VIRGINIA STANDARDS OF LEARNING

Spring 2010 Released Test

END OF COURSE ALGEBRA I

Form M0110, CORE 1

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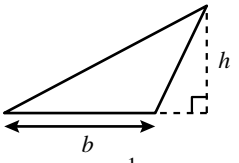
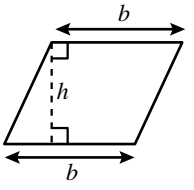
Algebra I Formula Sheet

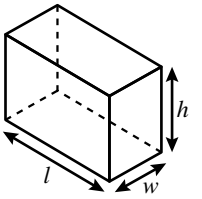
Geometric Formulas



$A = \frac{1}{2}bh$

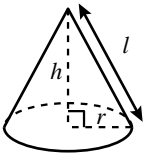


$A = bh$



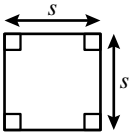
$V = lwh$

$S.A. = 2(lw + lh + wh)$



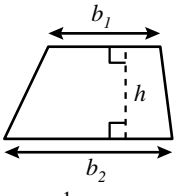
$V = \frac{1}{3}\pi r^2 h$

$S.A. = \pi r(l + r)$

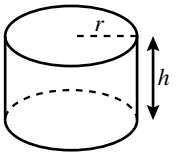


$p = 4s$

$A = s^2$

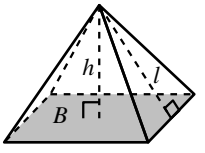


$A = \frac{1}{2}h(b_1 + b_2)$



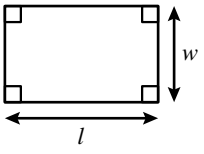
$V = \pi r^2 h$

$S.A. = 2\pi r(h + r)$



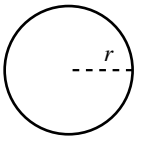
$V = \frac{1}{3}Bh$

$S.A. = \frac{1}{2}lp + B$



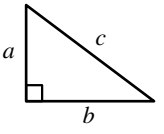
$p = 2(l + w)$

$A = lw$



$C = 2\pi r$

$A = \pi r^2$



$c^2 = a^2 + b^2$

Abbreviations

milligram	mg
gram	g
kilogram	kg
milliliter	mL
liter	L
kiloliter	kL
millimeter	mm
centimeter	cm
meter	m
kilometer	km
square centimeter	cm^2
cubic centimeter	cm^3

ounce	oz
pound	lb
quart	qt
gallon	gal.
inch	in.
foot	ft
yard	yd
mile	mi.
square inch	sq in.
square foot	sq ft
cubic inch	cu in.
cubic foot	cu ft

volume	V
total surface area	$S.A.$
area of base	B

year	yr
month	mon
hour	hr
minute	min
second	sec

Pi

$\pi \approx 3.14$

$\pi \approx \frac{22}{7}$

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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Directions

Read each question and choose the best answer. For this test you may assume that the value of the denominator is not zero.

SAMPLE

If $f(x) = x^2 + 2x + 3$, what is the value of $f(x)$ when $x = 6$?

A 27
B 42
C 51
D 60

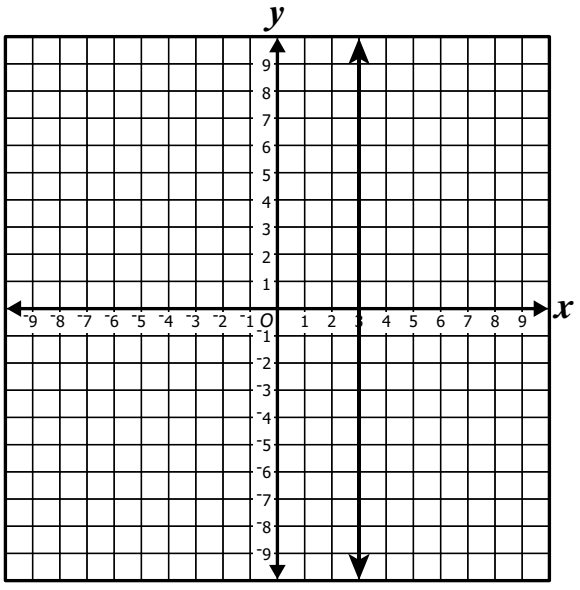
1 What value of x will make the equation $3(x+15)-6x=-6(x-3)$ true?

