VIRGINIA
STANDARDS OF LEARNING ASSESSMENTS

Spring 2002 Released Test

END OF COURSE
ALGEBRA I

DIRECTIONS

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

SAMPLE

What is the value of $3(2x + 5y)$ if $x = 2$ and $y = {}^-3$?

A $^-33$

B $^-27$

C   33

D   57

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1   **Which property justifies the following statement?**

If $3a + 3b = 12$ then $3(a + b) = 12$

A   Commutative property of multiplication

B   Distributive property for multiplication over addition

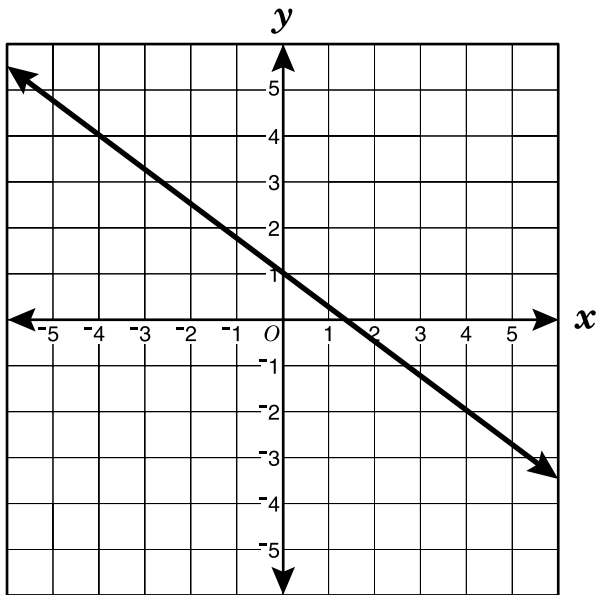C   Multiplicative identity property

D   Associative property of addition

2   **A rectangular planter can hold 2,304 cubic inches of soil. The dimensions of the base of the planter are 24 inches by 12 inches.**
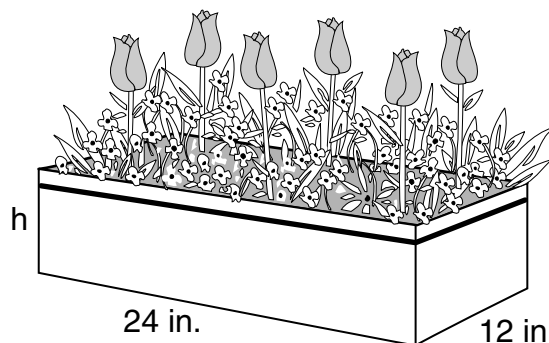
What is the height of the planter?

F   4 inches

G   8 inches

H   16 inches

J   192 inches

GO ON

3 The graph of $y = \dfrac{^-3}{4}x + 1$ is shown.

If the line in the graph is shifted up 2 units, which is the equation of the new line?

A $y = \dfrac{3}{4}x + 3$

B $y = \dfrac{3}{4}x + 2$

C $y = \dfrac{^-3}{4}x + 2$

D $y = \dfrac{^-3}{4}x + 3$

4 What is the solution to $12 - \dfrac{1}{9}d = 17$?

F $d = {}^-243$

G $d = {}^-45$

H $d = {}^-3$

J $d = \dfrac{^-5}{9}$

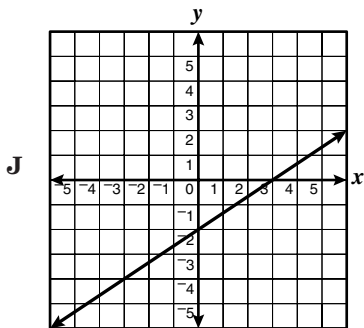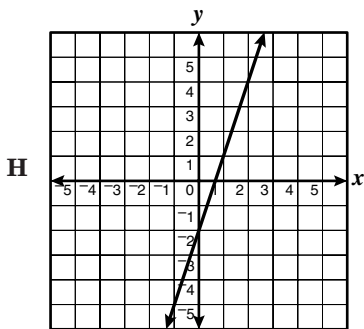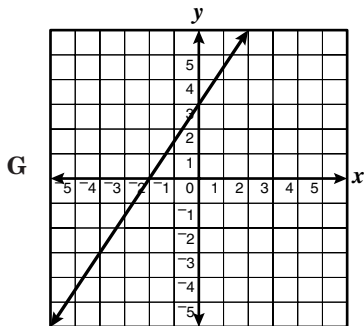**5** Which statement is *always* true?

