VIRGINIA
STANDARDS OF LEARNING ASSESSMENTS

Spring 2004 Released Test

END OF COURSE
ALGEBRA I
CORE 1

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DIRECTIONS
Read and solve each question. Then mark the space on the answer sheet for the best answer. 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 Consider the procedure used below to solve the given equation.

Given: $3(x - 2) = 17$

(1st step) $3x - 6 = 17$

(2nd step) $3x = 23$

(3rd step) $x = \frac{23}{3}$

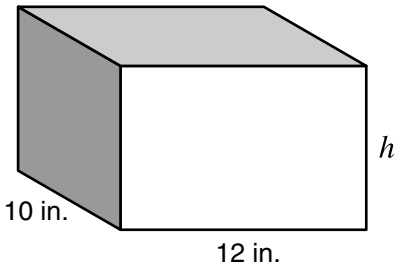
Which of the following properties is a justification for the 1st step?

A Associative property of addition
B Commutative property of addition
C Distributive property
D Transitive property of equality

2 Which statement *cannot* be justified by one of the properties of real numbers?

F $(a + b) + c = a + (b + c)$
G $a - (b \div c) = (a - b) \div c$
H $(ab)c = a(bc)$
J $(a + b) + 0 = 0 + (a + b)$

3 The volume of a rectangular solid is 960 cubic inches. The dimensions of the base are 12 inches by 10 inches.



What is the height of the solid?

A 4 in.
B 8 in.
C 120 in.
D 840 in.

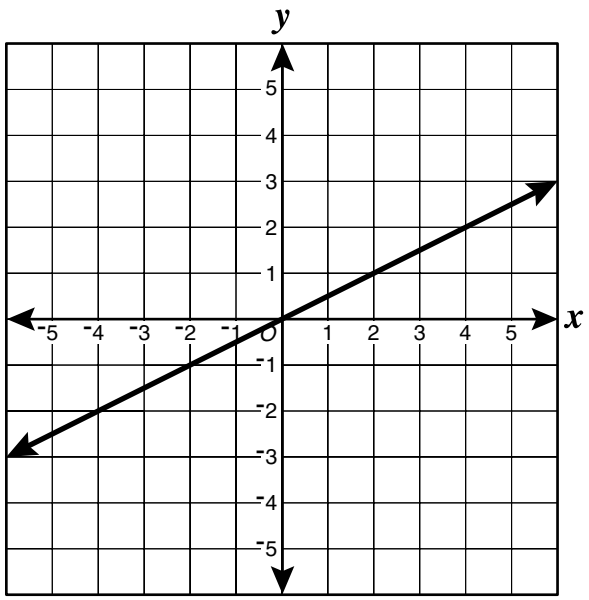
4 What is the solution to

$5 - \frac{n}{2} = 12$?

F $^-34$
G $^-14$
H 14
J 34

GO ON

5 This graph represents $y = \frac{1}{2}x$.



If the line in the graph is shifted down 3 units, which is the equation for the new line?

A $y = -\frac{1}{2}x$

B $y = \frac{3}{2}x$

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

D $y = \frac{1}{2}x + 3$

6 The left side of a solid block is held at a constant temperature of 200°C. The temperature profile within the block is given by $T = 200 - 5x - x^2$ where x is the distance from the left side of the block in centimeters and T is the temperature in degrees Celsius of the block at location x. At what value of x is $T = 50$°C?

F $x = 5$ cm

G $x = 10$ cm

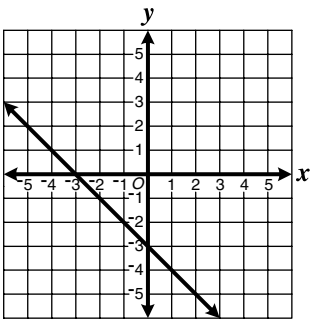
H $x = 15$ cm

J $x = 20$ cm

GO ON

7 Which graph best represents the equation of the line with slope of 1 and *y*-intercept of ⁻3?

A



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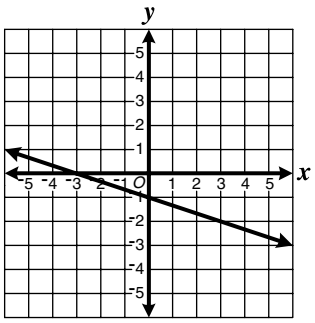

