

**VIRGINIA
STANDARDS OF LEARNING ASSESSMENTS**

Spring 2001 Released Test

**END OF COURSE
ALGEBRA I**

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Algebra I

DIRECTIONS

Read and solve each question. Then mark the space on the answer sheet for the best answer.

SAMPLE

Which shows $y = 2x + 4$ in completely factored form?

- A $y = 2(x + 4)$
- B $y = (x + 2)^2$
- C $y = 2(x + 2)$
- D $y = (x + 2)(x - 2)$

1 Which is an example of the commutative property of addition?

- A $3 + 5m = 3 + (1 + 4)m$
- B $3 + 5m = 5m + 3$
- C $3 + 5m = (3 + 5)m$
- D $3 + 5m = 3m + 5$

2 Pauline sells cookie baskets. She charges \$5 for the basket plus \$2 per cookie. If one filled basket sells for \$31, how many cookies are in it?

- F 13
- G 15
- H 18
- J 20

3 What property of real numbers justifies the following statement?

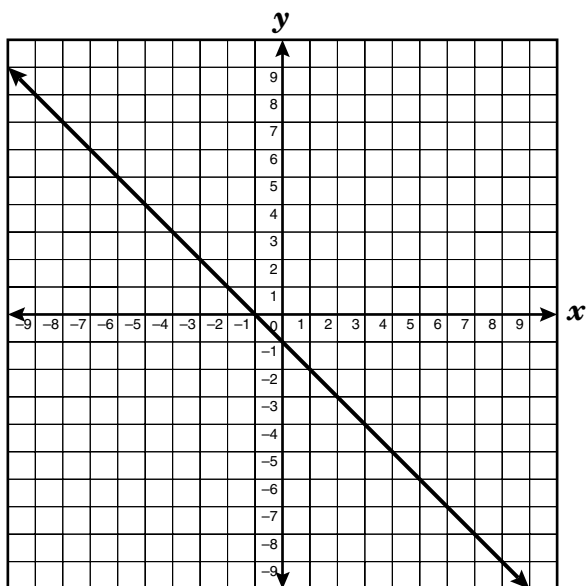
$4x(y + 2) - 3y$ is equivalent to $4x(y) + 4x(2) - 3y$

- A The associative property of multiplication
- B The commutative property of multiplication
- C The distributive property of multiplication over addition
- D The closure property of multiplication

4 What is the solution to $3(x - 5) \geq 12$?

- F $x \leq 1$
- G $x \geq -1$
- H $x \geq \frac{17}{3}$
- J $x \geq 9$

5



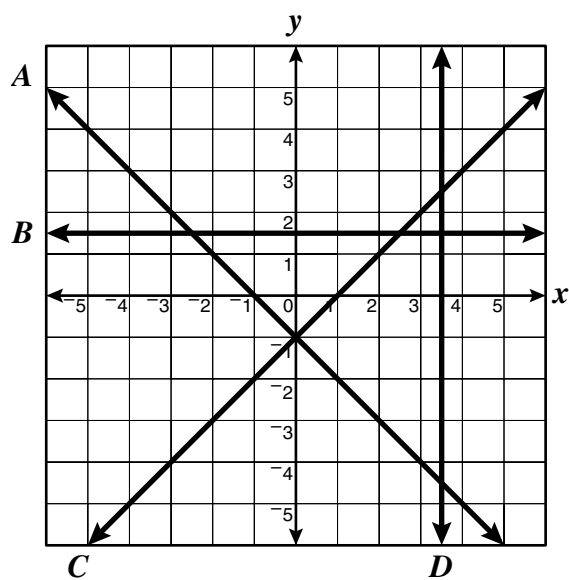
The line on the grid is best described by the equation —