A $4 + a = 4 \cdot a$

B $a + (^-4 + 4) = a + 0$

C $a \div 4 = 4 \div a$

D $4 - a = a - 4$

6 Which is the graph of a line that appears to have a slope of 3 and *y*-intercept ⁻2?

F

G

H

J
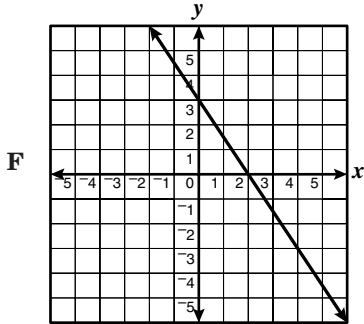
7 What is the slope of the line that contains points (2, 3) and (2, ⁻4)?

A Undefined

B 0

C $\dfrac{^-1}{4}$

D ⁻4

8

Which best represents the equation of the line shown?

F $y = 2x + 1$

G $y = 2x - 1$

H $y = ^-2x + 1$

J $y = ^-2x - 1$

GO ON

9 What is the slope of the line represented by the equation $^-2y = x - 1$?
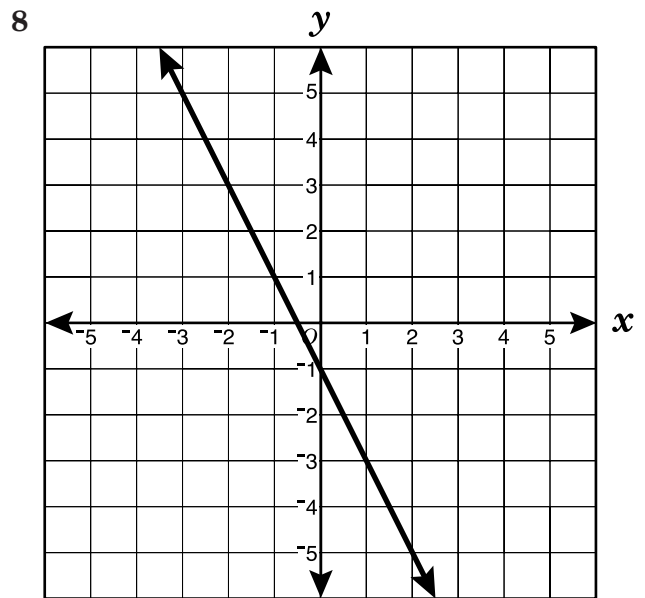
A $^-2$

B $\dfrac{^-1}{2}$

C $\dfrac{1}{2}$

D 2

10
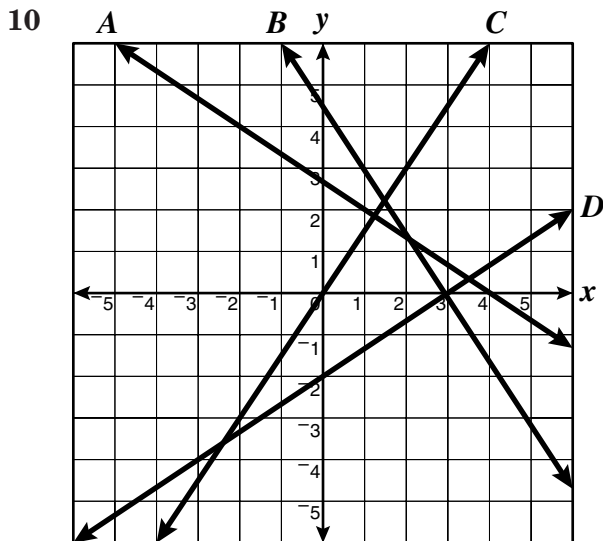
Which line on the grid appears to have slope $\dfrac{2}{3}$?

