VIRGINIA STANDARDS OF LEARNING

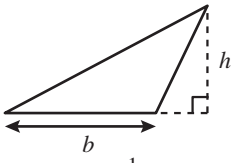
Spring 2007 Released Test

END OF COURSE ALGEBRA I

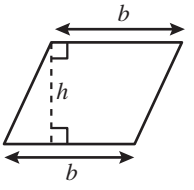
Form M0117, CORE 1

Algebra I Formula Sheet

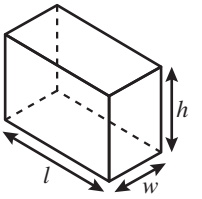
Geometric Formulas



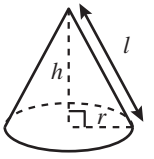
$A = \frac{1}{2}bh$



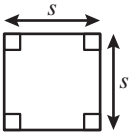
$A = bh$



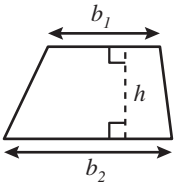
$V = lwh$
$S.A. = 2(lw + lh + wh)$



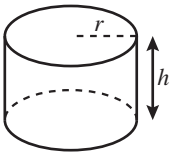
$V = \frac{1}{3}\pi r^2 h$
$S.A. = \pi r(l + r)$



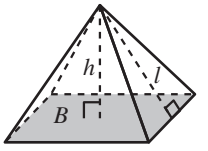
$p = 4s$
$A = s^2$



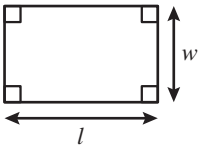
$A = \frac{1}{2}h(b_1 + b_2)$



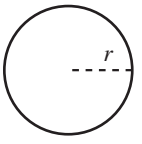
$V = \pi r^2 h$
$S.A. = 2\pi r(h + r)$



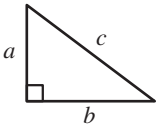
$V = \frac{1}{3}Bh$
$S.A. = \frac{1}{2}lp + B$



$p = 2(l + w)$
$A = lw$



$C = 2\pi r$
$A = \pi r^2$



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

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

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

Directions

Read and solve each question. Then mark the space on your answer document for 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 If $\frac{1}{3}t - 6 = 15$, what is the value of t?

A 21

B 27

C 53

D 63

2 What is the solution to the following system of linear equations?

$$\begin{cases} 4x - y = -6 \\ x - 2y = -5 \end{cases}$$

F $(-1, 2)$

G $(0, 6)$

H $(1, 2)$

J $(2, -1)$

3 What is the solution set for the equation below?

$$(x+5)(x+3)=0$$

A $\{0, 8\}$

B $\{3, 5\}$

C $\{-2, 8\}$

D $\{-5, -3\}$

4 What is the slope of the line that passes through the points (5, 0) and (10, 0)?

F 0

G 1

H 5

J Undefined

5

$$\begin{cases} x - y = 7 \\ 2x + y = -1 \end{cases}$$

Which is the solution to the system of equations shown?

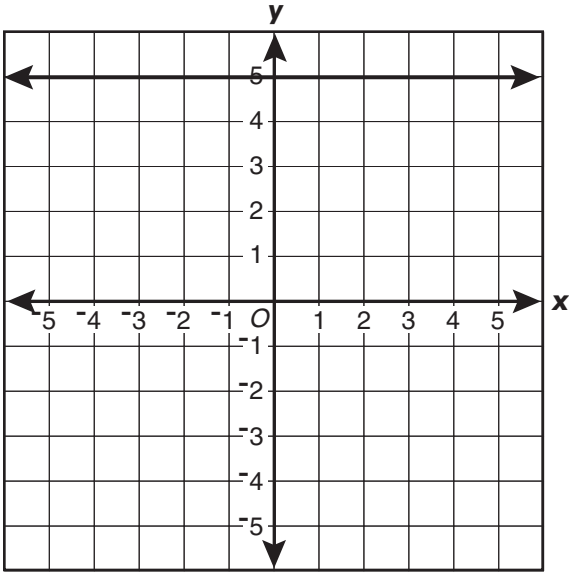
A $x = -5, y = 2$

B $x = -2, y = 5$

C $x = -1, y = -7$

D $x = 2, y = -5$

6



Which is *most* likely the equation of the line shown on the graph above?

