

**VIRGINIA  
STANDARDS OF LEARNING ASSESSMENTS**

**Spring 2003 Released Test**

---

**END OF COURSE  
ALGEBRA I**

**Property of the Virginia Department of Education**

© 2003 by the Commonwealth of Virginia Department of Education, James Monroe Building, 101 N. 14th Street, Richmond, Virginia, 23219. All rights reserved. Except as permitted by law, this material may not be reproduced or used in any form or by any means, electronic or mechanical, including photocopying or recording, or by any information storage or retrieval system, without written permission from the copyright owner. Commonwealth of Virginia public school educators may photocopy or print any portion of these Released Tests for educational purposes without requesting permission. All others should direct their requests to the Commonwealth of Virginia Department of Education at (804) 225-2102, Division of Assessment and Reporting.

## Algebra I

### DIRECTIONS

Read and solve each question. For this test you may assume that the value of a denominator is not zero.

#### SAMPLE

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

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

1 Which property of real numbers is utilized by rewriting  $11x + 5xy$  as  $x(11 + 5y)$ ?

- A Associative property for addition
- B Commutative property for addition
- C Closure property for multiplication
- D Distributive property for multiplication over addition

2 What is the solution to

$$2 - 4a = 16?$$

- F 18
- G 10
- H  $-\frac{7}{2}$
- J  $-\frac{9}{2}$

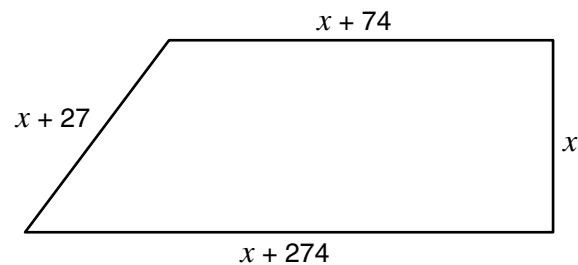
3 The volume of a cylinder is given by

$$V = \pi r^2 h$$

where  $r$  is the radius of the cylinder and  $h$  is the cylinder's height. Which equation could be used to solve for  $h$ ?

- A  $h = \pi r^2 V$
- B  $h = \frac{V}{\pi r^2}$
- C  $h = V + \pi r^2$
- D  $h = V - \pi r^2$

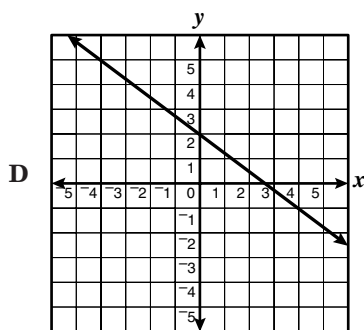
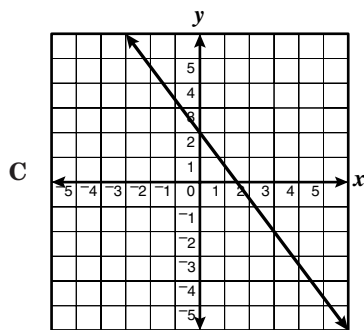
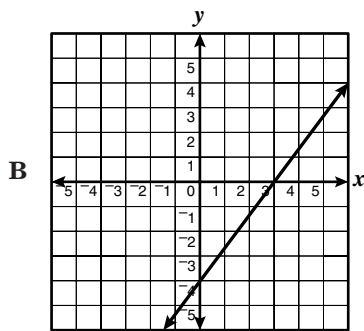
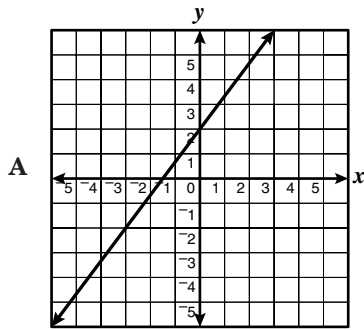
4



Tambria's property has the shape of a trapezoid with the dimensions shown. If the perimeter of the property is 3,279 feet, what is the value of  $x$ ?

