

VIRGINIA STANDARDS OF LEARNING

Spring 2008 Released Test

END OF COURSE ALGEBRA II (2001 Revised)

Form M0118, CORE 1

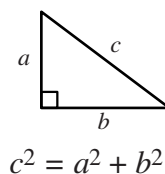
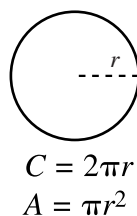
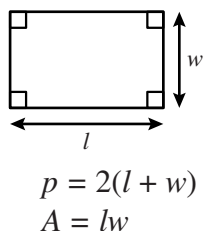
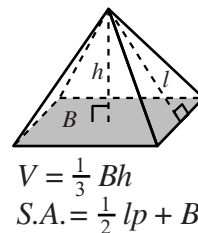
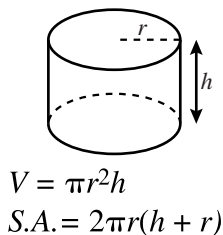
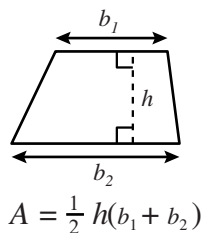
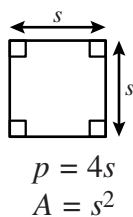
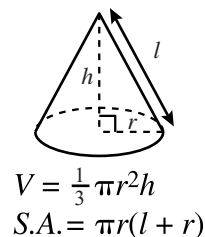
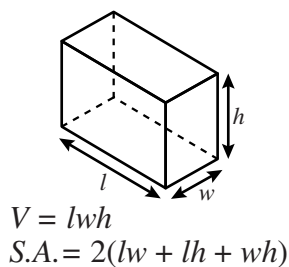
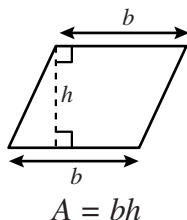
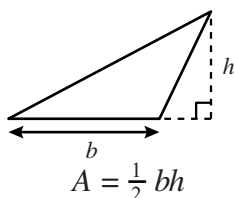
This released test contains 1 fewer test item (#1– 49 only)
than an original SOL EOC Algebra II test.

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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. Then fill in the circle on your answer document for the answer you have chosen. 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 is an equivalent form of the following expression?

$$2\sqrt{-9}$$

- A** -6
- B** $-6i$
- C** $5i$
- D** $6i$

2 What is the factored form of the following expression?

$$9h^2 + 24h + 16$$

- F** $3(h+1)^2$
- G** $(3h-4)^2$
- H** $(4h+3)^2$
- J** $(3h+4)^2$

3 Which is a simplified form of the following expression?

$$3\sqrt{2} + 4\sqrt{2} - \sqrt{2}$$

- A** $6\sqrt{2}$
- B** $6\sqrt{6}$
- C** $7\sqrt{2}$
- D** $6 + \sqrt{2}$

4 Which property is illustrated by the following statement?

$$4\left(\frac{1}{4}\right) = 1$$

- F** Commutative property of multiplication
- G** Distributive property
- H** Multiplicative identity property
- J** Multiplicative inverse property

5 Assuming $k \neq 0$, which expression is equivalent to the following complex fraction?

$$\frac{\frac{2k}{5}}{\frac{6k}{10}}$$

- A** $\frac{k}{6}$
- B** $\frac{2}{3}$
- C** $\frac{3}{2}$
- D** $\frac{6k^2}{25}$

6 When completely factored,

$$2x^2 - 16x + 32$$

is equivalent to —

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

G $2(x - 2)(x - 8)$

H $2(x + 8)(x + 2)$

J $2(x - 4)^2$

7 Which is an equivalent form of the following expression?

$$\sqrt{-64}$$

A $8i$

B $-8i$

C 8

D -8

8 Which is *not* an equivalent form of the following expression?

$$\left(\frac{4}{9}\right)^{\frac{1}{2}}$$

F $\frac{\sqrt{4}}{\sqrt{9}}$

G $\frac{4}{\sqrt{9}}$

H $\sqrt{\frac{4}{9}}$

J $\frac{2}{3}$

9 If defined, which is an equivalent form of this expression?

$$\frac{3}{10xy^4z} \cdot \frac{5yz^4}{3}$$

A $\frac{z^3}{2xy^3}$

B $\frac{zy^5z^5}{2}$

C $\frac{xz^3}{3y^3}$

D $\frac{9}{10xy^5z^5}$

10 Which is an equivalent form of the following expression?

$$\sqrt{-100} - \sqrt{-4}$$

F $-12i$

G -8

H $8i$

J $-8i$

11 Which equation represents a situation in which z varies jointly as x and y ?

A $z = \frac{x}{y}$

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

C $z = \frac{xk}{y}$

D $z = kxy$

12 Which is an arithmetic sequence?

F 2, 5, 9, 14, ...