F A

G B

H C

J D

11
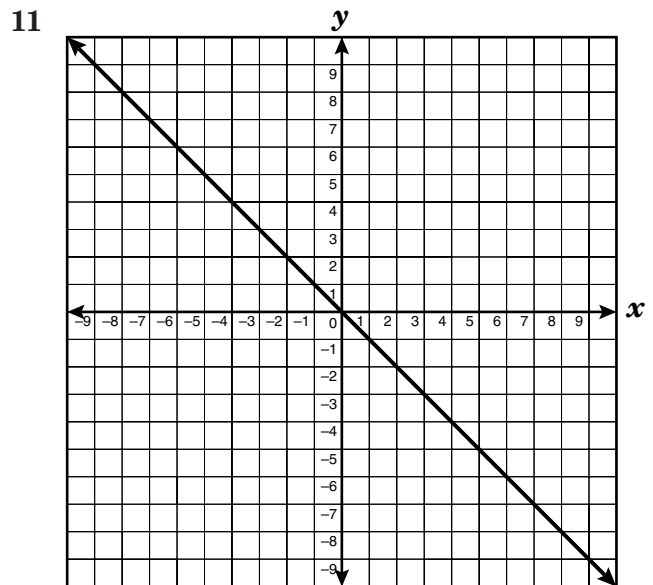
An equation for the line shown could be —

A $y = x$

B $y = {}^-x$

C $y = x - 1$

D $y = x + 1$

12 What is the solution to this system of equations?

$$\begin{cases} 5x + 4y = 22 \\ 3x + 4y = 10 \end{cases}$$

F $x = 2, y = 2$

G $x = 2, y = 3$

H $x = 2, y = 1$

J $x = 6, y = {}^-2$

13 Kristy is making a rectangular quilt that is 2 feet longer than it is wide. If the perimeter of the quilt is to be 32 feet, what will be its dimensions?

   A 4 ft by 8 ft

   B 5 ft by 7 ft

   C 7 ft by 9 ft

   D 15 ft by 17 ft

14

Which is most likely the solution to the system of equations shown in the graph?
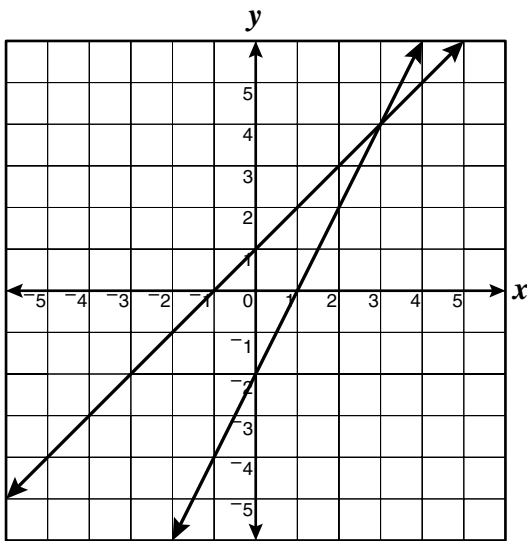
   F (4, 3)

   G ($^-$2, 0)

   H (3, 4)

   J (1, 0)

15 Which is an equation for the line that contains the points ($^-$3, 5) and (1, $^-$3)?

   A $y = {}^-x + 2$

   B $y = {}^-2x - 1$

   C $y = -\dfrac{1}{2}x - \dfrac{3}{2}$

   D $y = \dfrac{3}{2}x - \dfrac{9}{2}$

16 Which is a solution to $(2x + 3)^2 = 25$?

   F $^-$4

   G $^-$2

   H $^-$1

   J 2

17 The dimensions of a rectangle are shown in the drawing below.

$d - 12$

d
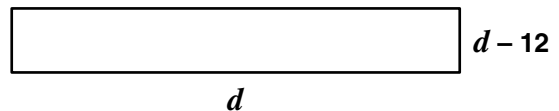
If the area is 28 square units, what is the value of d?