- F 726 ft
- G 781.25 ft
- H 913.5 ft
- J 1,452 ft

5 Which graph best represents the function  $y = -\frac{4}{3}x + 2$ ?



6 What is the solution to the inequality

$$7x - 5 \geq x + 1?$$

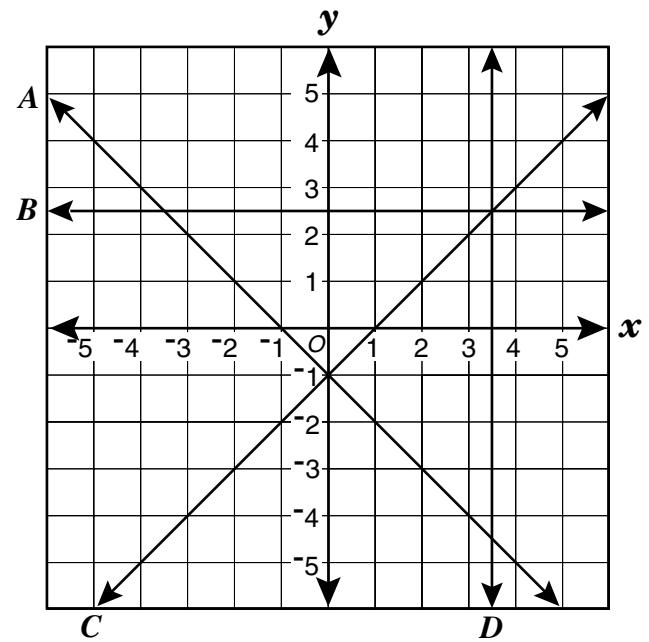
F  $x \leq 1$

G  $x \geq 1$

H  $x \leq -1$

J  $x \leq \frac{5}{2}$

7



Which line has a negative slope?

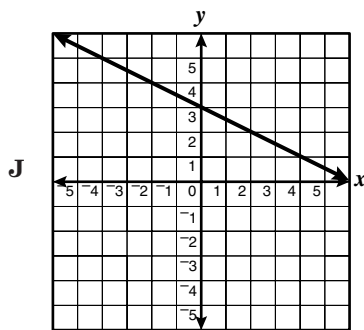
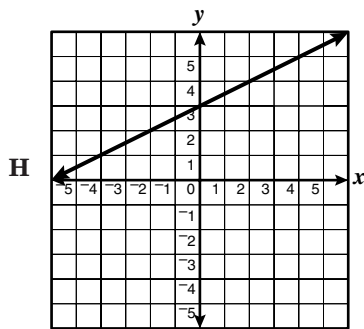
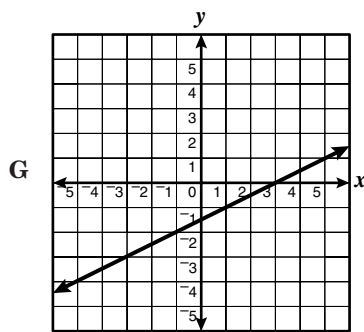
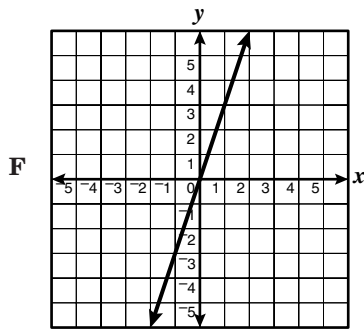
A A

B B

C C

D D

8 Which line most likely has a slope of  $\frac{1}{2}$  and y-intercept 3?



9 What is the slope of the graph of

$$y = 6x - 1?$$

A -6

B -1

C  $\frac{1}{6}$

D 6

10 What is the slope of the line that goes through

$(-3, 2)$  and  $(3, 2)$ ?