- A $y = x + 1$
- B $y = x - 1$
- C $y = -x + 1$
- D $y = -x - 1$

6 What is the slope of the line that contains $(4, -1)$ and $(3, 3)$?

- F -4
- G $-\frac{1}{2}$
- H $-\frac{1}{4}$
- J 2

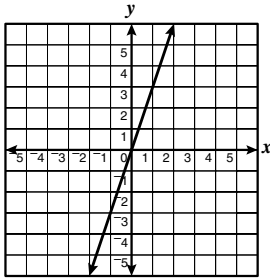
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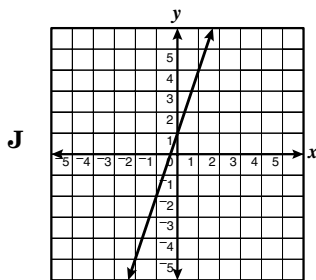
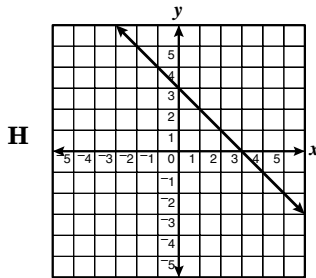
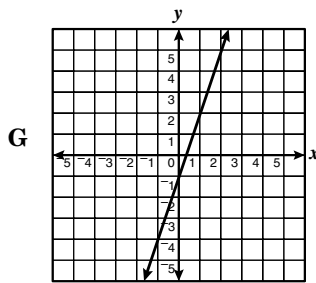
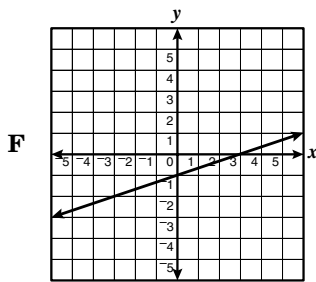
Which line on the graph has an undefined slope?

- A A
- B B
- C C
- D D

- 8 The graph below represents the equation $y = 3x$.



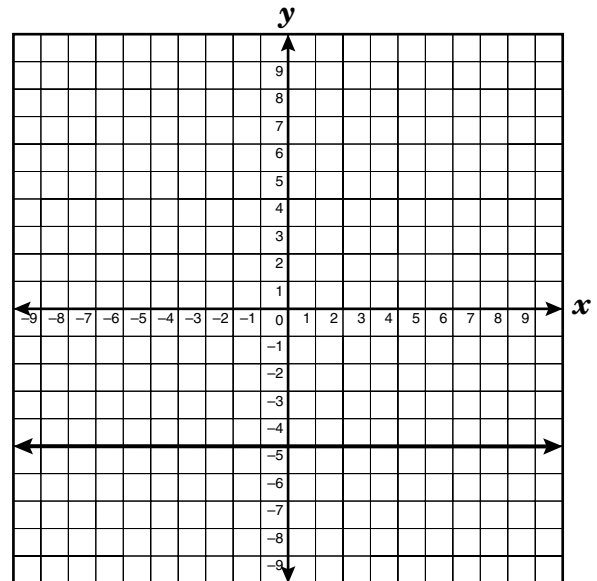
Which graph best represents $y = 3x - 1$?



- 9 What is the slope of the line $3x + y = 5$?

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

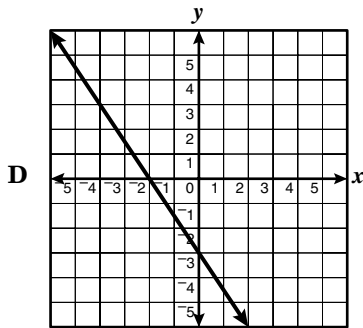
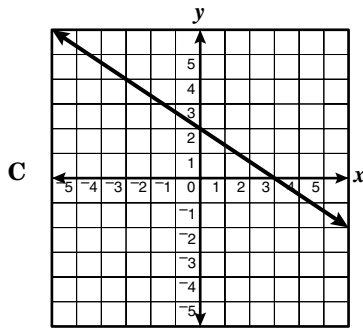
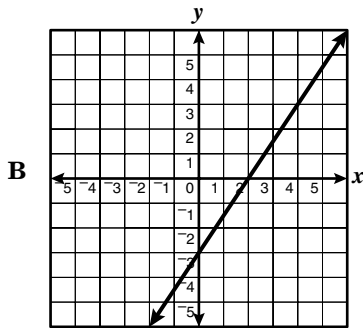
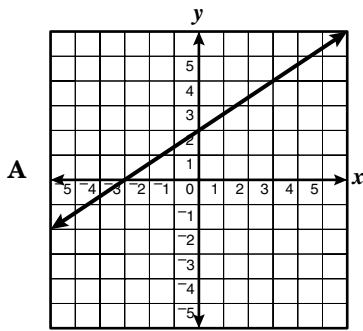
- 10