   A 2 units

   B 7 units

   C 12 units

   D 14 units

18 What is the solution to $2x + 3 \geq x - 5$?

F $x \geq \dfrac{^-8}{3}$

G $x \geq {}^-8$

H $x \geq \dfrac{^-2}{3}$

J $x \geq {}^-2$

19 What is the value of $a(b - c)$ if $a = 2$, $b = {}^-3$ and $c = {}^-2$?

A   2

B $^-2$

C $^-4$

D $^-10$

20 Each week Jessica earns a 2% bonus on any sales she makes over \$600. She also receives a fixed salary of \$190 per week. If Jessica sold \$1,300 worth of merchandise in a week, which equation could be used to determine her total earnings, *t*, for the week?

F $t = (0.02)[1.90 + (1{,}300 - 600)]$

G $t = 190 + (0.02)(600)$

H $t = (190 + 600)(0.02)$

J $t = 190 + (0.02)(1{,}300 - 600)$

21 Which expression correctly describes x divided by the sum of y and 7?

A $\quad x \div y + 7$

B $\quad \dfrac{x}{y + 7}$

C $\quad \dfrac{x}{y} + 7$

D $\quad \dfrac{y + 7}{x}$

22 Which is equivalent to $(2x^2)^3$?

F $\quad 8x^6$

G $\quad 6x^6$

H $\quad 8x^5$

J $\quad 6x^5$

23 The diameter of a barium atom is 0.0000004346 millimeters. In scientific notation it is —

A $\quad 43.46 \times 10^{-8}$ mm
B $\quad 4.346 \times 10^{7}$ mm
C $\quad 4.346 \times 10^{-7}$ mm
D $\quad 4346.0 \times 10^{-7}$ mm

24 The length of a rectangular classroom floor is 19 feet less than twice the width.

$2w - 19$

w
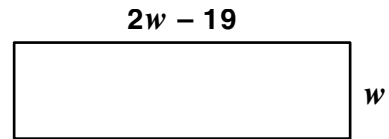
Which expression represents the area of the classroom floor?

F $\quad 3w - 19$
G $\quad 6w - 38$
H $\quad 2w^2 - 19w$
J $\quad 2w^2 - 19$

25 Which is closest to the value of x if $x = 3\sqrt{11} + 4\sqrt{11}$?

A $\quad 13.6$
B $\quad 23.2$
C $\quad 77$
D $\quad 132$

GO ON

26 Consider the following models

$\square$ = x^2 $\square$ = x $\square$ = 1

$\blacksquare$ = $^-x^2$ $\blacksquare$ = ^-x $\blacksquare$ = $^-1$

What polynomial is represented by this diagram?
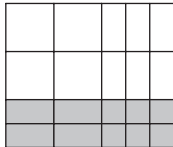
F $4x^2 - 10x - 6$

G $4x^2 - 2x - 6$

H $4x^2 + 2x - 6$

J $4x^2 + 10x + 6$

27 $\dfrac{12x^5y - 3x^{10}y^3 + 21x^{15}y^4}{3x^5y}$ is equivalent to —

A $4 - x^5y^2 + 7x^{10}y^3$

B $4xy - x^5y^2 + 7x^{10}y^3$

C $4 - x^5y^3 + 7x^{10}y^4$

D $4xy - x^2y^3 + 7x^3y^4$

28 If the area of a rectangle can be represented by $x^2 - 25$, which could represent its length and width?

F $x - 5, x - 5$

G $x - 5, x + 5$

H $x^2, {}^-25$

J $5, 5$

29 Which is the complete factorization of $2x^2 + 5x + 3$?

A $(2x + 1)(x + 2)$

B $(2x + 1)(x + 3)$

C $(2x + 2)(x + 1)$

D $(2x + 3)(x + 1)$

30 The height of an equilateral triangle can be determined by evaluating the expression $\dfrac{n\sqrt{3}}{2}$ where n is the length of a side of the triangle. To the nearest tenth of an inch, what is the height of an equilateral triangle with sides of 6.5 inches?