F Undefined

G 0

H  $\frac{2}{3}$

J  $\frac{3}{2}$

11

$x$	-2	0	2	4
$y$	3	2	1	0

Which equation fits the data in the table?

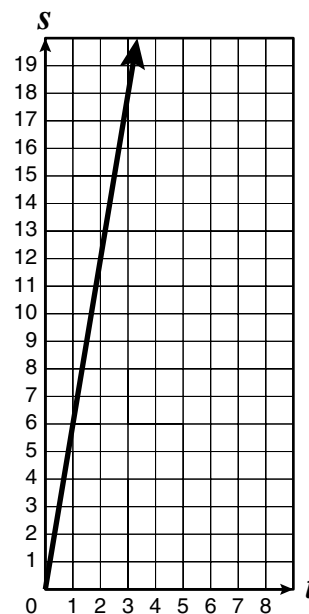
A  $y = -\frac{x}{2} + 2$

B  $y = x + 3$

C  $y = 2x - 3$

D  $y = \frac{x}{2} + 2$

- 12 Roy works at the local grocery store and is paid \$6.00 per hour. The graph shown describes his salary,  $S$ , based on the number of hours,  $t$ , he works.



Which is an equation of the graph shown?

F  $S = 6 + t$

G  $S = 6t$

H  $S = \frac{6}{t}$

J  $S = \frac{t}{6}$

13 The equation of the line that contains the points  $(-8, 1)$  and  $(0, -5)$  is —

A  $y = \frac{3}{4}x + 7$

B  $y = \frac{1}{2}x + 1$

C  $y = -\frac{3}{4}x - 5$

D  $y = -\frac{3}{4}x + 7$

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

Which is the solution to the system of equations shown?

F  $x = 1, y = 3$

G  $x = 2, y = 2$

H  $x = 3, y = 1$

J  $x = 4, y = 0$

15 A rectangle has a perimeter of 68 inches. Its length is 2 inches less than 3 times its width. What are the length and width of the rectangle?

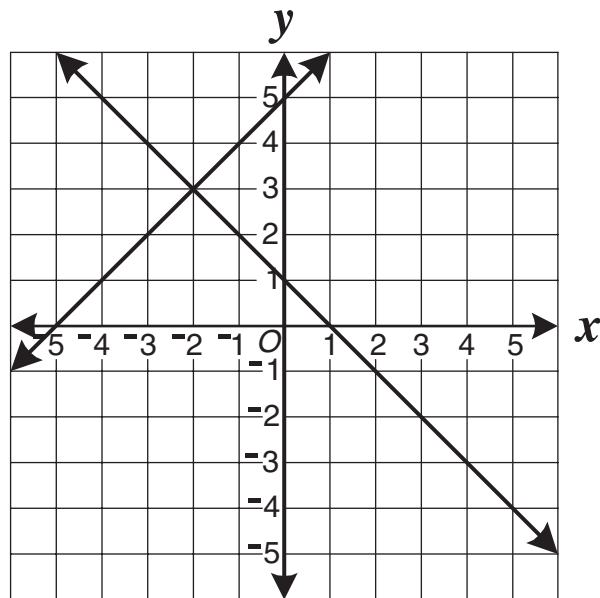
A Length = 22 in., width = 12 in.

B Length = 25 in., width = 9 in.

C Length = 28 in., width = 10 in.

D Length = 22 in., width = 8 in.

16 This is a graph of a system of equations.



Which is most likely the solution to the system of equations shown?

F  $(0, 5)$

G  $(1, 0)$

H  $(3, -2)$

J  $(-2, 3)$

17  $2x^2 - 3x + 1 = 0$

Which is the solution set for the equation above?

A  $\{-2, -1\}$

B  $\left\{-1, -\frac{1}{2}\right\}$

C  $\left\{\frac{1}{2}, 1\right\}$

D  $\{1, 2\}$

18

$$x^2 - 4 = 0$$

Which is the solution set for the equation above?