Which equation best describes this graph?

- F $x = 5y$
- G $x = -5$
- H $y = -5x$
- J $y = -5$

- 11 Which line has y -intercept -3 and x -intercept 2 ?



- 12 During a sale, an automobile dealer sold 69 cars and trucks. If she sold 27 more cars than trucks, how many of each did she sell?

- F 48 cars, 21 trucks
 G 45 cars, 24 trucks
 H 42 cars, 27 trucks
 J 35 cars, 34 trucks

- 13 A line has a slope of -2 and contains the point $(1, -1)$. Which is an equation of this line?

- A $y = -2x - 1$
 B $y = -x + 2$
 C $y = -2x + 1$
 D $y = 2x - 3$

14
$$\begin{cases} 2x + y = 4 \\ 3x - y = -14 \end{cases}$$

Which is the solution to the system of equations shown?

- F $(-2, 8)$
 G $(-2, 0)$
 H $(2, 0)$
 J $(0, -2)$

15 Which is an equation for the line that contains the points $(-2, 3)$ and $(2, -1)$?

- A $y = x + 5$
- B $y = x - 3$
- C $y = -x + 1$
- D $y = -2x - 1$

16 The velocity of an object in a liquid can be described by the equation $v = 20 - t - t^2$ where v is the velocity in meters per second and t is time in seconds. At what time will $v = 0$?

- F 4 sec
- G 5 sec
- H 6 sec
- J 7 sec

17 A weather balloon in the shape of a sphere has a surface area of 160 square meters. If the formula for the surface area of a sphere is $S.A. = 4\pi r^2$, to the nearest tenth of a meter, what is the radius of the balloon?

- A 2.0 m
- B 3.6 m
- C 11.2 m
- D 12.7 m

18 Mary published her first book. She was given \$10,000.00 and an additional \$0.10 for each copy of the book that sold. Her earnings, d , in dollars, from the publication of her book are given by

$$d = 10,000 + 0.1n$$

where n is the number of copies sold. During the first year Mary earned \$35,000.00 from the publication and sale of her book. How many copies of her book sold in the first year?

- F 25,000
- G 35,000
- H 250,000
- J 350,000

19 When completely factored, $3x^2 - 48$ equals —

- A $3(x^2 - 48)$
- B $3(x^2 + 16)$
- C $3(x - 4)(x + 4)$
- D $(3x - 16)(x + 3)$

20 Victor bought a computer for \$1,800. He made a down payment of \$200 and will pay the rest in 5 equal payments. If p represents the amount of each payment, which equation can be used to find this amount?

- F $\$200p = \$1,800$
- G $\$1,800 + 5p = \200
- H $\$1,800 + \$200 = 5p$
- J $\$1,800 = 5p + \200

21 When completely factored, $x^2 + x - 12$ equals —

- A $(x + 3)(x - 4)$
- B $(x + 4)(x - 3)$
- C $(x + 7)(x - 5)$
- D $(x + 12)(x - 1)$

22 The population of Asia is about 3.4×10^9 . The population of Africa is about 7×10^8 . About how many more people live in Asia than live in Africa?