A -9
B -6
C 2
D 3

2 Which describes the graph of $g(x)=-3x+5$?

F A line with a slope of -3 and a y-intercept of -5.
G A line with a slope of -3 and a y-intercept of 5.
H A line with a slope of 3 and a y-intercept of -5.
J A line with a slope of 3 and a y-intercept of 5.

3 What is *most* likely the slope of the line graphed on the coordinate plane?



A −3

B 0

C 3

D Undefined

4 Which ordered pair represents the solution to the system of equations?

$$\begin{cases} 2x - 7y = 0 \\ x - 6y = -5 \end{cases}$$

F (7, 2)

G (2, 7)

H (1, 1)

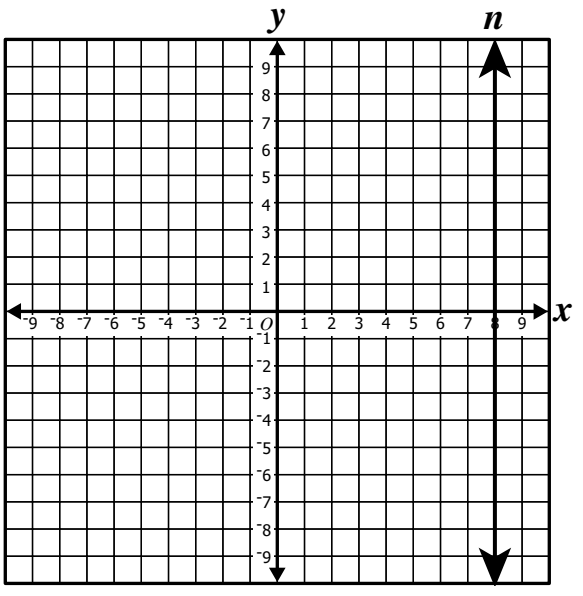
J ($^-$11, $^-$1)