- F  $\{-4, 1\}$   
 G  $\{-2, 2\}$   
 H  $\{-1, 4\}$   
 J  $\{0, 4\}$

19 What is the value of  $3x^2 - y^2$  if  $x = -1$  and  $y = 3$ ?

- A 12  
 B -3  
 C -6  
 D -12

20 Which expression correctly represents \$10 less than twice the cost,  $c$ ?

- F  $10 - 2c$   
 G  $10 - 2 + c$   
 H  $2c - 10$   
 J  $\frac{c}{2} - 10$

21 Which is equivalent to  $\frac{x^5 y^2 z^8}{(xy)^{-3}}$ ?

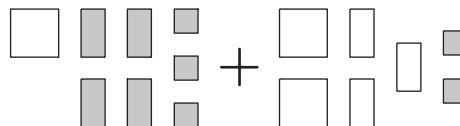
- A  $\frac{x^2 z^8}{y}$   
 B  $x^{12} y^8 z^8$   
 C  $\frac{-x^4 y z^8}{3}$   
 D  $x^8 y^5 z^8$

22 Consider the following models.

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

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

What polynomial is represented by the following?

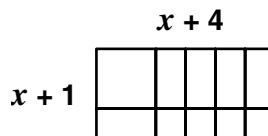


- F  $3x^2 - x - 5$   
 G  $3x^2 - 7x - 5$   
 H  $3x^2 + 7x - 5$   
 J  $3x^2 + x - 5$

23 Consider the following models.

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

Which expression represents the area of the diagram below?



- A  $x^2 + 5x + 4$   
 B  $2x + 5$   
 C  $4x + 10$   
 D  $x^2 + 4$

24 The continent of North America has an area of approximately  $9.4 \times 10^6$  square miles. The area of Asia is approximately  $1.74 \times 10^7$  square miles. How many square miles larger is Asia than North America?

- F  $7.6 \times 10^1$
- G  $7.6 \times 10^{-1}$
- H  $8.0 \times 10^6$
- J  $8.0 \times 10^1$

25 Which expression is equivalent to  $(9x + 1)(9x - 1)$ ?

- A  $18x$
- B  $81x^2 - 1$
- C  $18x^2 - 1$
- D  $81x^2 - 18x - 1$

26 What is one of the factors of

$$x^2 - 2x - 15?$$

- F  $(x - 3)$
- G  $(x - 5)$
- H  $(x + 1)$
- J  $(x + 15)$

27 When completely factored,  $4 - 16x + 28y$  equals —

- A  $4(1 - 4x + 7y)$
- B  $4(1 - 4x) + 28y$
- C  $(4 - 7y)(1 + 4x)$
- D  $4 - 4(4x - 7y)$

28 The area of a rectangle is represented by the expression

$$2x^2 + 5x + 2.$$

Which is an equivalent expression for this area?

- F  $(2x + 2)(x + 1)$
- G  $(2x + 3)(x + 2)$
- H  $(2x + 1)(x + 4)$
- J  $(2x + 1)(x + 2)$

29 Which is closest to the value of  $x$  if  $x = 2\sqrt{7}$ ?

- A 3.2
- B 3.7
- C 5.3
- D 9.9

30 What is the value of  $\frac{\sqrt{3.2}}{2}$  to the nearest tenth?

- F 0.7
- G 0.9
- H 1.3
- J 1.5

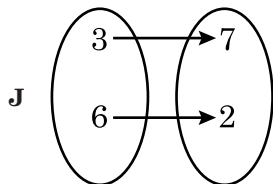
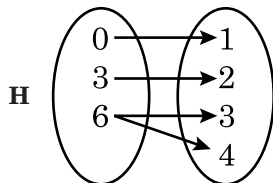
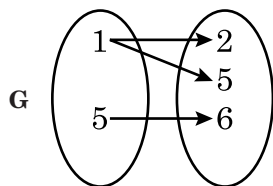
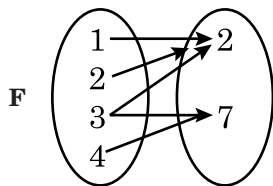


- 31 The numbers in this table follow a linear pattern.