- F 27,000,000
- G 270,000,000
- H 360,000,000
- J 2,700,000,000

23 Which is equivalent to $(5x^2 + 4x + 1) + (-7x + 2)$?

- A $-2x^2 + 6x + 1$
- B $5x^2 - 3x - 1$
- C $5x^2 - 3x + 3$
- D $5x^2 + 11x + 3$

24 Which expression is equivalent to $\frac{8x^4 - 2x^2}{2x^2}$?

- F $4x^2$
- G $6x^2$
- H $4x^2 - 1$
- J $6x^2 - 1$

25 Which is closest to the value of $3\sqrt{5}$?

- A 3.9
- B 6.7
- C 7.5
- D 8.7

26 One factor of $5x^2 + 13x - 6$ is —

- F $5x - 6$
- G $5x - 1$
- H $5x - 2$
- J $5x - 3$

27 What is the value of $x(5 + y)$ if $x = 4$ and $y = 2$?

- A 18
- B 22
- C 28
- D 36

28 Ben's Bakery charges a fee of $2d + 25$ to deliver d boxes of baked goods while Dan's Bakery charges $3d + 20$. Which expression describes how much more Dan's Bakery charges than Ben's Bakery?

- F $5d + 45$
- G $d - 5$
- H $d + 5$
- J $-d + 5$

29 Which is equivalent to $\frac{b^6}{b^2}$?

A $\frac{1}{b^3}$

B b^3

C b^4

D b^8

30 Which is closest to the value of $\sqrt{12} \cdot \sqrt{15}$?

F 52.0

G 13.5

H 13.4

J 6.7

31 Which of the following tables does *not* represent a function?

A

| x | $f(x)$ |
|-----|--------|
| 2 | 7 |
| 3 | 10 |
| 5 | 16 |
| 8 | 25 |

B

| x | $f(x)$ |
|-----|--------|
| 1 | 2 |
| 7 | 2 |
| -4 | 2 |
| -5 | 2 |

C

| x | $f(x)$ |
|-----|--------|
| 36 | 6 |
| 36 | -6 |
| 25 | 5 |
| 25 | -5 |

D

| x | $f(x)$ |
|-----|--------|
| 0 | 36 |
| 2 | 38 |
| 9 | 45 |
| 20 | 56 |

32

| x | y |
|-----|-----|
| 0 | 4 |
| 3 | 1 |
| 6 | -2 |

Which equation *most* likely describes the relation indicated by the table?

F $y = x + 4$

G $y = x - 2$

H $y = -x + 4$

J $y = -x - 8$

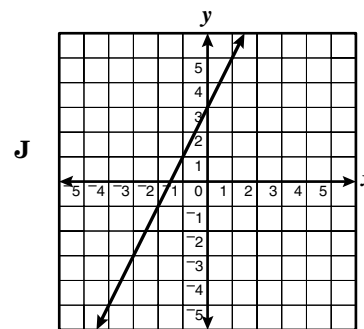
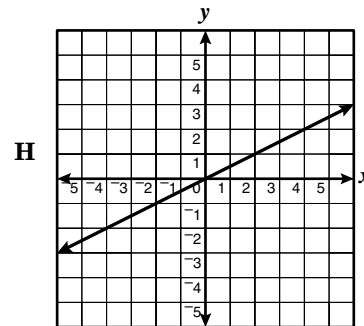
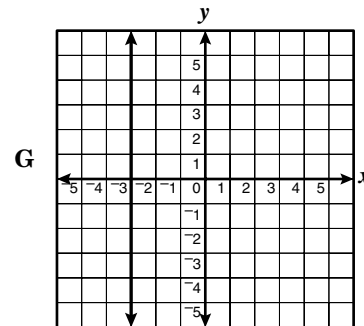
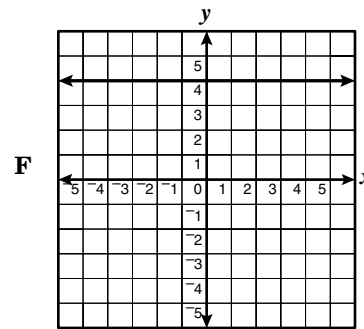
- 33 The table shows the relationship between the cost, c , in dollars of a taxi ride and the number, t , of minutes the ride lasts.