5 What is the solution to the following inequality?

$$3(x - 3) \leq 3$$

A $x \leq 2$
B $x \geq 2$
C $x \leq 4$
D $x \geq 4$

6 Which equation *best* models line n ?



F $x = 8$

G $y = 8$

H $x = 8y$

J $y = x + 8$

7 Which quadratic equation has solutions of 5 and 7 ?

A $x^2 - 5x = 0$

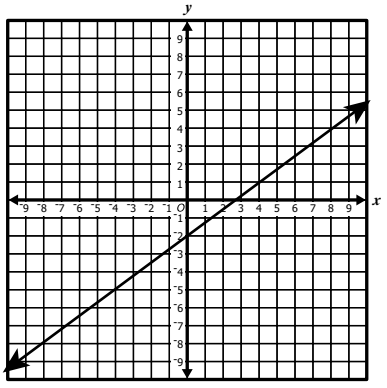
B $x^2 - 2x - 35 = 0$

C $x^2 - 3x - 28 = 0$

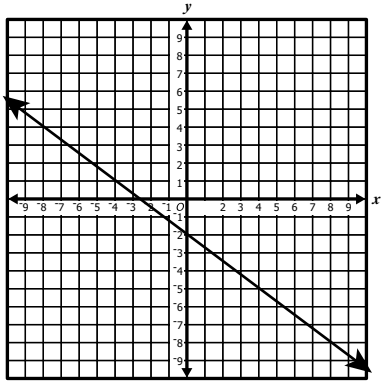
D $x^2 - 12x + 35 = 0$

8 Which graph *best* represents the equation $y = \frac{3}{4}x - 2$?

F



G



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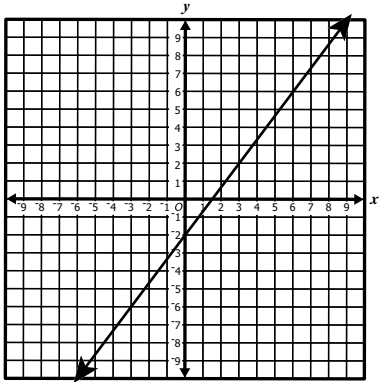
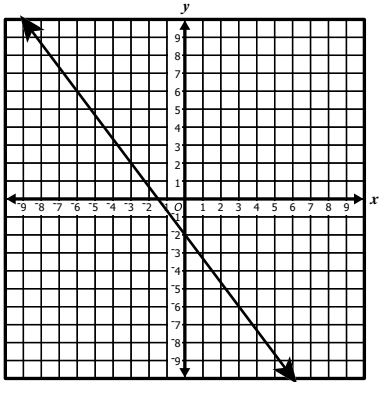
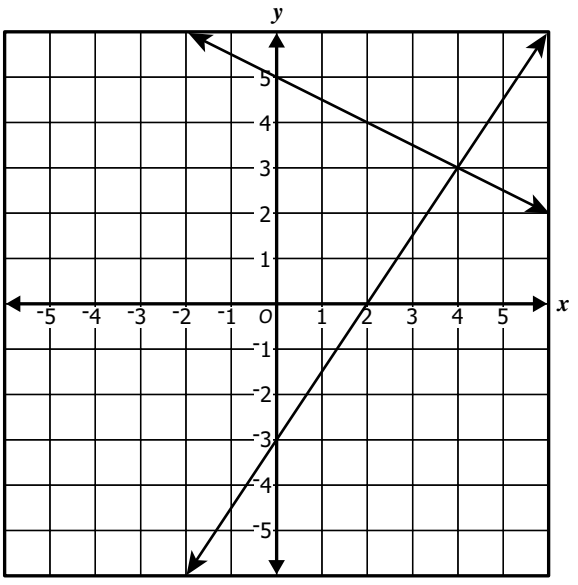


J



9 This is the graph of a system of linear equations.



Based upon the graph, which is the apparent solution to the system of equations?

A (2, 5)

B (3, 4)

C (4, 3)

D (5, 2)

10 Which is an example of the distributive property?

F $10 + 5x = 5x + 10$

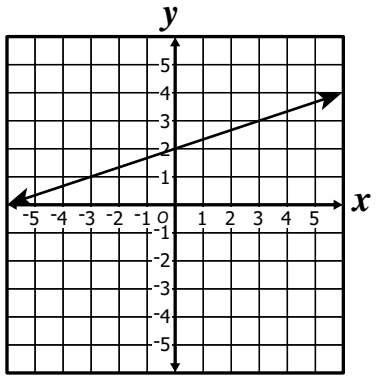
G $5(x + 2) = 5x + 10$

H $5x + 10 = 5x + 10$

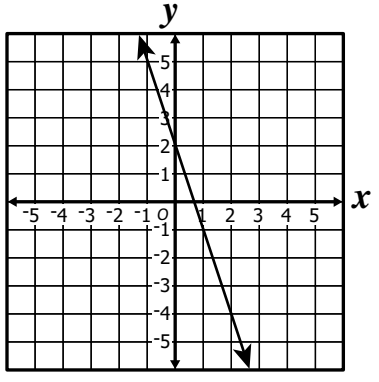
J $(5 + 10)x = x(5 + 10)$

11 Which graph best represents the equation of the line $y = \frac{-1}{3}x + 2$?

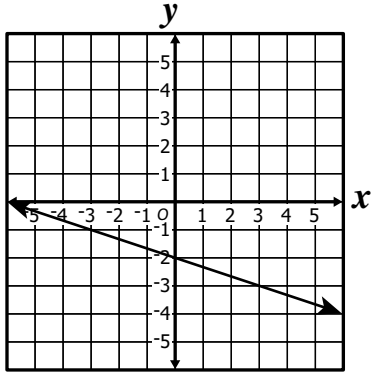
A



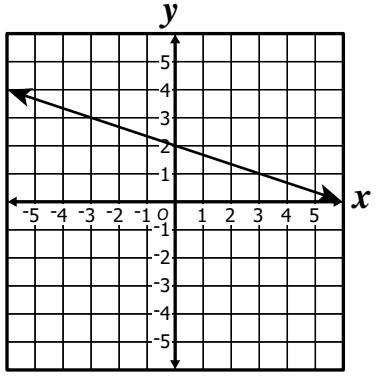
B



C



D



12 **A school play cost $1,200 to produce. If tickets sold for $5 each, the profit, p, made on the play by selling x tickets is given by the equation shown.**