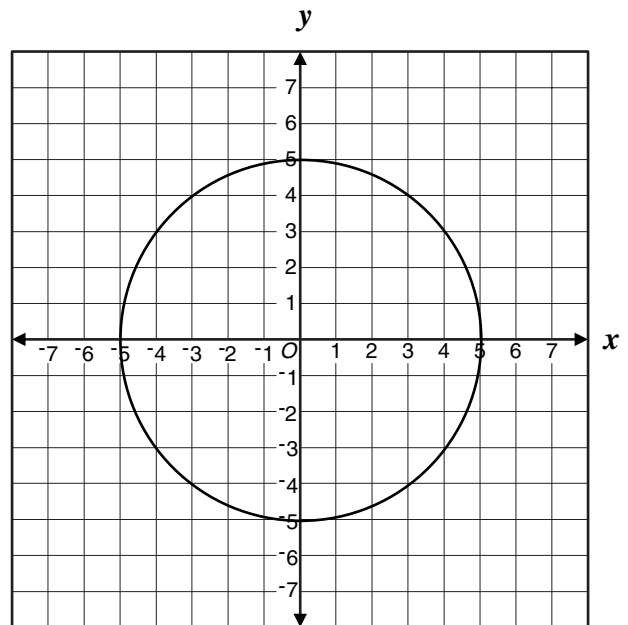
$p$	$w$
-3	14
-2	11
-1	?
0	5
1	2
2	-1

What is the missing value?

- A 7  
 B 8  
 C 9  
 D 10
- 32 Which of these data sets represents a function?



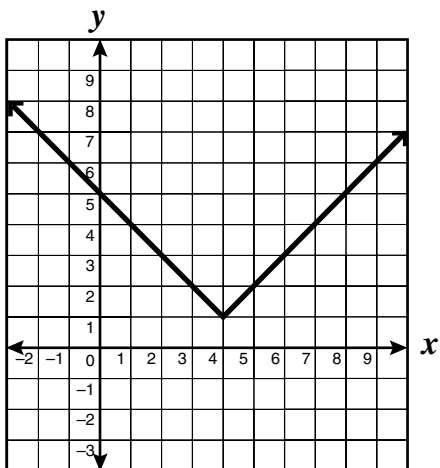
- 33 Loki said the following graph does *not* represent a function of  $x$ .



Which pair of points could Loki use to prove that her statement is correct?

- A  $(-3, 4)$  and  $(-3, -4)$   
 B  $(-4, 3)$  and  $(4, 3)$   
 C  $(-3, 4)$  and  $(4, -3)$   
 D  $(-5, 0)$  and  $(5, 0)$

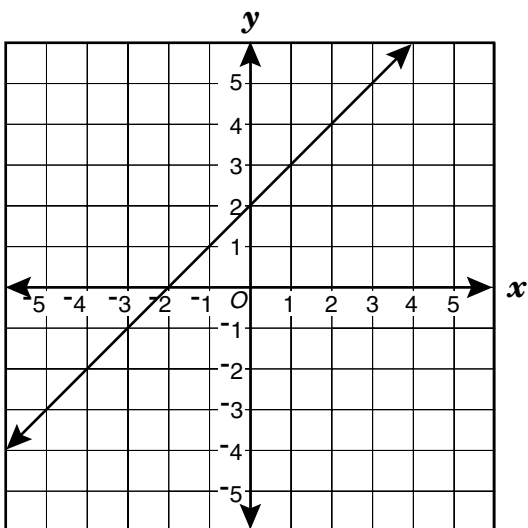
34



What is the apparent range of the function of  $x$  shown?

- F The set of all real numbers greater than or equal to 4
- G The set of all real numbers greater than or equal to 1
- H The set of all real numbers less than or equal to 1
- J The set of all real numbers

35



Which equation best describes this graph?

