

VIRGINIA STANDARDS OF LEARNING

Spring 2009 Released Test

END OF COURSE ALGEBRA II (2001 Revised)

Form M0119, CORE 1

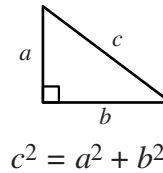
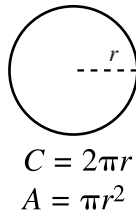
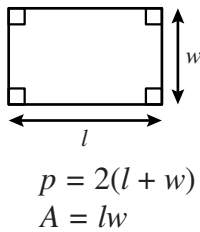
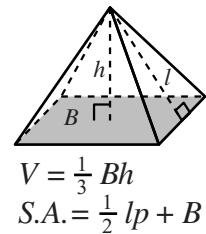
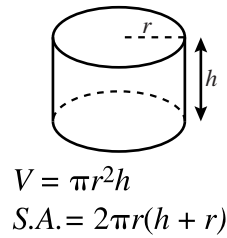
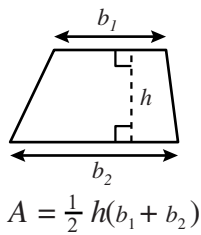
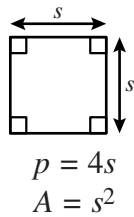
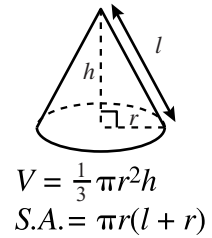
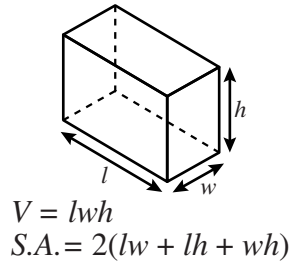
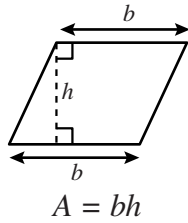
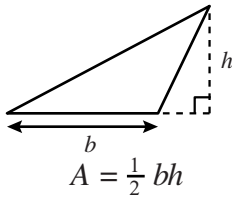
This released test contains 2 fewer test items (#1-48 only)
than an original SOL EOC Algebra II test.

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Algebra II Formula Sheet

Geometric Formulas



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

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

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

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

SAMPLE

$$\frac{6(a+2)}{a} \cdot \frac{a^3}{a+2} =$$

A $\frac{6}{a^2}$

B $\frac{6(a+2)}{a}$

C $6a^2$

D $\frac{6a^2 + 24a + 24}{a^4}$

1 Which number is equivalent to $(32)^{\frac{3}{5}}$?

- A** 2
- B** 6
- C** 8
- D** 16

2 For non-zero denominators, which expression is equivalent to $\frac{5x - 15}{(x - 3)(x + 3)}$?

- F** $\frac{-10}{x - 9}$
- G** $\frac{5}{x - 3}$
- H** $\frac{10}{9}$
- J** $\frac{5}{x + 3}$

3 If $x \neq 0$, which is equivalent to the following expression?

$$\frac{y+z}{x} - \frac{z}{x}$$

A $\frac{y+2z}{x}$

B $\frac{y}{x}$

C $\frac{y}{x-z}$

D $\frac{y-x}{x-z}$

4 When completely factored, $2x^2 + 2x - 24$ is equivalent to —

F $2(x-3)(x+4)$

G $2(x+3)(x-4)$

H $2(x+6)(x-2)$

J $(2x-3)(x+8)$

5 Which of the following is equivalent to $\sqrt{-72} + \sqrt{-50}$?

- A $11i$
- B $-11i$
- C $11i\sqrt{2}$
- D $i\sqrt{122}$

6 Assuming no denominator is equal to zero, which is equivalent to the following expression?

$$\frac{x(x-2)(x-1)}{(x-4)(x-1)}$$

- F $\frac{x-2}{x-4}$
- G $\frac{x(x-2)}{x-4}$
- H $\frac{x}{2}$
- J $\frac{(x-2)}{-4}$