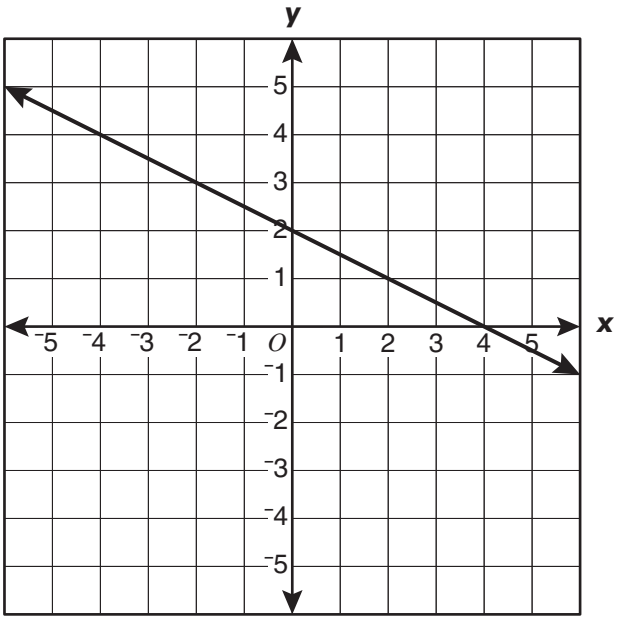
F $y = x + 5$

G $y = 5x$

H $y = 5$

J $x = 5$

7



Which could be an equation for the line shown on the grid?

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

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

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

D $y = 2x - 2$

GO ON

8 Which is an equation for the line with slope $= \frac{1}{2}$ and *y*-intercept of 3?

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

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

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

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

9 Which property justifies rewriting

$$3x - 5x$$
as
$$(3 - 5)x\text{?}$$

A Associative property of multiplication

B Distributive property

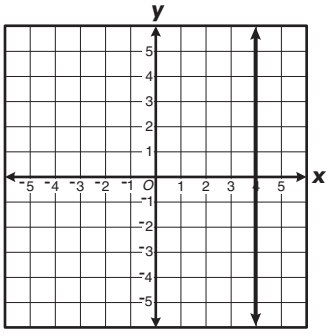
C Commutative property of multiplication

D Associative property of addition

GO ON

10 Which graph best represents a line with an undefined slope?

F



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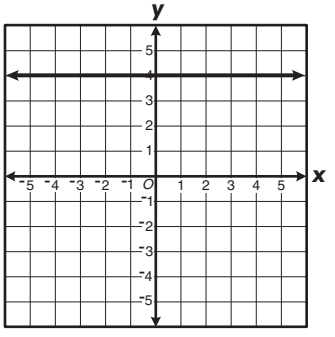

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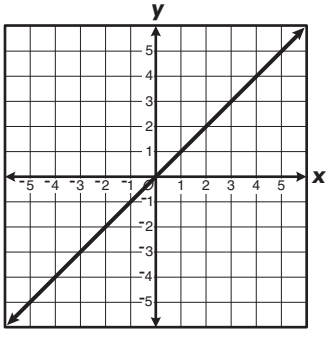
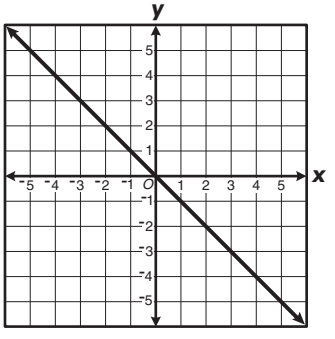
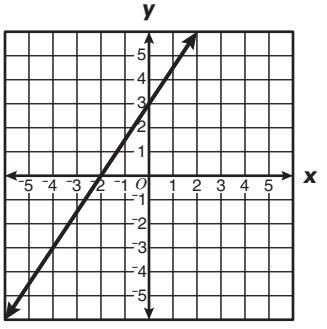


J

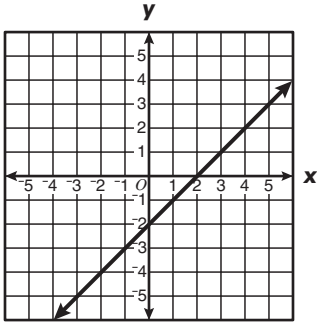


11 Which graph best represents a line with an *x*-intercept of 2 and a *y*-intercept of $^{-}3$?

A



B



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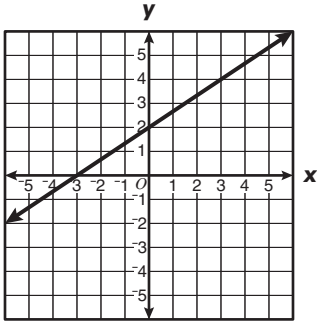