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

36 If  $f(x) = -2x + 3$ , what is  $f(-4)$ ?

- F -5
- G -1
- H 5.5
- J 11

37 The chart shows how the wholesale price of an item,  $p$ , depends on the cost of the materials needed to produce the item,  $m$ . Which equation represents this linear relationship?

$m$	\$0.50	\$1.00	\$1.50	\$2.00
$p$	\$4.00	\$5.00	\$6.00	\$7.00

- A  $p = m + 3.5$
- B  $p = 2m + 3$
- C  $p = 3m + 2.5$
- D  $p = 4m + 2$

38 What is the range of the function  $f(x) = 3x - 1$  when the domain is  $\{-1, 0, 1\}$ ?

- F  $\{-1, 2\}$
- G  $\{-1, 0, 1\}$
- H  $\{1, 2, 4\}$
- J  $\{-4, -1, 2\}$

- 39 Which of the following does *not* represent a function of  $x$ ?

A

$x$	1	1	1	1
$y$	1	2	3	4

B

$x$	1	2	3	4
$y$	1	1	1	1

C

$x$	1	2	3	4
$y$	2	2	4	5

D

$x$	0	2	5	3
$y$	7	3	0	2

- 40 Which is a zero of the function

$$f(x) = x^2 + 6x - 7?$$

- F -7  
G -6  
H 7  
J 41

- 41 Jill was looking at a picture of herself and 3 friends. She measured the height of her image as 10 centimeters. If Jill is actually 60 inches tall, which equation can she use to find  $h$ , the actual height in inches, of one of her friends who is  $c$  centimeters tall in the picture?

A  $h = 10c$

B  $h = 6c$

C  $h = \frac{5}{3}c$

D  $h = \frac{1}{6}c$

- 42 The gas pressure in a chamber varies directly with the temperature in the chamber. If the pressure in the chamber is 150 atmospheres (atm) when the chamber is at  $50^\circ\text{F}$ , what is the pressure in the chamber when the temperature of the chamber is  $75^\circ\text{F}$ ?

F 175 atm

G 200 atm

H 225 atm

J 275 atm

43  $\begin{bmatrix} 3 & 7 \\ 4 & 6 \end{bmatrix} - \begin{bmatrix} -8 & 2 \\ 6 & -2 \end{bmatrix}$

is equal to which matrix?

A  $\begin{bmatrix} 0 & 5 \\ -2 & 4 \end{bmatrix}$

B  $\begin{bmatrix} 11 & 5 \\ -2 & 8 \end{bmatrix}$

C  $\begin{bmatrix} -9 & 12 \\ 24 & -12 \end{bmatrix}$

D  $\begin{bmatrix} 6 & -5 \\ 2 & 4 \end{bmatrix}$

44 The number of car sales for May 2000 at Auto One are:

	Compacts	Sport UV	Luxury
Bob	14	8	6
Carol	7	13	1
Blanca	12	10	8

If the sales people get a \$200 commission on any car they sell, which matrix shows the amount in commissions each earns?

	Compacts	Sport UV	Luxury
Bob	2,800	1,600	1,200
Carol	1,400	2,600	200
Blanca	2,400	2,000	1,600

	Compacts	Sport UV	Luxury
Bob	214	208	206
Carol	207	213	211
Blanca	212	210	208

	Compacts	Sport UV	Luxury
Bob	186	192	194
Carol	193	187	199
Blanca	188	190	192

	Compacts	Sport UV	Luxury
Bob	1,600	1,000	800
Carol	900	1,500	300
Blanca	1,400	1,200	1,000

45  $D = \begin{bmatrix} 0 & 2 \\ 1 & -3 \\ 5 & 4 \end{bmatrix}$

$-2D = ?$

A  $\begin{bmatrix} 0 & -4 \\ -2 & 6 \\ -10 & -8 \end{bmatrix}$

B  $\begin{bmatrix} -2 & 0 \\ -1 & -5 \\ 3 & 2 \end{bmatrix}$

C  $\begin{bmatrix} -2 & -4 \\ -2 & 6 \\ -10 & -8 \end{bmatrix}$

D  $\begin{bmatrix} 0 & 2 \\ -2 & 6 \\ -10 & 8 \end{bmatrix}$

46 Barry's daily grades for one grading period are shown below.

94, 88, 87, 92, 78, 88, 93, 100, 92, 90, 92, 85

What was the mode of his daily grades?