F 3.5 in.

G 4.8 in.

H 5.6 in.

J 10.4 in.

GO ON

31
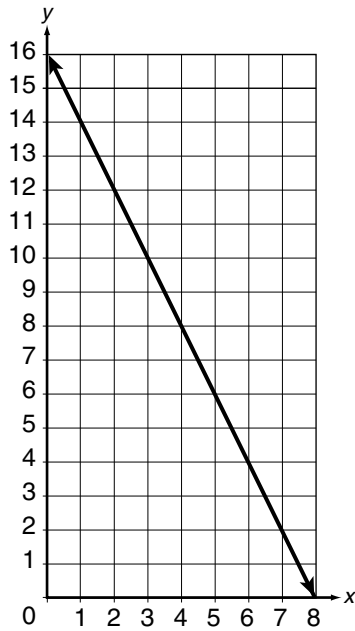
Which equation best describes this graph?

A $y = 20 - 4x$

B $y = x + 14 - x^2$

C $y = 16 - 2x$

D $y = x^2 - 5x + 18$

32

x	$^-6$	2	10
y	1	3	5

Which equation is satisfied by all the points in the table?

F $x - 4y = 10$

G $4y - x = 10$

H $7y - x = 20$

J $x - 7y = 20$

33 **The ordered pairs in the table follow a quadratic pattern.**

8	2	7	9	4	x
64	4	49	81	16	25

What is the value of x?

A 10

B 6

C 5

D 3

34
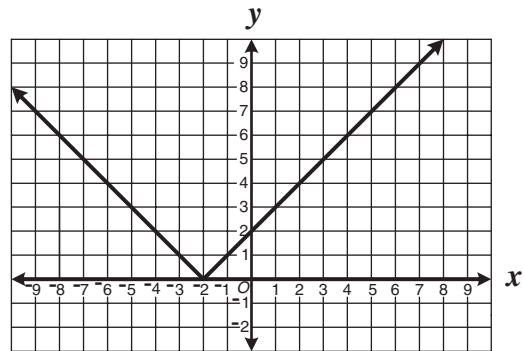
What is the domain of the function shown?

F {All real numbers greater than zero}

G {All real numbers}

H {All real numbers less than $^-2$}

J {All real numbers greater than $^-2$}

35
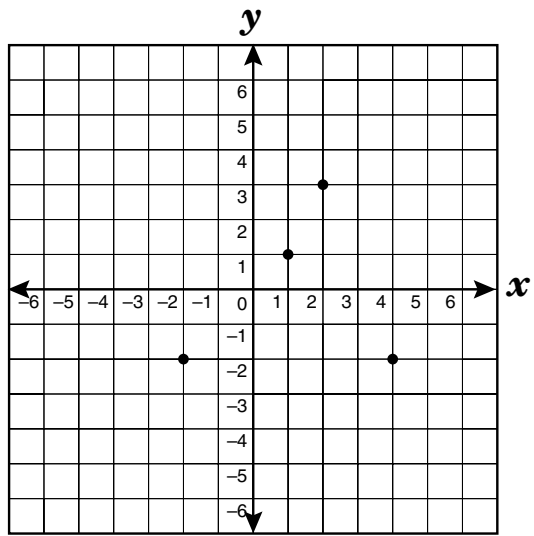
What is the apparent range of the relation shown on the grid?

A {⁻2, 1, 3}

B {⁻2, 1, 2, 4}

C {1, 2, 3, 4}

D {⁻2, 2, 3, 4}

36

x	1	4	3
y	4	⁻2	0

Which graph appears to contain all the points in the table?