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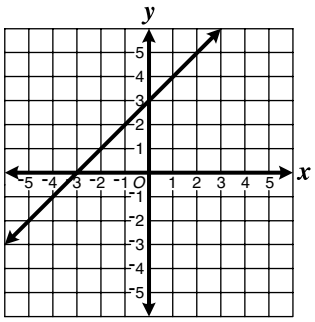

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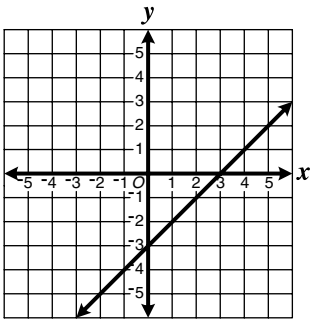


8 Which equation is the slope-intercept form of

$$^{-}x + 6y = 12?$$

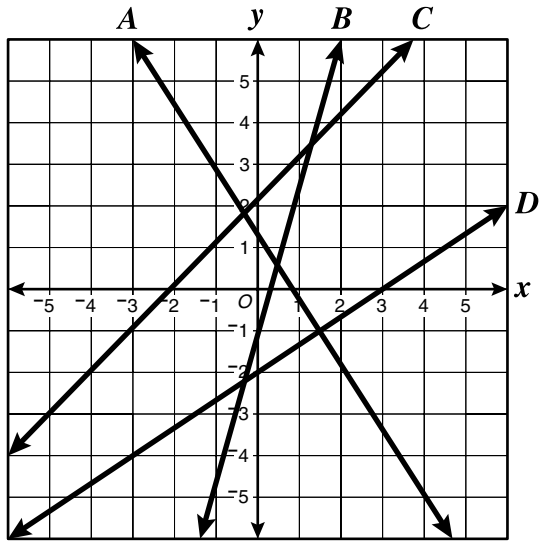
F $y = \frac{1}{6}x + 2$

G $y = \frac{^{-}1}{6}x + 2$

H $x = 6y - 12$

J $6y = 12 + x$

9 Which line on the graph below has a negative slope?



A *A*

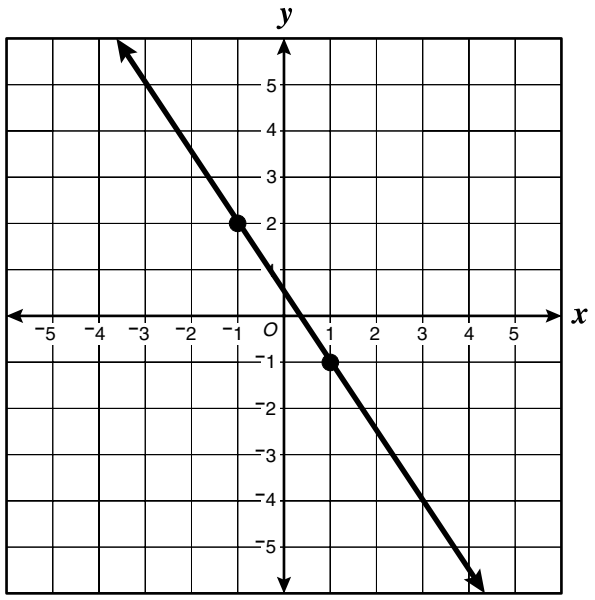
B *B*

C *C*

D *D*

GO ON

10



The line shown contains (⁻1, 2) and (1, ⁻1). What is the slope of the line?