| t | 5 | 10 | 15 | 20 |
|-----|------|-----|------|----|
| c | 4.75 | 6.5 | 8.25 | 10 |

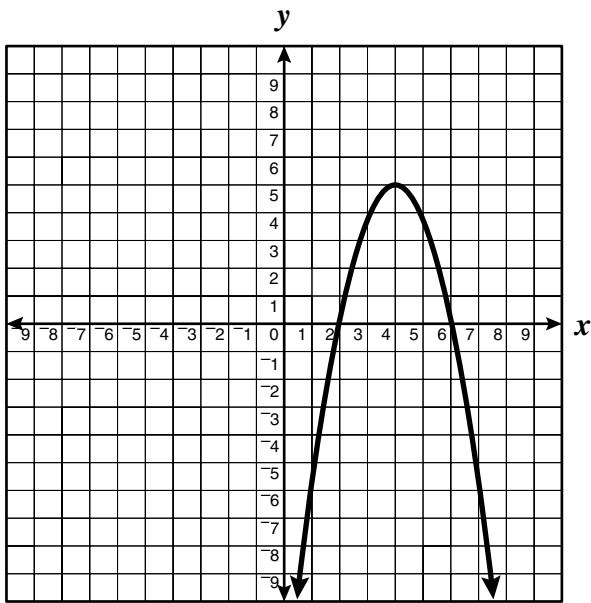
Which equation algebraically represents this data?

- A $c = 3 + 0.35t$
- B $c = 2.75 + 0.5t$
- C $c = t - 0.25$
- D $c = 4 + 0.15t$

- 34 In which graph is y a direct variation of x ?



35 The graph shows part of a function f .



What is the range of the function?

- A All real numbers
- B All real numbers less than or equal to five
- C All real numbers greater than zero
- D All real numbers between 2 and 6

36 In which table are all the points represented by the equation

$$y = -\frac{x}{4} + 2?$$

F

| | | | | |
|-----|---|---|---------------|---|
| x | 0 | 2 | 6 | 8 |
| y | 2 | 1 | $\frac{1}{2}$ | 0 |

G

| | | | | |
|-----|---|---|---------------|---|
| x | 0 | 4 | 6 | 8 |
| y | 2 | 1 | $\frac{1}{2}$ | 0 |

H

| | | | | |
|-----|---|---|---|----|
| x | 0 | 4 | 6 | 8 |
| y | 2 | 1 | 0 | -1 |

J

| | | | | |
|-----|---|---|---|----------------|
| x | 0 | 2 | 4 | 6 |
| y | 2 | 1 | 0 | $-\frac{1}{2}$ |

37 Which equation represents an inverse variation?

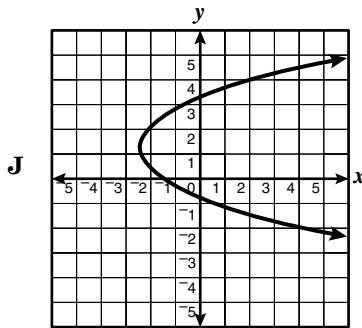
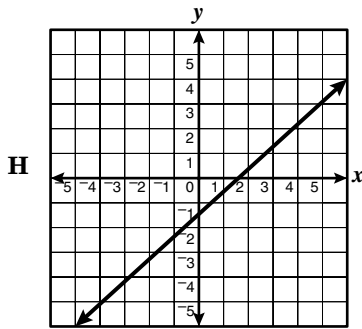
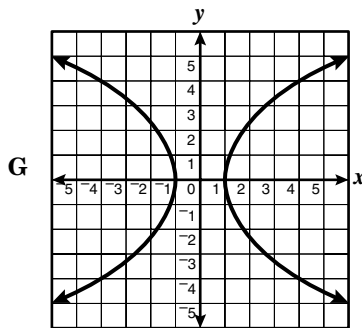
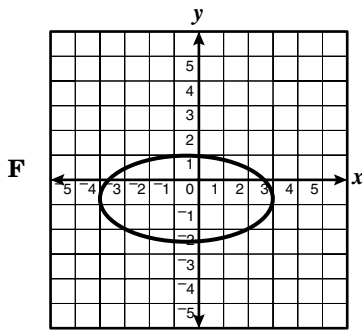
A $\frac{a}{4} = \frac{b}{9}$