$$p = 5x - 1{,}200$$

What is the slope of the line representing this equation?

F $^{-}1{,}200$

G $^{-}240$

H 1

J 5

13 **Which of the following is a solution to $2x^2 + 2x - 12 = 0$?**

A $^{-}12$

B $^{-}3$

C $^{-}2$

D 0

14 **Which is an equation for the line that contains (1, 2) and has a slope of 4 ?**

F $y = 2x - 4$

G $y = {}^{-}2x + 4$

H $y = 4x - 2$

J $y = {}^{-}4x + 2$

15 Which inequality is equivalent to $4x - 2y \leq 8$?

A $y \leq 2x - 4$

B $y \geq 2x - 4$

C $y \leq {}^{-}2x - 4$

D $y \geq {}^{-}2x - 4$

16 What is the slope of the line that passes through $({}^{-}2, 5)$ and $(3, 9)$?

F $\frac{{}^{-}5}{4}$

G $\frac{{}^{-}4}{5}$

H $\frac{4}{5}$

J $\frac{5}{4}$

17 In addition to an $80 bonus, Joan earned $8 per hour working last week. Joan's total earnings last week were $240. How many total hours did she work last week?

A 10

B 20

C 30

D 40

18 **Tommie paid $17.50 to buy 6 youth tickets and 1 adult ticket to a school carnival. Susan paid $22.50 to buy 3 youth tickets and 3 adult tickets at the carnival. What was the price of an adult ticket?**

F $2.00
G $2.90
H $5.50
J $7.50

19 **What is the value of $\frac{6x-3y}{xy}$ when $x = 6$ and $y = -4$?**

A -2
B -1
C 2
D 3

20 **Which equals $(2.3 \times 10^3)(3.6 \times 10^3)$?**

F 8.28×10^9
G 8.28×10^6
H 5.90×10^9
J 5.90×10^6

21 Which expression is equivalent to

$$(4x^2 - 3x + 9) + (7x^2 - 11) + (^{-}x^2 + 7x - 2)\ ?$$

A $10x^2 + 4x - 4$

B $10x^2 - 10x - 22$

C $10x^6 + 4x^2 - 4$

D $11x^2 + 4x + 4$

22 In simplest radical form, $\sqrt{845}$ is equal to —

F 13

G $13\sqrt{2}$

H $13\sqrt{3}$

J $13\sqrt{5}$

23 Which polynomial is equivalent to $\frac{8x^3+12x}{2x}$ when $x \neq 0$?

A $4x^2+6$

B $4x^2+6x$

C $4x^2+12x$

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

24 What is the complete factorization of $x^2-5x-14$?

F $(x-2)(x+7)$
G $(x+2)(x-7)$
H $(x-1)(x+14)$
J $(x+1)(x-14)$

25 Which statement could be represented by the expression n^2+4n ?

A The square of a number increased by four
B The square of the product of a number and four
C The sum of two times a number and four times a number
D The square of a number increased by four times the number

26 Which expression is equivalent to $4x(2x^2 - x - 3)$?

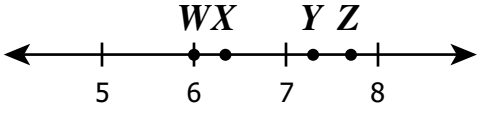
F $6x^2 - 5x - 7$

G $6x^3 - 5x^2 + 7x$

H $8x^2 - 4x + 12$

J $8x^3 - 4x^2 - 12x$

27 Which labeled point on the number line is closest to $\sqrt{40}$?



A W

B X

C Y

D Z

28 A computer chip has two pins on one side. One pin is 4.0×10^{-3} inches long and the other is 2.5×10^{-3} inches long. What is the difference in the lengths of the pins?