F

G

H

J

37 If a varies directly as b and $a = 3$ when $b = 12$, what is the value of a when $b = 18$?

   A 0.25

   B 4

   C 4.5

   D 72

38 Which set of ordered pairs is *not* a function?

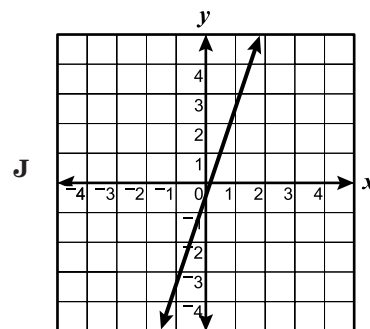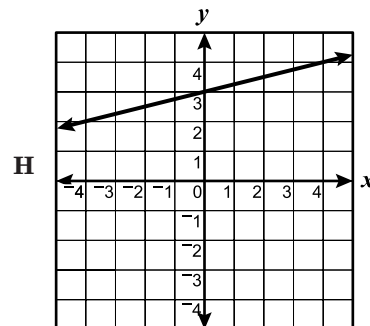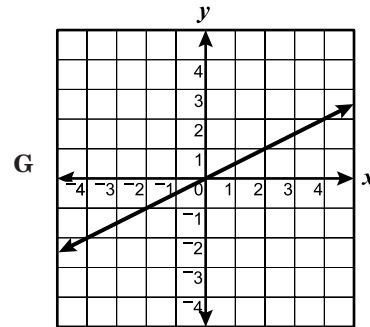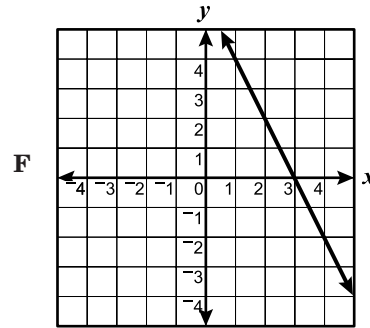   **F** {(⁻2, 3), (4, 1), (2, 1), (1, 5)}
   G {(1, 4), (2, 3), (3, 2), (4, 3)}
   H {(2, 3), (3, 2), (4, 4), (5, 2)}
   J {(⁻2, 3), (1, 4), (2, 3), (1, 5)}

39 The stress distribution on a structure is given by $s = 2x^2 + 4x - 30$ where s is stress in pounds per square inch and x is the distance in feet from a reference point. At what distance is the stress equal to 0?

   A 3 ft
   B 5 ft
   C 6 ft
   D 12 ft

40 In which table of ordered pairs does n vary directly as m?

F

m	n
⁻2	⁻1
⁻1	⁻2
1	2

G

m	n
⁻2	4
⁻1	2
1	⁻2

H

m	n
⁻2	⁻2.5
⁻1	⁻5.0
1	5.0

J

m	n
⁻2	⁻2
⁻1	⁻4
1	4

41 Which is a zero of the function $f(x) = 3x - 21$?

   A ⁻21
   B ⁻7
   C 0
   D 7

42 A lumber yard sells square scraps of plywood with sides varying from 1 foot to 4 feet. Ed wants to use some of these pieces to build storage cubes. The relationship between the length of the side of a cube and the volume of the cube is expressed by the function

$$f(x) = x^3$$

where x is the length of a side of the cube. What is the range of this function in cubic feet for the domain given?

F Range varies from 1 to 64

G Range varies from 1 to 16

H {1, 64}

J {1, 16}

43

$$[B] = \begin{bmatrix} 2 & 0 & 5 \\ \text{-}3 & 1 & \text{-}2 \\ 4 & \text{-}1 & \text{-}2 \end{bmatrix}$$

$4[B] = ?$

A $\begin{bmatrix} 6 & 0 & 9 \\ 1 & 5 & 2 \\ 8 & 3 & 2 \end{bmatrix}$

B $\begin{bmatrix} 8 & 0 & 20 \\ 1 & 4 & \text{-}8 \\ 16 & \text{-}4 & \text{-}8 \end{bmatrix}$