B $\frac{a}{5} = \frac{2}{b}$

C $2a + 3 = 4b + 3$

D $\frac{a}{b} = 7$

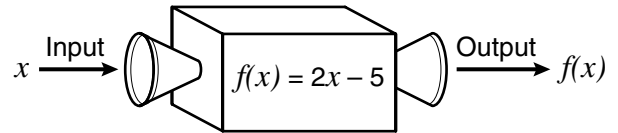
38 Which of the following represents the graph of a function?



39 Which of the following sets of ordered pairs is a function?

- A $\{(2, 1), (2, 2), (3, 4), (5, 6)\}$
- B $\{(-2, -1), (1, 2), (3, 4), (1, 5)\}$
- C $\{(1, 2), (2, 2), (3, 3), (2, 4)\}$
- D $\{(1, 1), (2, 1), (3, 2), (4, 4)\}$

40



Using the function machine from the diagram, what is $f(10)$?

- F 5
- G 7.5
- H 15
- J 25

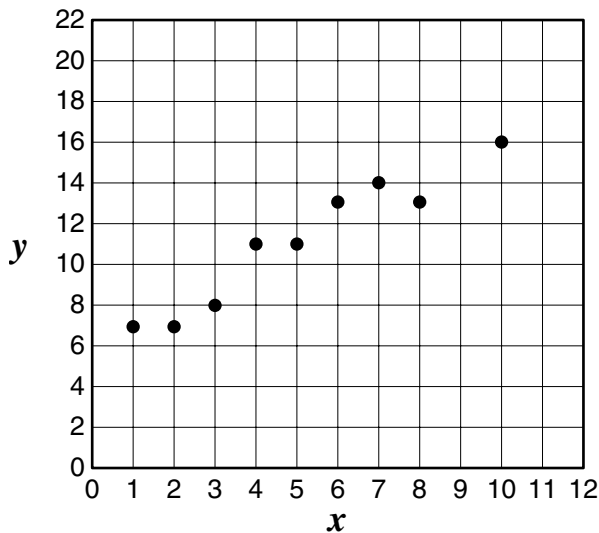
41 Which is a zero of the function $f(x) = x^2 + 3x - 4$?

- A -4
- B -1
- C 3
- D 4

42 What is the range of the function $f(x) = \frac{1}{2}x + 5$ when the domain is $\{2, 4, 6\}$?

- F $\{-6, -2, 2\}$
- G $\{6, 7, 8\}$
- H $\{2, 4, 6\}$
- J $\{1, 3, 5\}$

43



Based on the scatterplot, which x value would best match $y = 17$?

- A 8
- B 11
- C 14
- D 17

44 Which of the following operations

would result in the matrix $\begin{bmatrix} -4 & 2 \\ 6 & 1 \end{bmatrix}$?

F $2 \begin{bmatrix} -2 & 1 \\ 3 & 0 \end{bmatrix}$

G $\frac{1}{2} \begin{bmatrix} -2 & 1 \\ 3 & 0 \end{bmatrix}$

H $\begin{bmatrix} 5 & 5 \\ 4 & 3 \end{bmatrix} - \begin{bmatrix} -1 & -3 \\ -2 & -2 \end{bmatrix}$

J $\begin{bmatrix} 3 & -1 \\ -2 & 2 \end{bmatrix} + \begin{bmatrix} -7 & 3 \\ 8 & -1 \end{bmatrix}$

45 During a summer reading program, Mary read 9 books. The books contained 217 pages, 138 pages, 159 pages, 356 pages, 270 pages, 112 pages, 138 pages, 210 pages, and 195 pages. What was the median number of pages of the 9 books that Mary read during the summer reading program?