F 6.5×10^{9} in.

G 6.5×10^{-3} in.

H 1.5×10^{-3} in.

J 1.5×10^{-6} in.

29 Which represents the *complete* factorization of $3v^2 + 9v$?

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

30 Lincoln High School earned $5,100 in ticket sales for a play. The cost per ticket was $12. Let t represent the number of tickets sold to the play. Which of the following equations could be used to determine how many tickets were sold to the play?

F $12 = 5{,}100t$
G $12t = 5{,}100$
H $t = 5{,}100 - 12$
J $t = 5{,}100 \cdot 12$

31 The function $f(x) = 35 + 15x$ represents the amount of money, in dollars, Mr. Lewis earns for working x hours. How much money does Mr. Lewis earn for working 25 hours?

A $75
B $375
C $410
D $1,250

32 Which equation represents the relationship between time, t, and distance, d ?

Distance Traveled

Time (hours)	Distance (miles)
2	90
3	135
4	180
5	225

F $d = t + 45$

G $d = 45t$

H $t = 45d$

J $t = \frac{45}{d}$

33 What is the domain of the relation shown in the table?

x	y
-5	-23
-2	-14
0	-8
3	1
6	10

A $\{-5, -2, 0, 3, 6\}$

B $\{-23, -14, -8, 1, 10\}$

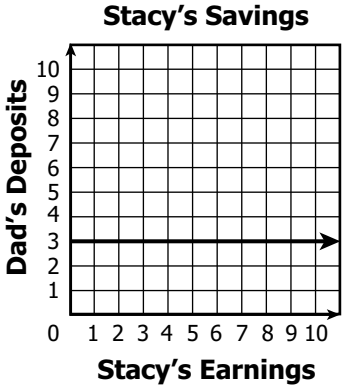
C $\{-23, -14, -8, -5, -2, 0, 1, 3, 6, 10\}$

D $\{(-5, -23), (-2, -14), (0, -8), (3, 1), (6, 10)\}$

34 **For every dollar that Stacy earns, her dad deposits twice that amount into a savings account for her.**

Which graph illustrates this example of direct variation?

F



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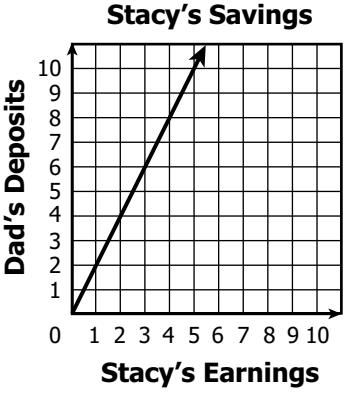

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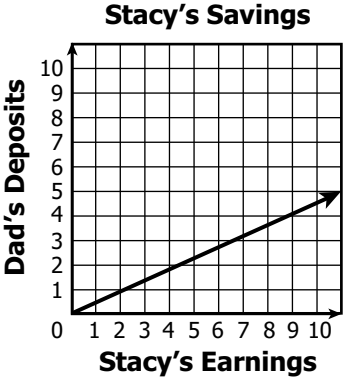

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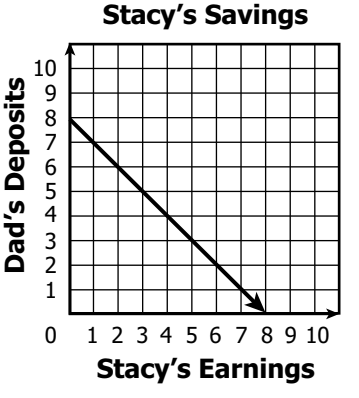