7 Which expression is equivalent to $\sqrt[6]{x^3y^4}$?

A $x^{\frac{1}{2}}y^{\frac{2}{3}}$

B $x^{\frac{1}{2}}y^{\frac{3}{2}}$

C x^2y^4

D $x^2y^{\frac{2}{3}}$

8 Which expression is equivalent to $64x^2 - 81y^2$?

F $(8x + 9y)^2$

G $(8x - 9y)^2$

H $(8x + 9y)(8x - 9y)$

J $(8x + 9)(8x - 9)$

9 For which of the following sets is multiplication *not* commutative?

A Complex numbers

B Matrices

C Real numbers

D Whole numbers

10 The graph of $y = 3x - 2$ is translated up 5 units. What is the equation of the new graph?

F $y = 8x - 2$

G $y = 3x + 3$

H $y = 3x - 7$

J $y = 3x + 5$

11 Which equation *best* represents the data in this table?

x	y
0	1
1	3
2	9
3	19

A $y = 2x + 1$

B $y = x^2 + 1$

C $y = 2x^2 + 1$

D $y = x + 1$

12 Which is a zero of $f(x) = 6x^2 + 5x - 6$?

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

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

H $\frac{3}{2}$

J 6

13 $y = x^2 - 8x + 15$

What are the x -intercepts of the graph that represents the equation?

A (0, 3) and (0, 5)

B (3, 0) and (5, 0)

C (-8, 0) and (15, 0)

D (0, -8) and (0, 15)

14 Given: $a_n = a_1 r^{n-1}$

Which is the 6th term of the geometric sequence for which $a_1 = 4$ and $r = -\frac{1}{2}$?

F $-\frac{1}{8}$

G $\frac{1}{16}$

H $\frac{1}{2}$

J 1

15 If y varies jointly with x and z , what is the constant of proportionality when $y = 30$, $x = 4$, and $z = 5$?

A $\frac{2}{3}$

B $\frac{3}{2}$

C 21

D 24

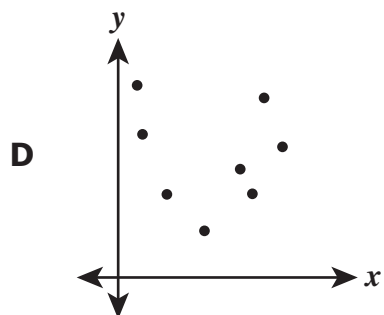
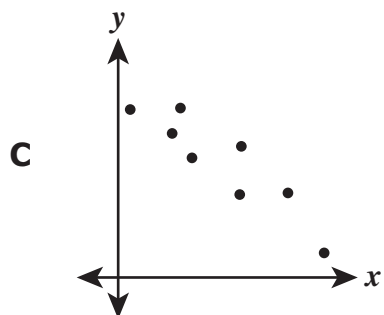
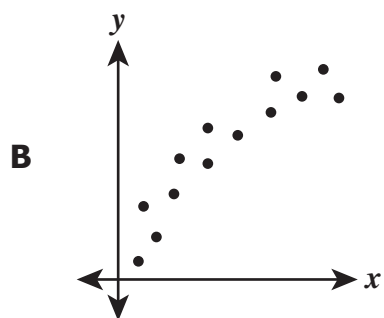
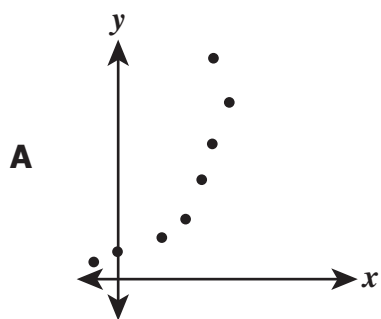
- 16** Bill rode his bike to a store 5 kilometers from his house. The table shows the distance from the store paired with the number of minutes after leaving his house.