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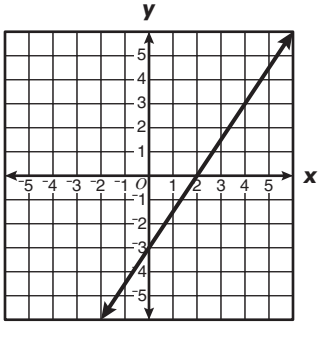
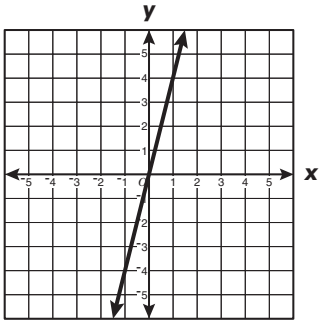


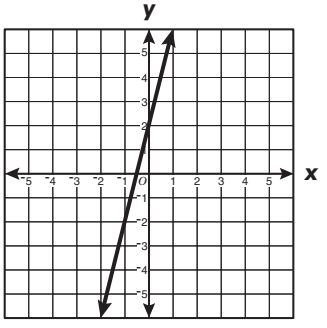
12 Which graph best represents the following function?

$$y = 4x + 2$$

F



G



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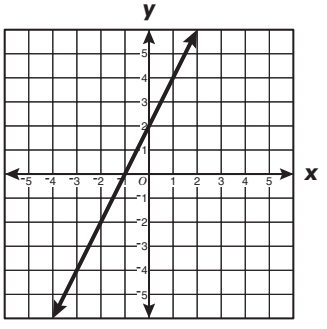

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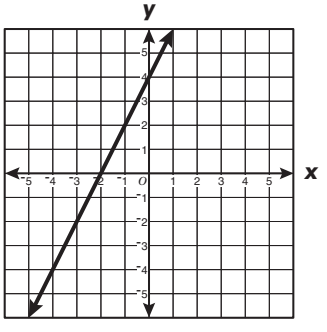


13

$$\begin{cases} y = 4x + 2 \\ y = x - 1 \end{cases}$$

What is the solution to the system of equations?

A $x = -1, y = 2$

B $x = -1, y = -2$

C $x = 1, y = -2$

D $x = 1, y = 2$

14 While solving an equation, Lenny wrote the following steps on the board.

$$(2x + 1) + 5 = 9$$

$$2x + (1 + 5) = 9$$

What property of real numbers guarantees that the second equation is equivalent to the first?

F Associative property of addition

G Additive inverse property

H Commutative property of addition

J Distributive property

15 What is the solution to the following equation?

$$5(x+2)=7(4-x)$$

A $^{-}9.0$

B 1.5

C 3.2

D 9.0

16 What are the *x*-intercepts of the graph of the following equation?

$$y=x^2+5x+4$$

F $^{-}4$ and $^{-}1$

G $^{-}2$ and 3

H $^{-}1$ and 1

J $^{-}1$ and 2

17 What values of *x* make the following inequality true?

$$-3(x+1) \leq 15$$

A $x \geq 6$
B $x \leq 6$
C $x \geq -6$
D $x \leq -6$

18 The profit equation for a manufacturing firm is $P = x^2 - 2{,}500$ where *P* is profit and *x* is the number of units sold. For what number of units sold does the company break even $(P = 0)$?

F 50 units sold
G 100 units sold
H 500 units sold
J 1,250 units sold

19 What is the value of

$$\frac{4x - 5y}{2y}$$

if $x = {}^{-}6$ and $y = 2$?

A $^{-}26.5$

B $^{-}8.5$

C $^{-}3.5$

D $^{-}0.5$

GO ON

20 **The expression**

$$5\sqrt{7}$$

is the simplest radical form of —

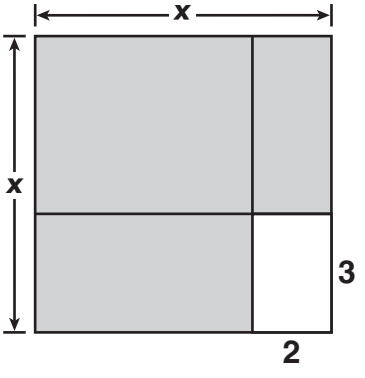
F $\sqrt{1,225}$

G $\sqrt{245}$

H $\sqrt{175}$

J $\sqrt{35}$

21



The figure above is composed of rectangles. Which expression represents the shaded area?