GO ON

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

A $\{(3, 4), (2, 3), (3, -2), (4, 1)\}$

B $\{(2, 5), (-1, 9), (6, 3), (-1, -2)\}$

C $\{(1, 3), (-2, 5), (4, 5), (3, -2)\}$

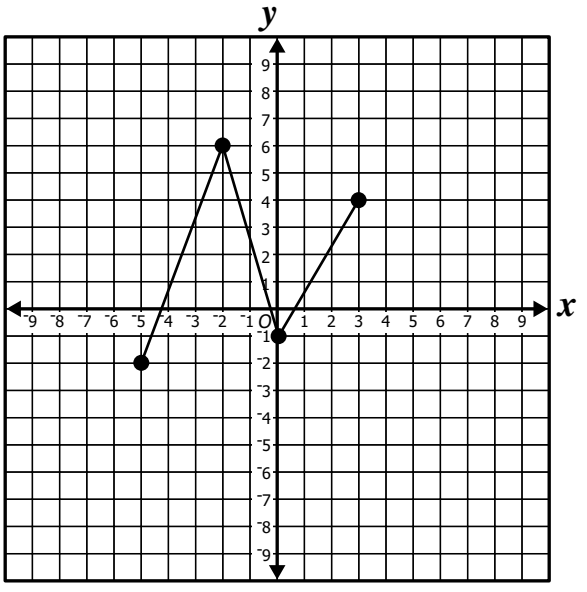
D $\{(5, 6), (-2, 3), (10, 1), (-2, -9)\}$

36 What is $g(2)$ for $g(x) = \frac{1}{2}x^3 + 2x$?

F 5
G 7
H 8
J 12

GO ON

37 What is the domain of the function shown?



A $-2 \leq x \leq 6$

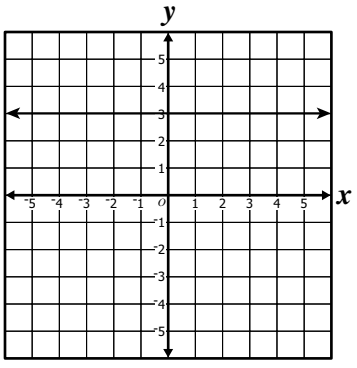
B $-5 \leq x \leq 3$

C $-2 \leq y \leq 6$

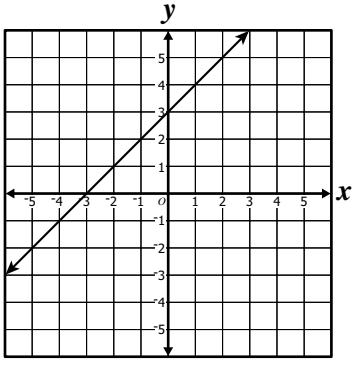
D $-5 \leq y \leq 3$

38 Which graph *best* represents a direct variation?

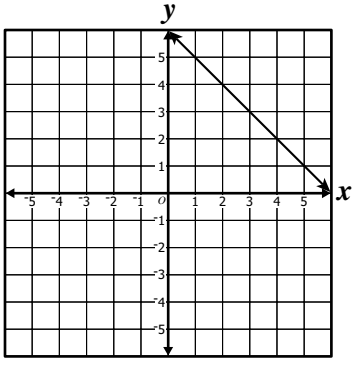
F



G



H



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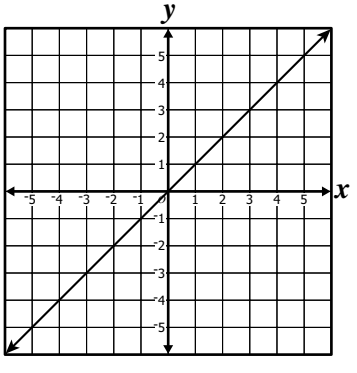


39 What are the range values of the function $f(x) = -3x^2 + 5$ for the domain values $\{-2, 0, 1\}$?

A $\{-31, -4, 5\}$

B $\{-7, 2, 5\}$

C $\{5, 8, 17\}$

D $\{5, 14, 41\}$

40 Which of the following tables indicates that x and y vary directly?

F

x	y
1	2
2	4
3	4
4	5
5	8

G

x	y
1	1
2	4
3	9
4	16
5	25

H

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

J

x	y
1	3
2	6
3	9
4	12
5	15

41 The table shows the cost of a 12-inch pizza for different numbers of toppings.

Pizza Pricing

Number of toppings	Cost of pizza
0	\$15.50
1	\$17.35
2	\$19.20
3	\$21.05
4	\$22.90

Which equation gives C, the cost of a pizza with t toppings?