Minutes (x)	Kilometers from Store (y)
0	5
3	4
5	3.2
8	2.9

Which equation best models a line of best fit for the data?

- F** $y = -0.2x + 4.5$
G $y = -0.2x + 6.1$
H $y = -0.3x + 4.9$
J $y = -0.3x + 6.4$

- 17 For which set of data would the equation for the curve of best fit most likely be linear?



18 The height of an object when projected upward can be described by the equation $h = 270t - 4.9t^2$, where h is height and t is time. The relationship between the height of the object and the elapsed time is —

- F** an exponential function
- G** a linear function
- H** a quadratic function
- J** a step function

19 These are the first three terms of an arithmetic sequence.

$$\frac{1}{2}, \frac{3}{4}, 1$$

What are the fourth and fifth terms of the sequence?

- A** $\frac{5}{4}, \frac{7}{4}$
- B** $\frac{5}{4}, \frac{3}{2}$
- C** $\frac{3}{2}, \frac{5}{2}$
- D** $\frac{3}{2}, 2$

20 If $f(x) = x^5$ and $g(x) = -2 - 3x^2$, which is $f(g(x))$?

F $\frac{x^5}{-2x - 3x^{10}}$

G $(-2 - 3x^2)^5$

H $(-2 - 3x^{10})^5$

J $-2x^5 - 3x^7$

21 What is the number of turning points in the graph of the function of x defined below?

$$y = 2x^2 + 5x - 7$$

A 4

B 3

C 2

D 1

22 What is the value of $\sum_{k=1}^4 \left(\frac{1}{4}\right)^k$?

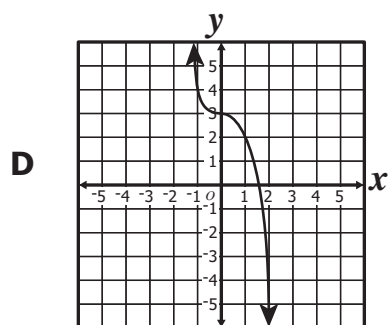
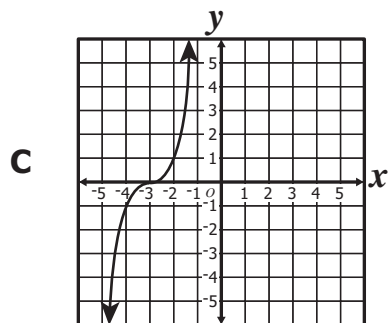
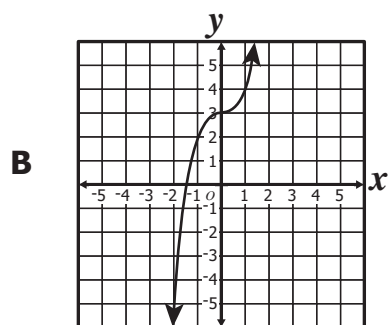
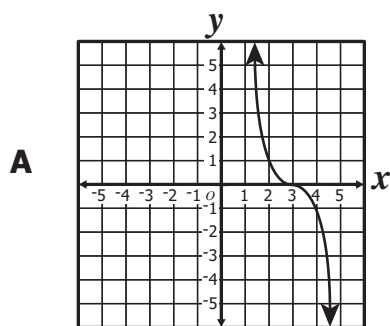
F $\frac{85}{4}$

G $\frac{85}{64}$

H $\frac{85}{256}$

J $\frac{21}{64}$

23 Which graph *most* accurately represents the function $f(x) = -x^3 + 3$?



24 Which equation represents the statement

" z varies directly with x and inversely with y " ?

