interval was Travis' average rate of travel the fastest?

- A. 0 to 6
- B. 6 to 8
- C. 8 to 11
- D. 11 to 16

Question 2
Benchmark E
Spring 2005

2. Ted and Bob each must type a 1,500-word research paper. The graph below represents their normal typing rates.



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

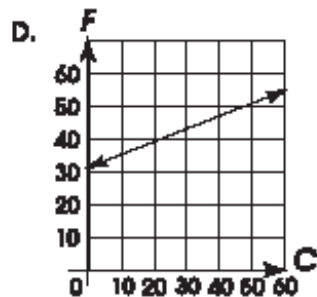
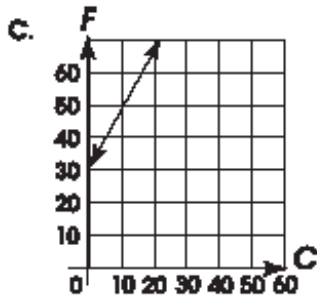
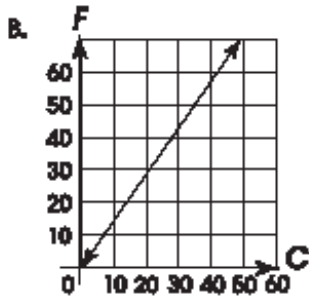
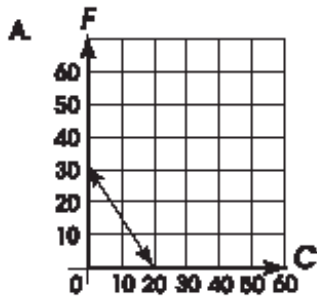
- A. Bob can type his research paper in half the time it takes Ted to type his paper.
- B. Ted can type his research paper in half the time it takes Bob to type his paper.
- C. Ted will take 4 minutes longer than Bob to type his research paper.
- D. Bob will take 4 minutes longer than Ted to type his research paper.

Question 23
Benchmark F
Spring 2003

23. A telephone manufacturing company has determined that the cost of producing a certain type of telephone can be found by using the equation $y = 42x + 2,000$, where y is the production cost and x is the number of telephones produced. The company accountant calculates an average daily production cost of \$8,426. Approximately how many telephones does the company produce daily?
- A. 153
 - B. 248
 - C. 6,426
 - D. 355,892

Question 31
Benchmark F
Spring 2003

31. The formula for converting temperature on the Celsius scale, C , to the Fahrenheit scale, F , is $F = \frac{9}{5}C + 32$. Which graph represents this equation?



Question 3
Benchmark F
Spring 2004

3. Which equation is equivalent to
 $3(2x - 5) = 4(x + 3)$?

- A. $2x = -27$
- B. $2x = 27$
- C. $10x = -27$
- D. $10x = -3$

Question 14
Benchmark F
Spring 2004

14. Pippi calculates her total earnings for the month with the equation

$$E = 15m + 5b,$$

where E is the total number of dollars she earns,
 m is the number of lawns she mows, and
 b is the number of hours she baby-sits.

If Pippi mows 6 lawns, how many hours must she baby-sit to earn a total of \$200?

- A. 20
- B. 22
- C. 40
- D. 45

Question 4
Benchmark F
Spring 2005

4. Neal is selecting a new health club. The one he likes has monthly dues of \$24 and a start-up fee of \$400. He has determined that the equation $y = 400 + 24x$ can be used to find y , the total cost of being a member at the club based on the number of months, x .

After how many months will Neal have spent exactly \$1,000 at this health club?

- A. 16
- B. 25
- C. 41
- D. 58

Question 18
Benchmark H
Spring 2004

18. A system of equations is shown below.

$$\begin{aligned}3x + 2y &= 19 \\2x - y &= 1\end{aligned}$$

What is the solution to the system of equations?

- A. $x = 1, y = 1$
- B. $x = 3, y = 5$
- C. $x = 7, y = -1$
- D. $x = 19, y = 1$

Question 32
Benchmark H
Spring 2004

Cameron had \$500 in savings on January 1.
Quinn had \$800 in savings on January 1.
Cameron deposits \$20 per week into his
savings account. Quinn withdraws
\$15 per week from his savings account.

In your **Answer Document**, write two equations:
one for the amount of money in Cameron's
savings x weeks after January 1st, and one for
the amount of money in Quinn's savings
 x weeks after January 1st.

Determine the number of weeks until Cameron
will have more money in his savings account
than Quinn. Show your work or provide an
explanation for your answer.

Question 38
Benchmark H
Spring 2005

38. Sara ordered 2 slices of pizza and a 12-ounce
cola and paid \$3.00. Sydney ordered 3 slices of
pizza and 2 12-ounce colas for \$4.75.

How much does a slice of pizza cost?

- A. \$0.50
- B. \$1.00
- C. \$1.25
- D. \$2.50

Question 26
Benchmark I
Spring 2003

Density is a physical property of matter which measures the mass of an object per unit of volume.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

As most stars grow older, the mass remains the same while the radius becomes smaller. What happens to the star's density as the star ages?

- A. The density increases.
- B. The density decreases.
- C. The density stays the same.
- D. The density increases and decreases periodically over time.

Question 14
Benchmark I
Spring 2005

14. Under ideal conditions, there is an inverse relationship between the pressure (P) and the volume (V) of a gas. The table shows the relationship of the experimental pressures recorded for four different volumes of the gas.

**Pressure and Volume of
Experimental Gas (Boyle's Law)**

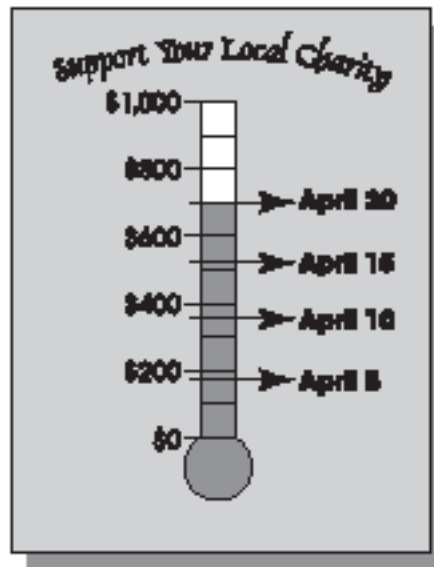
Volume (liters)	Pressure (kilopascals)
1.9	50.2
2.8	34.9
8.7	11.5
6.6	15.0

Which equation shows the relationship between the pressure and the volume of this gas?

- A. $V = \frac{P}{25}$
- B. $V = \frac{25}{P}$
- C. $V = \frac{100}{P}$
- D. $V = P - 48$

Question 24
Benchmark J
Spring 2005

24. Last spring, the employees of an Akron tire company contributed to a local charity. The graphic represents the total dollar contributions as of several dates in April.



In your **Answer Document**, determine on what date the charity could have expected to reach its goal of \$1,000, if the pattern of donations remains about the same. Show your work or provide an explanation for your answer.