A $C = 1.85t$

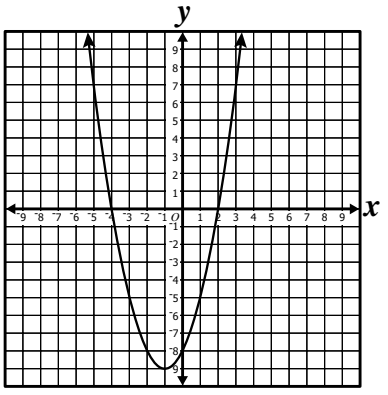
B $C = 17.35t$

C $C = 15.50 + 1.85t$

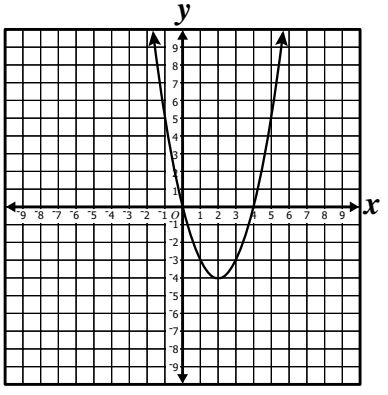
D $C = 22.90 - 1.85t$

42 Which graph *best* represents the function $g(x) = (x - 2)(x + 4)$?

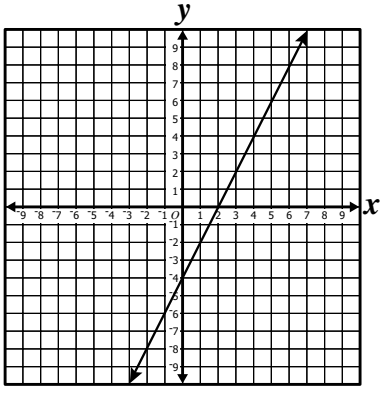
F



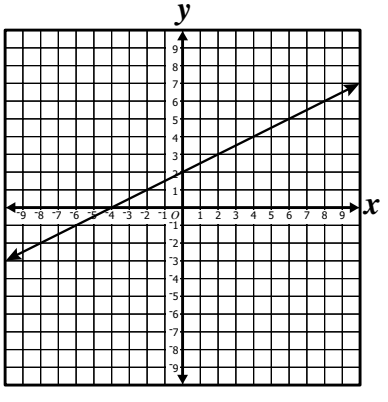
G



H



J



GO ON

43 What is the sum of these matrices?

$$\begin{bmatrix} \mathbf{2} & \mathbf{1} \\ \mathbf{-4} & \mathbf{0} \\ \mathbf{-3} & \mathbf{-3} \end{bmatrix} + \begin{bmatrix} \mathbf{5} & \mathbf{-6} \\ \mathbf{7} & \mathbf{2} \\ \mathbf{5} & \mathbf{1} \end{bmatrix}$$

A $\begin{bmatrix} -3 & 7 \\ -11 & -2 \\ -8 & -4 \end{bmatrix}$

B $\begin{bmatrix} 10 & -6 \\ -28 & 0 \\ -15 & -3 \end{bmatrix}$

C $\begin{bmatrix} 7 & -5 \\ 3 & 2 \\ 2 & -2 \end{bmatrix}$

D $\begin{bmatrix} 7 & -5 \\ -3 & 2 \\ -2 & -2 \end{bmatrix}$

44 The table shows high temperatures for four Virginia cities during one week in March.

March High Temperatures (degrees Fahrenheit)

Day	Arlington	Norfolk	Roanoke	Virginia Beach
Sunday	52	52	63	50
Monday	70	71	70	73
Tuesday	74	75	65	78
Wednesday	66	70	57	68
Thursday	56	53	59	55
Friday	50	70	48	71
Saturday	63	73	54	72

Which city had the greatest mean high temperature during this week?