F $z = kxy$

G $z = \frac{kx}{y}$

H $z = \frac{ky}{x}$

J $z = \frac{k}{xy}$

25 Which is the solution set for $2x^2 - 7x + 6 = 0$?

A $\{ 1.5, 2 \}$

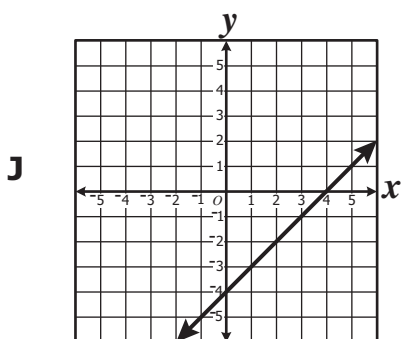
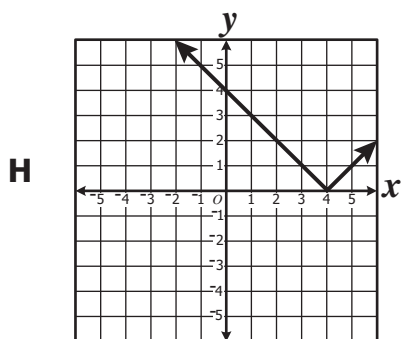
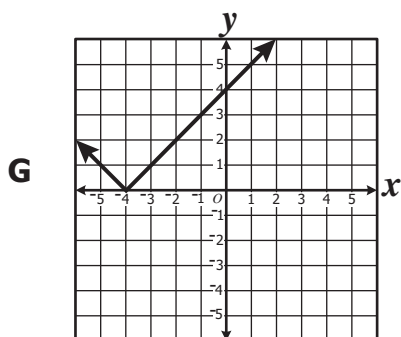
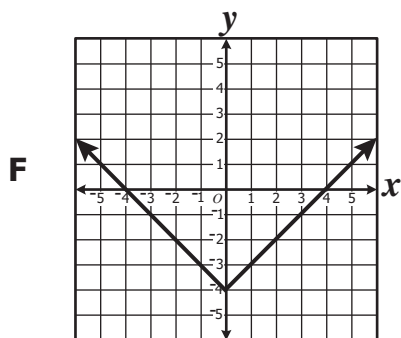
B $\{ -1.5, 2 \}$