F $\frac{3}{2}$

G $\frac{2}{3}$

H $-\frac{2}{3}$

J $-\frac{3}{2}$

11 **What is the slope of the line**

$$y = 2x - 3?$$

A -3

B $-\frac{3}{2}$

C $-\frac{2}{3}$

D 2

12 **Which is an equation of the line with slope $\frac{2}{3}$ that passes through the point (4, ⁻1)?**

F $y = -\frac{1}{4}x + \frac{2}{3}$

G $y = -4x + \frac{2}{3}$

H $y = \frac{2}{3}x - \frac{5}{3}$

J $y = \frac{2}{3}x - \frac{11}{3}$

13

x	-1	0	1	2
y	-3	-1	1	3

Which equation fits the data in the table?

A $y = x - 2$

B $y = 2x - 1$

C $y = 3x - 3$

D $y = x + 1$

14 **Karen makes $5 per hour baby-sitting and $12 per hour giving music lessons. One weekend, she worked a total of 18 hours and made $139. How many hours did she spend baby-sitting?**

F 11

G 9

H 7

J 6

GO ON

15 $\begin{cases} x - y = 5 \\ x + y = 7 \end{cases}$

What is the solution to the system of equations shown above?

A $x = 6, y = 1$

B $x = 4, y = 3$

C $x = 1, y = 6$

D $x = -1, y = 7$

16 The Arcadia Theater charges \$4 for adult tickets and \$3 for student tickets. Mr. Steele purchased 9 tickets (some student and some adult) for \$31. Which system of equations could be used to find a, the number of adult tickets, and s, the number of student tickets Mr. Steele purchased?

F $\begin{cases} a + s = 31 \\ 4a + 3s = 9 \end{cases}$

G $\begin{cases} 4a + 3s = 31 \\ a + s = 9 \end{cases}$

H $\begin{cases} 3a + 4s = 31 \\ a + s = 9 \end{cases}$

J $\begin{cases} 3a + 4s = 9 \\ a + s = 31 \end{cases}$

17 What is the solution to the inequality shown below?

$$-2x + 3 > 7$$

A $x < -5$

B $x < -2$

C $x > 2$

D $x < 3$

18 Which of the following is a solution of the equation

$$x^2 - 13x + 40 = 0?$$

F -8

G 4

H 5

J 10

19 The formula for the surface area of a cylinder is $SA = 2\pi r(h + r)$. What is the value of SA when $r = 3$ centimeters and $h = 4$ centimeters?

A 28π cm^2

B 32π cm^2

C 36π cm^2

D 42π cm^2

20 A consulting engineer bills his customers \$90 for each hour he works. If a client's bill is \$955, which equation could be used to find the number of hours worked?

F $\frac{90}{x} = 955$

G $\frac{x}{955} = 90$

H $90x = 955$

J $955x = 90$

GO ON

21 **Which is equivalent to**

$$(-2ab^3)(-3a^2b^5)?$$

A $-5ab$

B $6a^2b^{15}$

C $6a^3b^2$

D $6a^3b^8$

22 **Which expression is equivalent to**

$$2x^3y(x^2y - 3xy^2)?$$

F $2x^5y^2 - 6x^4y^3$

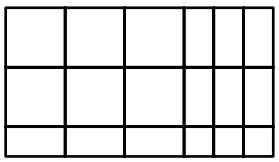
G $3x^5y^2 - 5x^4y^3$

H $2x^6y^2 - 6x^3y^2$

J $2x^6y - 6x^3y^3$

23 $\square = x^2$ $\square = x$ $\square = 1$

Consider the models above.



What polynomial is represented by this diagram?

A $6x^2 + 12x$

B $2x^2 + 3x + 1$

C $6x^2 + 9x + 3$

D $9x^2 + 6x + 3$

24 **Which is one of the correct factors of**

$$x^2 - 3x - 18?$$

F $(x - 2)$

G $(x + 6)$

H $(x - 9)$

J $(x + 3)$

25 **If $x \neq 0$, which expression is equivalent to**

$$\frac{8x^7 - 2x^3 + 2x}{2x}?$$

A $6x^6 - x^2$

B $4x^6 - x^2$

C $6x^7 - x^3 + x$

D $4x^6 - x^2 + 1$

26 **If $ab \neq 0$, which is equivalent to**

$$\frac{-12a^3b^2}{6ab^2}?$$

F $2a^2b$

G $-2a^2$

H $-6a^2b$

J $6a^4b^4$

GO ON

27 When factored completely,

$$x^2 - 9 \text{ equals —}$$

A $(x + 3)(x - 3)$
B $(x + 1)(x - 9)$
C $(x - 3)^2$
D $(x + 3)^2$

28 The speed of sound in water is 1.46×10^3 meters per second. The speed of sound in air is 3.31×10^2 meters per second. How much faster does sound travel in water than in air?