- A 138
- B 159
- C 195
- D 244

46 $[Q] = \begin{bmatrix} 2 & 1 \\ -1 & 1 \\ 3 & 4 \end{bmatrix}$ $[R] = \begin{bmatrix} -7 & 3 \\ -4 & 1 \\ 3 & -2 \end{bmatrix}$

$[Q] - [R] = ?$

F $\begin{bmatrix} -2 & 9 \\ 0 & 3 \\ 6 & 9 \end{bmatrix}$

G $\begin{bmatrix} 9 & -2 \\ 3 & 0 \\ 0 & 6 \end{bmatrix}$

H $\begin{bmatrix} -5 & 2 \\ -5 & 0 \\ -9 & -6 \end{bmatrix}$

J $\begin{bmatrix} 7 \\ 3 \\ -11 \end{bmatrix}$

47 In which data set is the median value equal to the mean value?

- A {2, 4, 6, 7, 8}
- B {12, 18, 20, 23, 24}
- C {16, 17, 18, 19, 20}
- D {50, 60, 65, 75, 85}

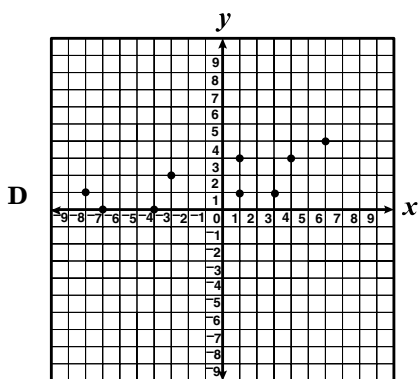
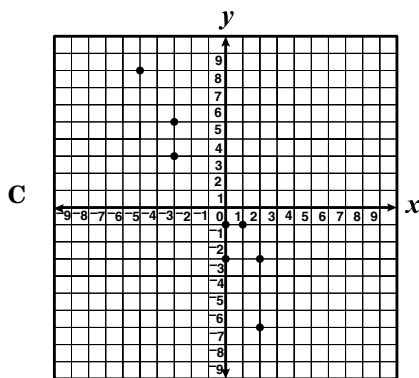
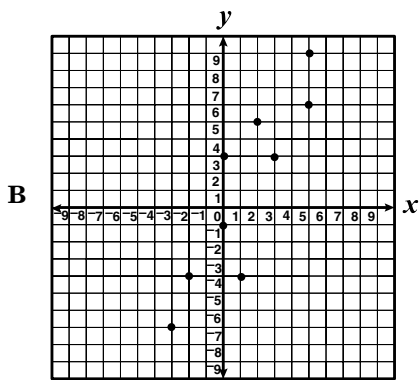
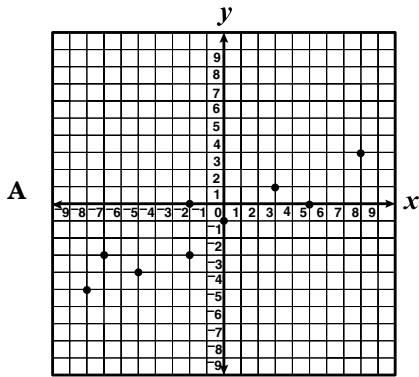
48 Jorge made the following stem-and-leaf diagram of the weights of the members of the football team he was coaching.

| Stem | Leaf |
|------|---------------------|
| 10 | 9 |
| 11 | |
| 12 | 3, 8 |
| 13 | 2, 4, 4, 6, 8 |
| 14 | 1, 3, 5, 5, 9 |
| 15 | 2, 3, 7, 7, 9 |
| 16 | 1, 3, 7, 8, 8, 8, 9 |
| 17 | 3, 8 |

What was the mode of the weight of the players on the team?