C $\{ 1.5, -2 \}$

D $\{ -1.5, -2 \}$

26 Which graph best represents the following equation?

$$y = |x - 4|$$



27 What is the solution set for the following equation?

$$3\sqrt{x-3} = 15$$

A $\left\{ \frac{34}{3} \right\}$

B $\left\{ \frac{41}{3} \right\}$

C $\{ 24 \}$

D $\{ 28 \}$

28 The width of a rectangular window is 2 feet more than its height. If the area is 35 square feet, what is the height?

F 9 ft

G 7 ft

H 5 ft

J 3 ft

29 Which value of x is a solution to the equation below?

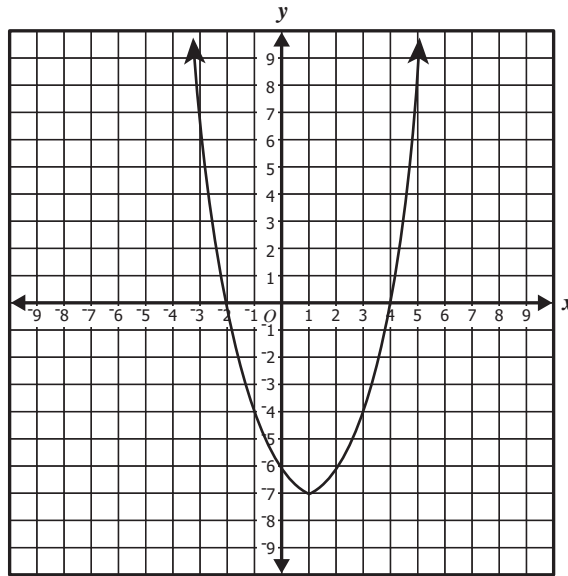
$$\frac{\sqrt{2x} + 2}{4} = 3$$

- A** 12.5
- B** 25
- C** 50
- D** 70

30 Which is the solution set of $\left| \frac{1}{2}x - 5 \right| = 3$?

- F** $\{16\}$
- G** $\{-16, 16\}$
- H** $\{-1, 11\}$
- J** $\{4, 16\}$

31 Which are the apparent zeros of the function shown in the graph?



- A** $-6, -2, 4$
- B** $-2, 4$
- C** $1, -7$
- D** $2, -4$

32 When $x \neq 0$, what is the solution set for $\frac{x-4}{4} = \frac{x-3}{x}$?

- F** $\{4\}$
- G** $\{6\}$
- H** $\{2, 6\}$
- J** $\{3, 4\}$

33 What is the solution set to $2x^2 + 5x - 3 = 0$?

A $\left\{ -\frac{3}{2}, -1 \right\}$

B $\left\{ -\frac{1}{2}, 3 \right\}$

C $\left\{ -3, \frac{1}{2} \right\}$

D $\left\{ \frac{3}{2}, 1 \right\}$

34 What are all the roots for the equation $|2u - 9| = 5$?

F -2 and -7

G -2 and 7

H 2 and -7

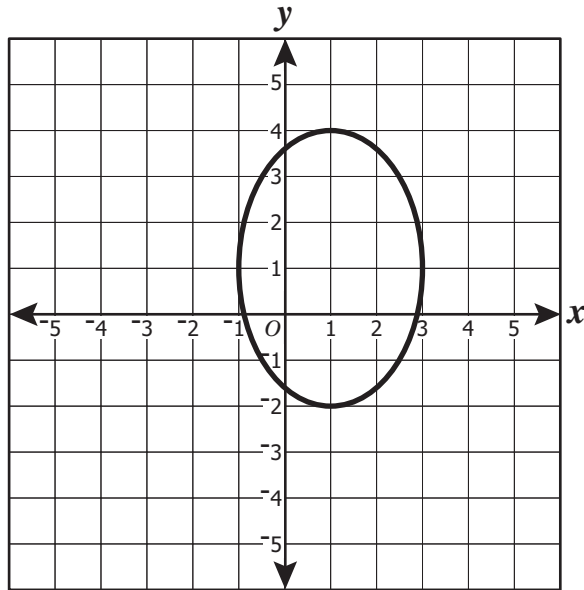
J 2 and 7

35 What are the coordinates of the vertex of the graph of $y + 5 = (x - 2)^2$?

- A** $(2, -5)$
- B** $(2, 5)$
- C** $(-2, 5)$
- D** $(-2, -5)$

36 A polynomial function has a zero at $x = 6$. Which expression *must* be a factor of the polynomial?

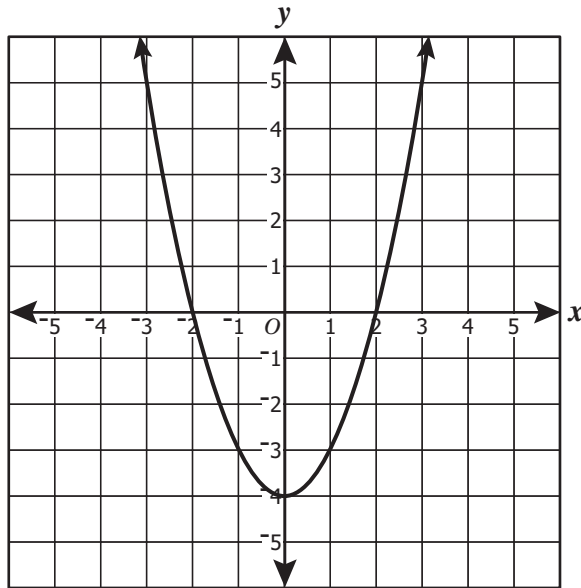
- F** $x - 36$
- G** $x - 6$
- H** $x + 6$
- J** $x + 36$



The conic section graphed above is —

- A** a parabola
- B** a hyperbola
- C** a circle
- D** an ellipse

38 A polynomial function, $P(x)$, is graphed as follows.



What is the apparent solution set for $P(x) = 0$?