F 1.85×10^{-3} m/s
G 1.129×10^2 m/s
H 1.85×10^2 m/s
J 1.129×10^3 m/s

29 Which is closest to the value of

$$\left(2\sqrt{3}\right)\left(6\sqrt{2}\right)?$$

A 7.7
B 8.5
C 18.0
D 29.4

30 Which measure is closest to the length of a side of a square that has an area of 221 square feet?

F 11.0 ft
G 14.9 ft
H 16.4 ft
J 55.2 ft

31 The ordered pairs shown form a quadratic pattern.

x	y
0	1
1	2
2	5
3	10
4	17
5	?

What is the missing value of y?

A 10
B 22
C 24
D 26

GO ON

32

x	y
-2	-11
2	1
4	7
0	-5

Which equation is true for all the values in the table?

F $y = x - 9$
G $y = x - 5$
H $y = 3x - 5$
J $y = 2x - 7$

33 What is the range of the function

$$f(x) = (x - 1)^2$$

when the domain is $\{-5, 0, 5\}$?

A $\{1, 16, 36\}$
B $\{1, 24\}$
C $\{1, 26\}$
D $\{-12, -2, 8\}$

34 If $f(x) = -2x^2 + x - 5$, what is $f(3)$?

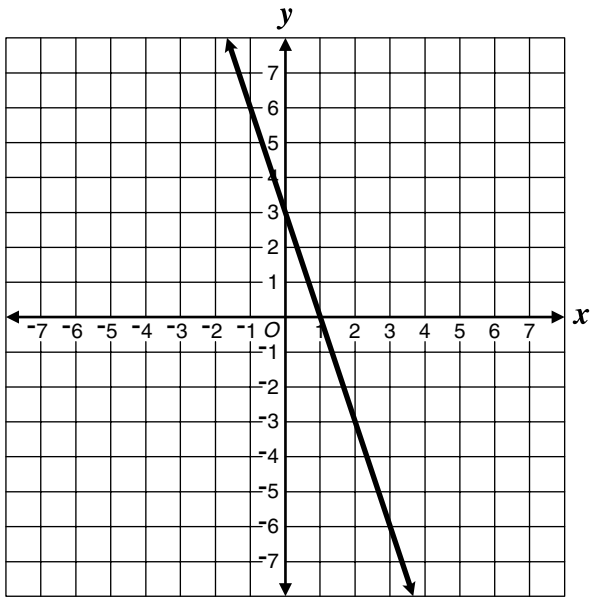
F -20
G -14
H 16
J 34

35 Which is a zero of the function

$$f(x) = x^2 - 8x + 7?$$

A 8
B 7
C -1
D -7

36 The graph of the function $f(x) = -3x + 3$ is shown.



What is the value of $f(3)$?

F 3

G 0

H -2

J -6

37 The table gives the average per capita income, d, in a region of the country as a function of the percent unemployed, u.

u	1	2	3	4
d	22,500	22,000	21,500	21,000

Which equation represents this data algebraically?