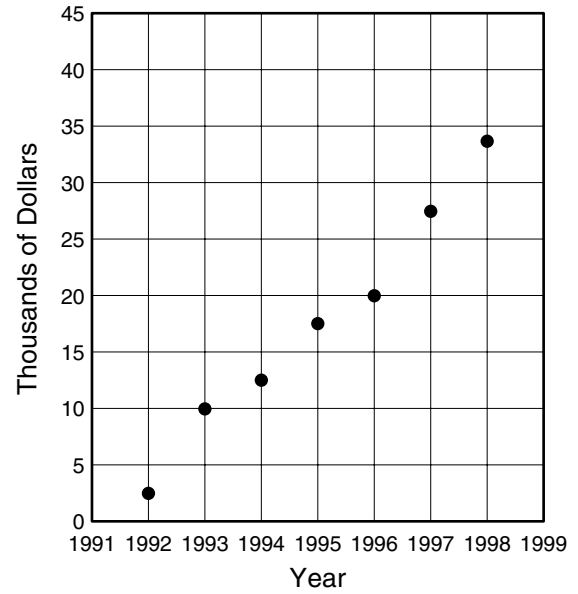
- F 145
- G 150
- H 152
- J 168

- 49 Using the median fit method, which scatterplot most likely has a line of best fit represented by $y = 2x - 1$?



50

Annual Income



Using the data plotted on the scatterplot, which is the *best* prediction for income in the year 2000?

- F 35,000
- G 43,000
- H 50,000
- J 57,000



Answer Key

| Test Sequence | Correct Answer | Reporting Category | Reporting Category Description |
|---------------|----------------|--------------------|--------------------------------|
| 1 | B | 003 | Equations and Inequalities |
| 2 | F | 003 | Equations and Inequalities |
| 3 | C | 003 | Equations and Inequalities |
| 4 | J | 003 | Equations and Inequalities |
| 5 | D | 003 | Equations and Inequalities |
| 6 | F | 003 | Equations and Inequalities |
| 7 | D | 003 | Equations and Inequalities |
| 8 | G | 003 | Equations and Inequalities |
| 9 | B | 003 | Equations and Inequalities |
| 10 | J | 003 | Equations and Inequalities |
| 11 | B | 003 | Equations and Inequalities |
| 12 | F | 003 | Equations and Inequalities |
| 13 | C | 003 | Equations and Inequalities |
| 14 | F | 003 | Equations and Inequalities |
| 15 | C | 003 | Equations and Inequalities |
| 16 | F | 003 | Equations and Inequalities |
| 17 | B | 003 | Equations and Inequalities |
| 18 | H | 003 | Equations and Inequalities |
| 19 | C | 001 | Expressions and Operations |
| 20 | J | 001 | Expressions and Operations |
| 21 | B | 001 | Expressions and Operations |
| 22 | J | 001 | Expressions and Operations |
| 23 | C | 001 | Expressions and Operations |
| 24 | H | 001 | Expressions and Operations |
| 25 | B | 001 | Expressions and Operations |
| 26 | H | 001 | Expressions and Operations |
| 27 | C | 001 | Expressions and Operations |
| 28 | G | 001 | Expressions and Operations |
| 29 | C | 001 | Expressions and Operations |
| 30 | H | 001 | Expressions and Operations |
| 31 | C | 002 | Relations and Functions |
| 32 | H | 002 | Relations and Functions |
| 33 | A | 002 | Relations and Functions |
| 34 | H | 002 | Relations and Functions |
| 35 | B | 002 | Relations and Functions |
| 36 | G | 002 | Relations and Functions |
| 37 | B | 002 | Relations and Functions |
| 38 | H | 002 | Relations and Functions |
| 39 | D | 002 | Relations and Functions |
| 40 | H | 002 | Relations and Functions |
| 41 | A | 002 | Relations and Functions |
| 42 | G | 002 | Relations and Functions |
| 43 | B | 004 | Statistics |
| 44 | J | 004 | Statistics |
| 45 | C | 004 | Statistics |
| 46 | G | 004 | Statistics |
| 47 | C | 004 | Statistics |
| 48 | J | 004 | Statistics |
| 49 | B | 004 | Statistics |
| 50 | G | 004 | Statistics |