F $\{-2, 2\}$

G $\{-4, 0\}$

H $\{0, 2\}$

J $\{-4\}$

39 What are the x -intercepts for the graph of $y = x^2 + 5x - 6$?

A $(0, 1)$ and $(0, -6)$

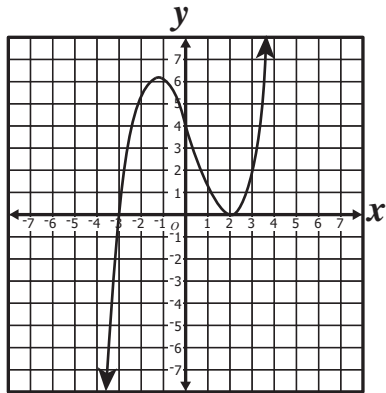
B $(1, 0)$ and $(-6, 0)$

C $(0, -1)$ and $(0, 6)$

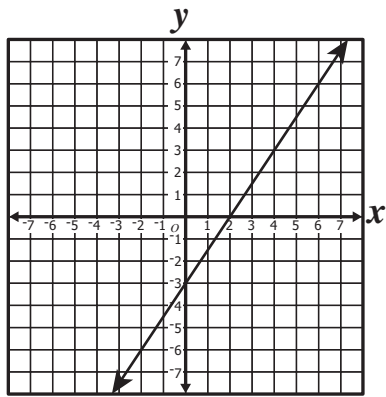
D $(-1, 0)$ and $(6, 0)$

40 The graph of which function *appears* to have 2 and -3 as zeros?

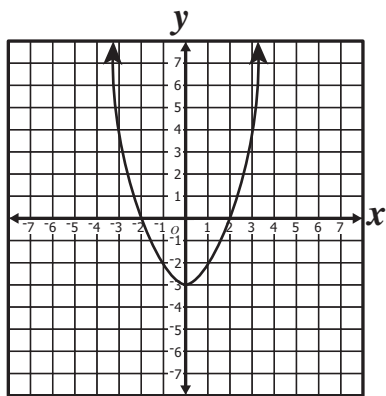
F



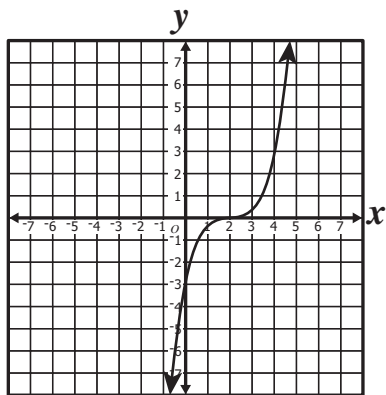
G



H



J



41 The dimensions of matrix A are 2×3 . The dimensions of matrix B are 3×17 . What are the dimensions of matrix AB ?

- A** 2×17
- B** 3×17
- C** 17×2
- D** 17×3

42 What is the solution set for the following system of equations?

$$\begin{cases} y = x^2 - 2x + 1 \\ y = 3 - x \end{cases}$$

- F** $\{(0, 3), (1, 2)\}$
- G** $\{(-2, -5), (-1, 4)\}$
- H** $\{(-2, 5), (1, 2)\}$
- J** $\{(-1, 4), (2, 1)\}$

43 Which of the following represents this system?

$$\begin{array}{l} 2x - 3y = 7 \\ 5x + 4y = -1 \end{array}$$

A $\begin{bmatrix} 2 & 5 \\ -3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -1 \end{bmatrix}$

B $\begin{bmatrix} 4 & 3 \\ -5 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -1 \end{bmatrix}$

C $\begin{bmatrix} 2 \\ 5 \end{bmatrix} - \begin{bmatrix} 3 \\ 4 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

D $\begin{bmatrix} 2 & -3 \\ 5 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -1 \end{bmatrix}$

- 44 The matrix shows the number of flowers in four types of flower arrangements.

	Roses	Daisies	Lilies
Type 1	3	0	0
Type 2	3	4	0
Type 3	0	4	3
Type 4	1	3	2

If roses cost \$3, daisies cost \$1, and lilies cost \$2, which product would represent the cost of each type of flower arrangement?