C $\begin{bmatrix} 8 & 0 & 20 \\ \text{-}12 & 4 & \text{-}8 \\ 16 & \text{-}4 & \text{-}8 \end{bmatrix}$

D $\begin{bmatrix} 6 & 0 & 9 \\ 1 & 5 & 2 \\ 8 & 3 & 2 \end{bmatrix}$

44 Matrix *A* shows the cost per pound of apples and oranges at three different markets during the first week of September.

$$\begin{array}{c}\quad\ \ \textit{GoGo}\quad\textit{Alto}\quad\textit{A\&B}\\ \begin{array}{c}\textit{apples}\\ \textit{oranges}\end{array}\begin{bmatrix}1.09 & 1.11 & 0.89\\ 1.15 & 1.11 & 0.79\end{bmatrix}=A\end{array}$$

Matrix *B* shows the prices one week later at the same three markets.

$$\begin{array}{c}\quad\ \ \textit{GoGo}\quad\textit{Alto}\quad\textit{A\&B}\\ \begin{array}{c}\textit{apples}\\ \textit{oranges}\end{array}\begin{bmatrix}1.09 & 1.14 & 0.49\\ 1.19 & 1.14 & 0.89\end{bmatrix}=B\end{array}$$

Which matrix correctly shows the difference in prices, *B* − *A*?

F $\begin{bmatrix} 0 & 0.03 & {}^{-}0.40\\ 0.04 & 0.03 & 0.10\end{bmatrix}$

G $\begin{bmatrix} 0.06 & 0 & {}^{-}0.10\\ 0.10 & 0 & 0.40\end{bmatrix}$

H $\begin{bmatrix} 0 & 0.03 & 0.40\\ 0.04 & 0.03 & 0.10\end{bmatrix}$

J $\begin{bmatrix} 2.18 & 2.25 & 1.38\\ 2.34 & 2.25 & 1.68\end{bmatrix}$

45

$$[G] = \begin{bmatrix} 4 & 3\\ 2 & \text{-}1\\ \text{-}2 & 1\end{bmatrix}$$

$$[H] = \begin{bmatrix} 8 & 2\\ 3 & {}^{-}3\\ 5 & 7\end{bmatrix}$$
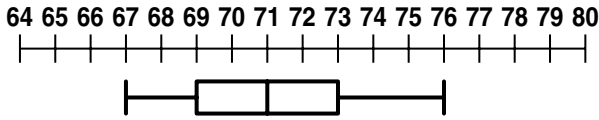
[G] + [H] = ?

A $\begin{bmatrix} 12 & 5\\ 5 & {}^{-}4\\ 3 & 8\end{bmatrix}$

B $\begin{bmatrix} 12 & 5\\ 5 & 4\\ {}^{-}3 & 8\end{bmatrix}$

C $\begin{bmatrix} 7 & 10\\ 1 & 0\\ {}^{-}1 & 2\end{bmatrix}$

D $\begin{bmatrix} {}^{-}4 & 1\\ {}^{-}1 & 2\\ {}^{-}7 & {}^{-}6\end{bmatrix}$

GO ON

46 Alberto made the box-and-whisker graph of the heights (in inches) of the members of his basketball team.

64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

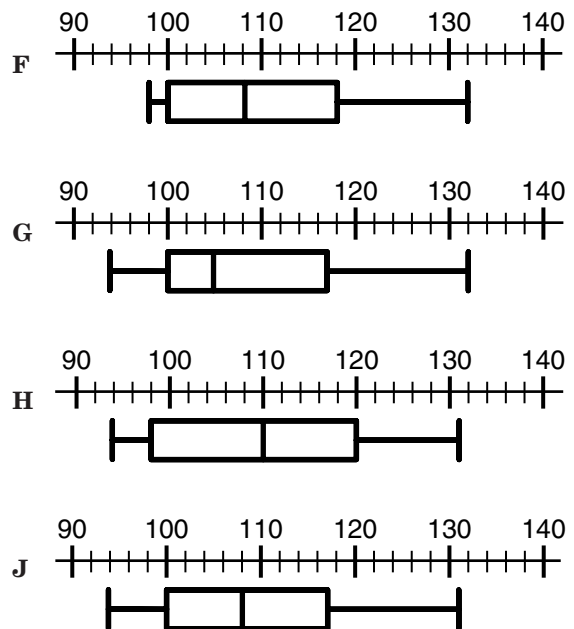**What is the range of heights of the team members?**

F   16 in.