A $4x - 10$

B $x^2 - 6$

C $x^2 - 5x + 6$

D $x^2 + 5x - 6$

22 Which is a factored form of the following expression?

$$\mathbf{5x^2 - 20x}$$

F $5\left(x^2 - 4\right)$

G $5\left(x - 2\right)^2$

H $5x\left(x - 4\right)$

J $\left(5x - 4\right)\left(x + 5\right)$

23 Which binomial is a factor of the following expression?

$$\mathbf{2x^2 + x - 1}$$

A $x - 1$

B $2x + 2$

C $2x - 1$

D $2x + 1$

24 Which polynomial is equivalent to the following expression?

$$\left(\mathbf{2x^2 - 5x + 6}\right) + \left(\mathbf{5x^2 - 3x + 4}\right)$$

F $7x^2 - 8x + 10$

G $7x^2 - 2x + 10$

H $7x^2 - 8x + 2$

J $7x^2 - 2x + 2$

25 **What is $\sqrt{180}$ written in simplest radical form?**

A $5\sqrt{6}$

B $4\sqrt{45}$

C $6\sqrt{5}$

D $6\sqrt{30}$

26 **What is the value of $3x + 4y$ if $x = \frac{1}{3}$ and $y = \frac{1}{2}$?**

F 17

G 3

H 2

J 1

27 **Which is a simplified form of the following expression?**

$$\left(xy^3\right)\left(xy\right)^4$$

A x^2y^7

B x^4y^{12}

C x^5y^7

D x^5y^{12}

28 Which is equivalent to the following expression?

$$\left(2.3 \times 10^4\right) - \left(6.5 \times 10^3\right)$$

F $^{-}42$
G 165
H 1,650
J 16,500

29 What is the value of

$$\frac{mn}{r^2}$$

if $m = 7$, $n = 18$ ***and*** $r = 6$**?**

A 3.5
B 10.5
C 21
D 63

30 When factored completely, $x^2 - 9$ **equals —**

F $\left(x+3\right)^2$
G $\left(x-3\right)^2$
H $\left(x+1\right)\left(x-9\right)$
J $\left(x+3\right)\left(x-3\right)$

31 For a group of objects made of the same material, the weight of an object varies directly with its volume. If an object that has a volume of 20 cubic inches weighs 28 ounces, what is the constant of variation?

A $\frac{5}{7}$

B $\frac{7}{5}$

C 20

D 28

32 What is the range of the function $f(x) = x^2 - 3$ when the domain is {1, 3, 5}?

F $\{-2, 22\}$

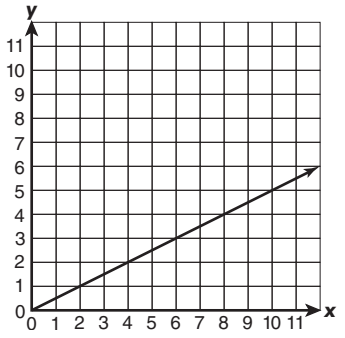
G $\{-2, 0, 2\}$

H $\{-2, 6, 22\}$

J $\{2, 4, 6\}$

33 Which graph shows that *y* varies directly as *x*?

A



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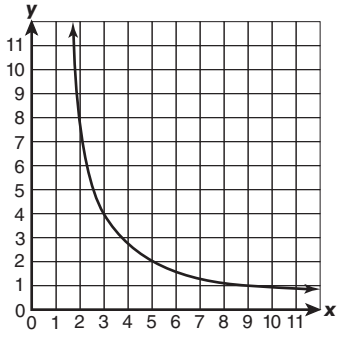

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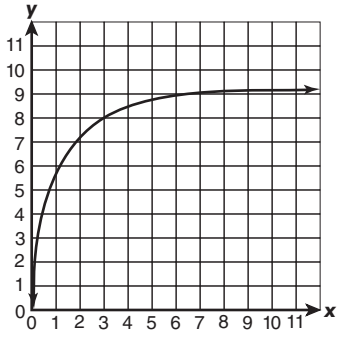

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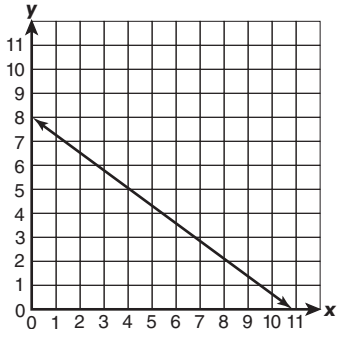


34 Which is a zero of the following function?

$$f(x) = x^2 - x - 12$$

F 1
G 2
H 3
J 4

35 The ordered pairs in the sets shown below are of the form (x, y). In which set of ordered pairs is *y not* a function of *x*?