F
$$\begin{bmatrix} 3 & 0 & 0 \\ 3 & 4 & 0 \\ 0 & 4 & 3 \\ 1 & 3 & 2 \end{bmatrix} \begin{bmatrix} 3 & 1 & 2 \end{bmatrix}$$

G
$$\begin{bmatrix} 3 & 0 & 0 \\ 3 & 4 & 0 \\ 0 & 4 & 3 \\ 1 & 3 & 2 \end{bmatrix} \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}$$

H
$$\begin{bmatrix} 3 & 0 & 0 \\ 3 & 4 & 0 \\ 0 & 4 & 3 \\ 1 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$$

J
$$\begin{bmatrix} 3 & 0 & 0 \\ 3 & 4 & 0 \\ 0 & 4 & 3 \\ 1 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

- 45 Which set of ordered pairs represents the vertices of the region that is the solution to the following system of inequalities?

$$\begin{cases} y \leq 1 \\ x \geq -2 \\ y \geq \frac{1}{2}x + 1 \end{cases}$$

- A** $\{(-2, 1), (0, 1), (-2, 0)\}$
- B** $\{(2, -1), (0, -1), (2, 0)\}$
- C** $\{(2, -1), (2, 0), (1, 0)\}$
- D** $\{(1, -2), (1, 0), (0, -2)\}$

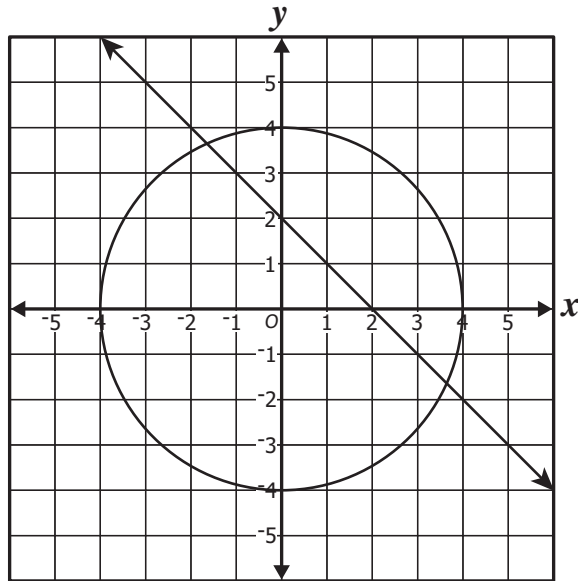
46 If $\begin{bmatrix} 4 & -2 \\ 1 & 3 \end{bmatrix} \cdot N = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, what is N ?

F $\begin{bmatrix} \frac{3}{14} & \frac{1}{7} \\ -\frac{1}{14} & \frac{2}{7} \end{bmatrix}$

G $\begin{bmatrix} \frac{2}{7} & -\frac{1}{7} \\ -\frac{1}{14} & \frac{3}{14} \end{bmatrix}$

H $\begin{bmatrix} \frac{3}{10} & \frac{1}{5} \\ -\frac{1}{10} & \frac{2}{5} \end{bmatrix}$

J $\begin{bmatrix} \frac{2}{5} & -\frac{1}{5} \\ \frac{1}{10} & \frac{3}{10} \end{bmatrix}$



Which is the apparent solution set for the system of equations shown on the graph?

- A $\{ (0, 2), (2, 0) \}$
- B $\{ (-4, 0), (0, -4), (0, 4), (4, 0) \}$
- C $\{ (-1.6, 3.6), (3.6, -1.6) \}$
- D $\{ (-4, 0), (-1.6, 3.6), (0, -4), (3.6, -1.6), (4, 0) \}$

48 Which graph shows the feasibility region of the following system of inequalities?

$$\begin{cases} y \geq 0 \\ y \leq x \\ x + y \leq 5 \end{cases}$$