G   9 in.

H   4 in.

J   2 in.

47 Carol went on a 5-day bicycle trip. She rode 23 miles the first day, 22 miles the second, 21 miles the third, 17 miles the fourth, and 17 miles the fifth day. What was the mean number of miles per day that Carol rode on her 5-day bicycle trip?

A   6 mi.

B   20 mi.

C   21 mi.

D   23 mi.

48 Researchers testing a new high blood pressure medication measured the initial blood pressure data of 15 patients before testing the drug.

Diastolic B.P.

Stem	Leaf
9	4, 5, 8
10	0, 2, 3, 4, 8
11	1, 6, 7, 7
12	2, 7
13	1

Which box-and-whisker graph best represents the stem-and-leaf plot?

90   100   110   120   130   140
F

90   100   110   120   130   140
G

90   100   110   120   130   140
H

90   100   110   120   130   140
J

GO ON

49
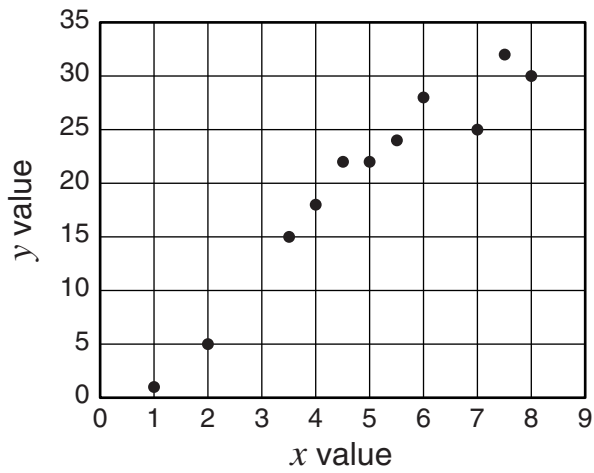
Based on the scatter plot, which x value would best match $y = 12$?

A 3

B 4

C 48

D 56

50

Which equation best represents the data shown on the scatterplot?

F $\quad y = \dfrac{^-3}{5}x - 2$

G $\quad y = \dfrac{x}{2} + 2$

H $\quad y = \dfrac{^-3}{5}x$

J $\quad y = \dfrac{3}{5}x + \dfrac{10}{3}$

STOP

Answer Key

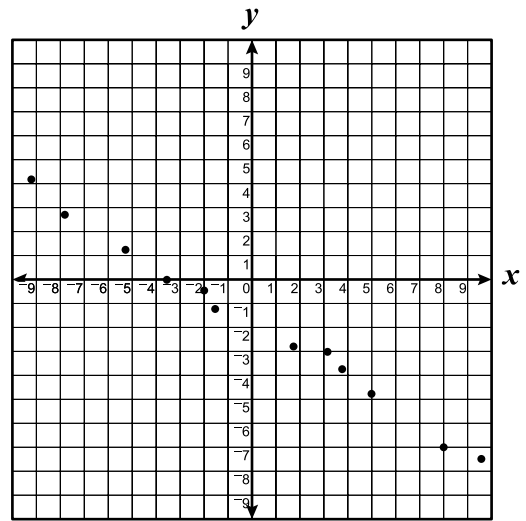| Test Sequence	Correct Answer	Reporting Category	Reporting Category Description
1	B	003	Equations and Inequalities
2	G	003	Equations and Inequalities
3	D	003	Equations and Inequalities
4	G	003	Equations and Inequalities
5	B	003	Equations and Inequalities
6	H	003	Equations and Inequalities
7	A	003	Equations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