A $d = 20{,}000 + 1{,}000u$

B $d = 22{,}000 + 500u$

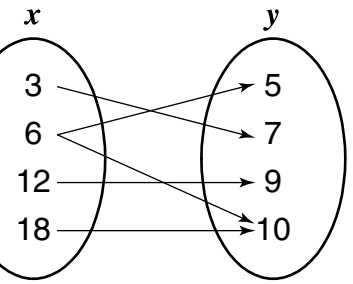
C $d = 23{,}000 - 500u$

D $d = 25{,}000 - 1{,}500u$

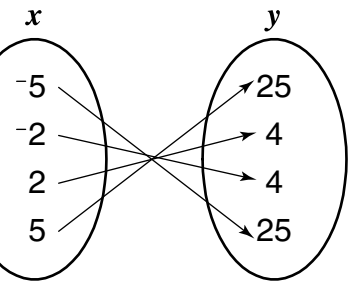
GO ON

38 Which of these data sets represents a function?

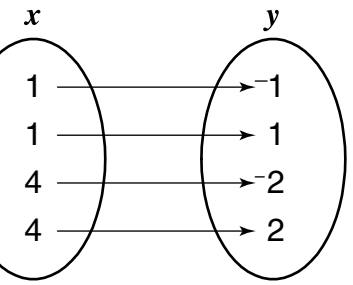
F



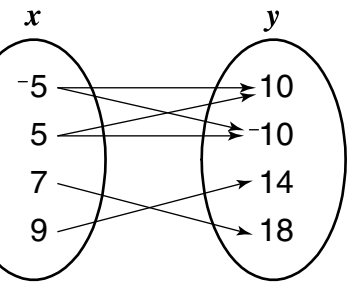
G



H



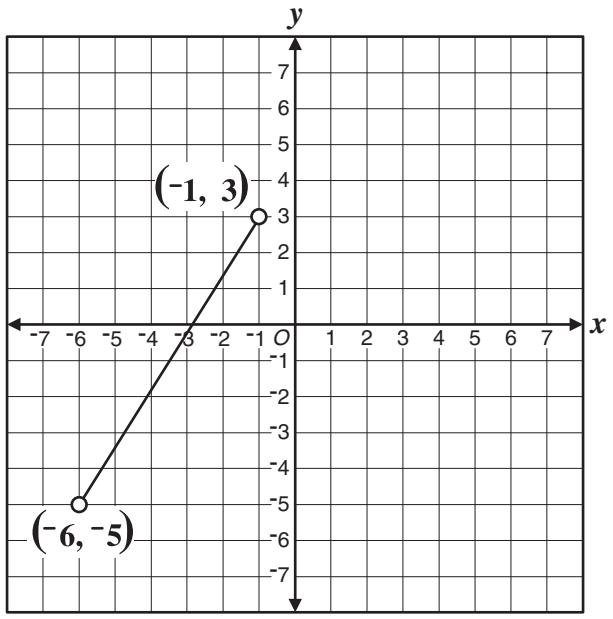
J



39 The number of words Maria typed varied directly with the amount of time she spent typing. If she typed 275 words in 5 minutes, how long would it take her to type 1,100 words?

A 220 minutes
B 20 minutes
C 15 minutes
D 4 minutes

40



What is the range of the function of x graphed above?

F {all real numbers < 3}
G {all real numbers < -1}
H {all real numbers between -6 and -1}
J {all real numbers between -5 and 3}

GO ON

41 **If y varies directly as x and the constant of variation is $^{-}2$, which equation represents this relationship?**

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

B $y = \frac{{}^{-}2}{x}$

C $y = \frac{x}{{}^{-}2}$

D $y = 2x$

42

x	y
1	\$0.05
2	\$0.10
3	\$0.15
4	\$0.20
5	\$0.25

Which is an equation for the variation that includes all the data in the table?

F $xy = 0.05$

G $y = x + 0.05$

H $y = 0.05x$

J $y = \frac{x}{0.05}$

43 **Sally recorded her daily grades for one grading period.**

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

What was her mean grade?

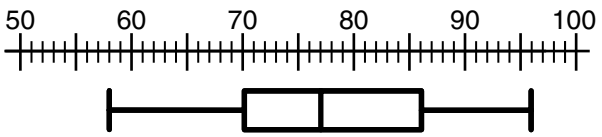
A 92

B 91

C 90

D 88

44 **Mr. Andrews made a box-and-whisker graph of the quiz grades in his chemistry class.**



Which is the median quiz grade for the class?