F Arlington
G Norfolk
H Roanoke
J Virginia Beach

45 Which equation *most* closely represents the line of best fit for the data in this table?

x	y
1	4
2	6
3	7
4	9
5	10
6	10

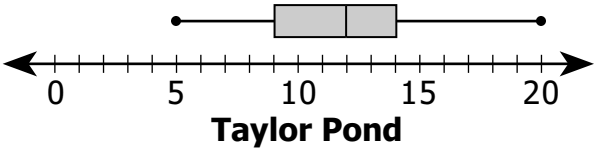
A $y = \frac{-5}{4}x + 3$

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

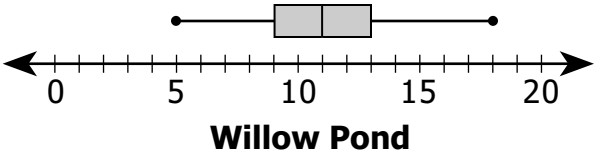
C $y = \frac{4}{5}x + 3$

D $y = \frac{5}{4}x + 3$

46 Collin caught 15 fish in each of the two ponds on his ranch. The box-and-whisker plots summarize the lengths in inches of the fish from each pond.



Taylor Pond



Willow Pond

The lengths of the fish from Willow Pond have a —

F greater range than the lengths of those from Taylor Pond

G median equal to 12 inches

H mean equal to 20 inches

J lower quartile equal to the lower quartile for Taylor Pond

47 **What is** $\begin{bmatrix} 5 & -3 \\ 2 & 6 \\ 2 & 6 \end{bmatrix} - \begin{bmatrix} -2 & 4 \\ 3 & -2 \\ 4 & -4 \end{bmatrix}$ **?**

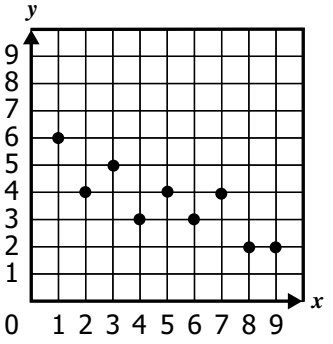
A $\begin{bmatrix} 3 & 1 \\ 5 & 4 \\ 6 & 2 \end{bmatrix}$

B $\begin{bmatrix} 7 & -7 \\ -1 & 8 \\ -2 & 10 \end{bmatrix}$

C $\begin{bmatrix} 7 & 1 \\ -1 & 4 \\ -2 & 2 \end{bmatrix}$

D $\begin{bmatrix} 10 & 12 \\ -6 & 12 \\ -8 & 24 \end{bmatrix}$

48 Which is most likely the equation of the line of best fit for the set of data points?



F $y = \frac{5}{2}x + 6$

G $y = \frac{2}{5}x + 6$

H $y = -\frac{2}{5}x + 6$

J $y = -\frac{5}{2}x + 6$

49 Jake worked part-time at a restaurant. The amount of money Jake earned for each of six weeks is shown.

$40, $80, $38, $40, $32, $65

Jake then earned $25 for working a seventh week. How were the mean and median affected?

A The mean decreased and the median remained the same.

B The median decreased and the mean remained the same.

C The median and the mean both remained the same.

D The mean and the median both decreased.

50 A sports league charges $60 per person to register and participate for each sport. The table shows the actual numbers of people registered for soccer and football by age range.

Sports League Registration

Age	Soccer	Football
7–8	350	280
9–10	320	165
11–14	180	120

Which product represents the registration fees paid for soccer and football by age range?

F $60\begin{bmatrix} 280 \\ 165 \\ 120 \end{bmatrix}$

G $60\begin{bmatrix} 350 \\ 320 \\ 180 \end{bmatrix}$

H $60\begin{bmatrix} 7-8 \\ 9-10 \\ 11-14 \end{bmatrix}$

J $60\begin{bmatrix} 350 & 280 \\ 320 & 165 \\ 180 & 120 \end{bmatrix}$

STOP