F 93

G 92

H 91

J 90

47 The stem-and-leaf plot shows the results of a science experiment in which 12 plants were each given a different combination of water and nutrients over a period of time and their growth in millimeters measured.

Millimeters Growth

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

What was the median number of millimeters of growth?

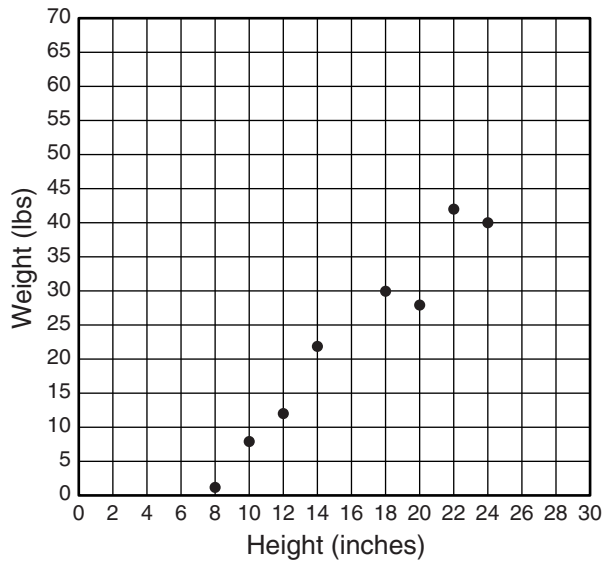
A 14

B 15

C 16

D 17

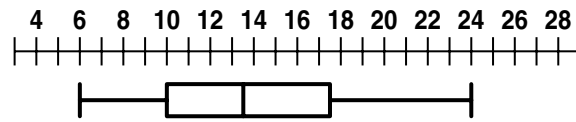
- 48 Connie made a scatterplot comparing the shoulder heights of her friends' dogs to their weights. Connie's dog stands 28 inches to his shoulder.



Using a line of best fit for the plot, which is the best prediction for her dog's weight?

- F 40 pounds
- G 55 pounds
- H 65 pounds
- J 70 pounds

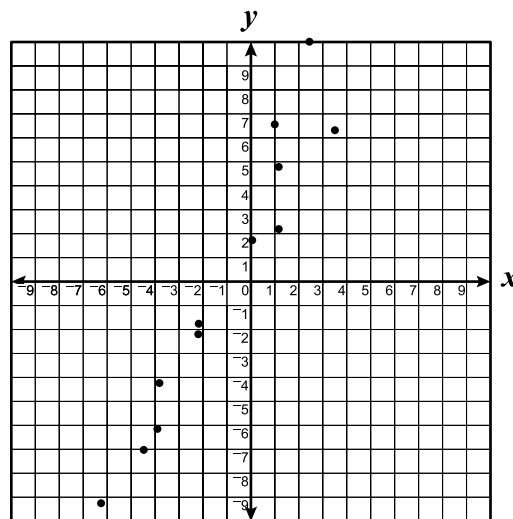
- 49 Scott made a box-and-whisker graph of the soccer goals made by the players in his district.



What is the range of the goals made by the players?

- A 24
- B 18
- C 6
- D 4

- 50



Which equation best represents the data shown in the scatterplot?

- F  $y = 2x - 2$
- G  $y = \frac{x}{2} - 2$
- H  $y = 2x + 2$
- J  $y = x - 1$



## Answer Key

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