F 70

G 77

H 80

J 85

GO ON

45 **This matrix shows the prices for some items at three hamburger shops.**

	Shop 1	Shop 2	Shop 3
Burger	**$2.60**	**$1.60**	**$2.10**
Fries	**$0.80**	**$0.60**	**$0.70**
Shake	**$1.00**	**$0.90**	**$1.10**

Each of the three shops honor their competitors' coupons. Which matrix shows what the prices would be with a 10%-off coupon?

A $\begin{bmatrix} \$2.34 & \$1.44 & \$1.90 \\ \$0.72 & \$0.54 & \$0.63 \\ \$0.90 & \$0.81 & \$1.00 \end{bmatrix}$

B $\begin{bmatrix} \$2.36 & \$1.44 & \$1.89 \\ \$0.72 & \$0.54 & \$0.63 \\ \$0.90 & \$0.81 & \$1.00 \end{bmatrix}$

C $\begin{bmatrix} \$2.36 & \$1.44 & \$1.90 \\ \$0.72 & \$0.54 & \$0.63 \\ \$0.90 & \$0.81 & \$0.99 \end{bmatrix}$

D $\begin{bmatrix} \$2.34 & \$1.44 & \$1.89 \\ \$0.72 & \$0.54 & \$0.63 \\ \$0.90 & \$0.81 & \$0.99 \end{bmatrix}$

46 $-2\begin{bmatrix} -2 & 4 \\ -3 & -6 \end{bmatrix}$ **is equal to which matrix?**

F $\begin{bmatrix} -4 & 2 \\ -5 & 12 \end{bmatrix}$

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

H $\begin{bmatrix} 4 & -8 \\ 6 & 12 \end{bmatrix}$

J $\begin{bmatrix} 0 & 2 \\ 1 & 4 \end{bmatrix}$

47 $\begin{bmatrix} 2 & -4 \\ 3 & 2 \end{bmatrix} + \begin{bmatrix} 6 & 1 \\ 4 & 2 \end{bmatrix}$ **is equal to which matrix?**

A $\begin{bmatrix} 8 & -3 \\ 7 & 4 \end{bmatrix}$

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

C $\begin{bmatrix} 8 & 4 \\ 0 & 4 \end{bmatrix}$

D $\begin{bmatrix} -4 & -6 \\ 26 & 7 \end{bmatrix}$

GO ON

48 **The chart below shows the ages in years of the girls on two Olympic teams.**

Gymnastics	14	17	15	15	16	13	12
Swimming	15	17	19	12	14	18	12

What is the difference in the median ages of the two teams?

F 0 yrs
G 1 yrs
H 2 yrs
J 3 yrs

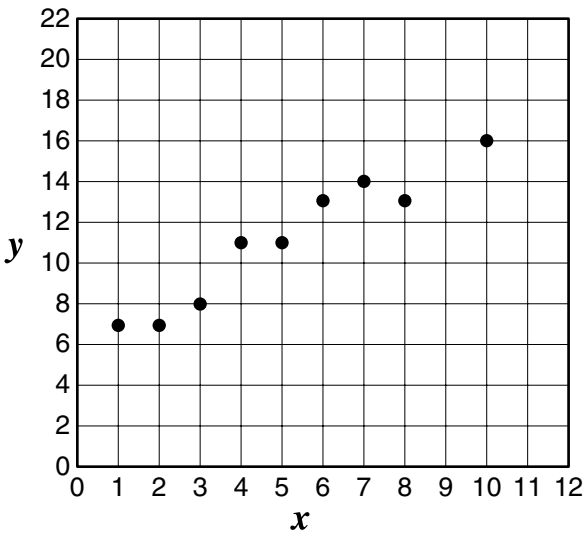
49 **Joe's New Car dealership lists the following prices for this year's models.**

$10,469, $12,895, $15,499, $17,999, $18,595, $21,245, $10,395, $14,985

What is the range in prices?

A $15,260
B $15,242
C $10,850
D $10,776

50



Using the data plotted on the scatterplot, which equation most closely describes a line of best fit for the data?

F $y = x + 6$
G $y = 2x - 4$
H $y = 2x + 5$
J $y = 3x - 4$

STOP