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

B $\{(2, 0), (4, 1), (6, 2), (8, 3)\}$

C $\{(11, 2), (12, 4), (13, 6)\}$

D $\{(^-6, 37), (^-6, 10), (^-5, 26)\}$

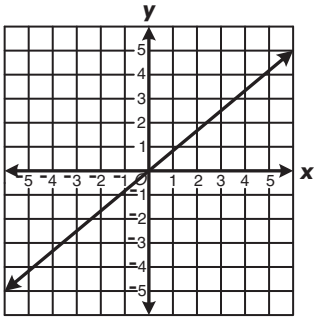
36 If $f(x) = 8x + 6$, what is $f(^-1)$?

F $^-14$
G $^-2$
H 2
J 14

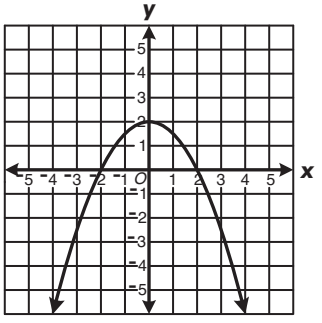
GO ON

37 Which of the following could not be the graph of a function of *x*?

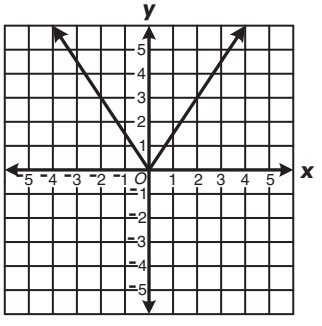
A



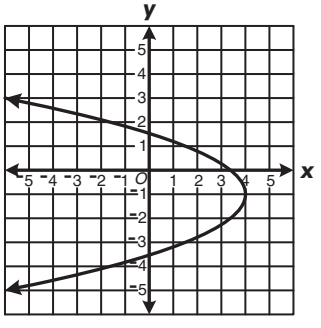
B



C



D



38 **If $f(x) = 5x - 2$, what is $f(3)$?**

F 0

G 8

H 13

J 15

39 **Which is a zero of the function defined by the following equation?**

$$f(x) = 5x - 20$$

A $^{-}20$

B 0

C 4

D 5

40 **The elements of a function of *x* are $(^{-}4, 1)$, $(^{-}2, 0)$, and $(8, ^{-}1)$. What is the range of the function?**

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

G $\{^{-}1, 0, 1\}$

H $\{^{-}4, ^{-}2, 8\}$

J $\{^{-}4, ^{-}2, ^{-}1, 0, 1, 8\}$

41 The following chart is used to calculate the price, *P*, in cents per color brochure for a certain bulk number of brochures, *n*, ordered by a company.

n	100	500	1,000	2,000
P	49	45	40	30

Which equation best represents this relationship?

A $P = \left(\frac{^{-}1}{100}\right)n + 50$

B $P = \left(\frac{1}{10}\right)n + 39$

C $P = \left(\frac{^{-}1}{10}\right)n + 59$

D $P = \left(\frac{1}{100}\right)n + 48$

42 Distance, *d*, varies directly as time, *t*, when speed remains constant. If *d* is 240 miles when *t* is 8 hours, what is the constant speed?

F 1,920 miles per hour

G 232 miles per hour

H 30 miles per hour

J $\frac{1}{30}$ mile per hour

43 If the mean of a set of 12 numbers is 13, then the sum of the numbers is —

A 25
B 144
C 156
D 169

44 The times in minutes for each of Curt's phone calls this week are shown in this list.

9, 15, 5, 7, 9, 12, 11, 4

Which statement is true regarding the duration of his calls?

F The mode is greater than 7.
G The mean is less than 8.
H The range is less than 10.
J The median is greater than 10.

45 The table shows the clothing purchases Jenny made last month and the tax charged for each purchase.

Clothing Purchases (in dollars), c	Tax (in dollars), t
35	3.15
40	3.60
22	1.98
68	6.12
74	6.66
31	2.79

Which equation represents the line that *best* fits the data?

A $t = 0.09c + 2.89$

B $t = 0.91c$

C $t = 0.09c$

D $t = 1.09c$

GO ON

46 The table below shows the home construction firms in the community and the number of homes each built last year.

Builder	Number of Homes
Acme	51
Quality	25
Custom	12
Professional	10
Courtesy	43
Personal	50
AA	41
Reliable	39
Dependable	25

Which of the following statements is true regarding the number of homes built?

F The range is less than the mean.

G The mode is greater than the mean.

H The mode is greater than the median.

J The median is greater than the mean.

47

$$\begin{bmatrix} \mathbf{3} & \mathbf{1} \\ \mathbf{-2} & \mathbf{-7} \\ \mathbf{6} & \mathbf{4} \end{bmatrix} + \begin{bmatrix} \mathbf{0} & \mathbf{5} \\ \mathbf{8} & \mathbf{-4} \\ \mathbf{-3} & \mathbf{2} \end{bmatrix}$$

A $\begin{bmatrix} 3 & 6 \\ 6 & 3 \\ 3 & 6 \end{bmatrix}$

B $\begin{bmatrix} 0 & 5 \\ 6 & -11 \\ 9 & 6 \end{bmatrix}$

C $\begin{bmatrix} 3 & 6 \\ 10 & 11 \\ 9 & 6 \end{bmatrix}$

D $\begin{bmatrix} 3 & 6 \\ 6 & -11 \\ 3 & 6 \end{bmatrix}$

48 Given the following matrices, what is $Q - P$?

$$P = \begin{bmatrix} 10 & 25 \\ 15 & 30 \\ 20 & 35 \end{bmatrix} \qquad Q = \begin{bmatrix} 40 & 70 \\ 50 & 80 \\ 60 & 90 \end{bmatrix}$$

F $\begin{bmatrix} 30 & 60 \\ 20 & 65 \\ 25 & 70 \end{bmatrix}$

G $\begin{bmatrix} 30 & 45 \\ 35 & 50 \\ 40 & 55 \end{bmatrix}$

H $\begin{bmatrix} 50 & 95 \\ 65 & 110 \\ 80 & 125 \end{bmatrix}$

J $\begin{bmatrix} -30 & -45 \\ -35 & -50 \\ -40 & -55 \end{bmatrix}$

49

$$\boldsymbol{M} = \begin{bmatrix} \mathbf{3} & \mathbf{2} \end{bmatrix}$$

$$\boldsymbol{N} = \begin{bmatrix} \mathbf{-1} \\ \mathbf{4} \end{bmatrix}$$

Which matrix is equal to $\boldsymbol{M} + \boldsymbol{N}$?

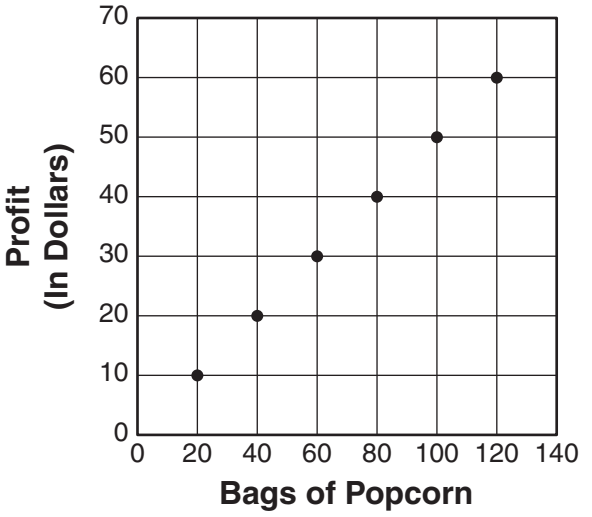
A $\begin{bmatrix} 2 & 6 \end{bmatrix}$

B $\begin{bmatrix} 2 \\ 6 \end{bmatrix}$

C $\begin{bmatrix} 2 & -3 \\ 8 & 6 \end{bmatrix}$

D *M* and *N* cannot be added.

50 The graph represents the relationship between the bags of popcorn sold and the amount of profit made during the Newton Honor Society's popcorn sale.



Which is closest to the minimum number of bags that must be sold to make a $200 profit?

F 250

G 300

H 350

J 400

STOP