G 100, 50, 12.5, 1.6, ...

H 3, 10, 17, 24, ...

J $-2, -1, \frac{-1}{2}, \frac{-1}{4}, \dots$

13 Which shows four consecutive terms of a geometric sequence?

A 1, 5, 25, 125, ...

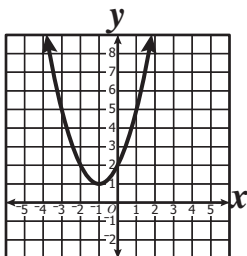
B 10, 20, 30, 40, ...

C 50, 100, 150, 200, ...

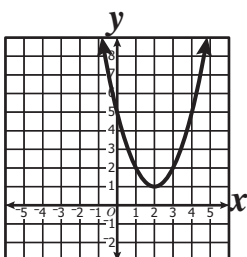
D 1, -1 , 2, -2 , ...

14 Which function of x appears to have two distinct real zeros?

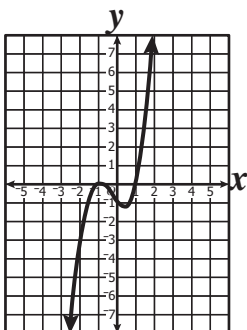
F



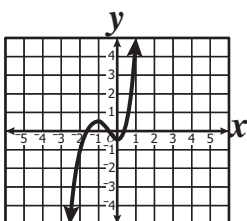
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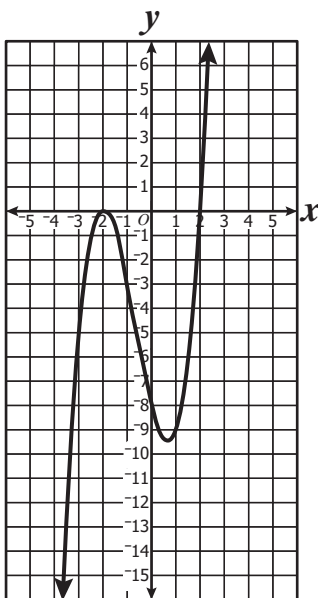
H



J



15 The following is the graph of a function of x .



Which appears to be a turning point?

- A $(2, 0)$
- B $(0, -8)$
- C $(-1, -3)$
- D $(-2, 0)$

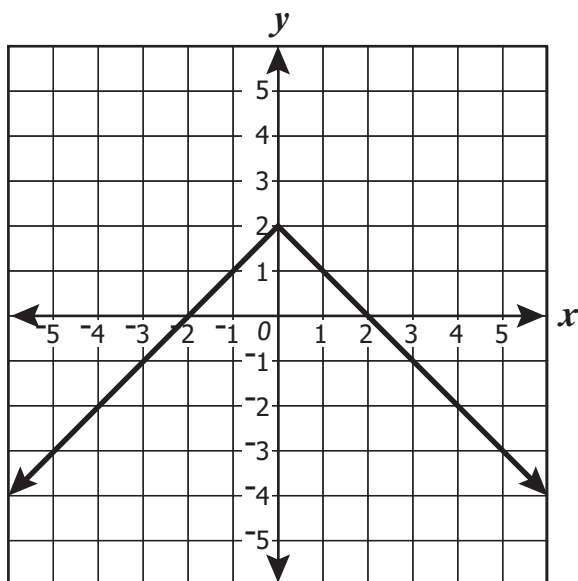
16 The formula for the sum of an infinite geometric series follows.

$$\text{For } |r| < 1, S = \frac{a_1}{1 - r}$$

What is the sum of the following infinite series?

$$2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

- F 3
- G 4
- H 5
- J 6



Which equation best defines the function graphed above?

A $y = -|x| + 2$

B $y = |-x| + 2$

C $y = -|x + 2|$

D $y = -x + 2$

18 Which of the following functions of x has the greatest number of roots in the complex number system?

F $y = x^3 + x^2 - 1$

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

H $y = x + x^2$

J $y = -x + 3$

19 The function defined by $f(x) = 3(5^x)$ is —

- A** an absolute value function
- B** an exponential function
- C** a linear function
- D** a quadratic function

20 A farmer pumps water from an irrigation well to water his field. The time it takes to water the field varies inversely with the rate at which the pump operates. It takes 20 hours to water the field when the pumping rate is 600 gallons per minute. If he adjusts the pump so that it pumps at a rate of 400 gallons per minute, how long will it take to water the field?

- F** 12.5 hours
- G** 15 hours
- H** 30 hours
- J** 40 hours

- 21 A college professor was matching raw test scores to averaged scores within a class. The table shows the match for four students in the class.

Raw Score	Averaged Score
75	88
45	64
55	70
65	79

Based on a line of best fit for the data, which is the best prediction for the averaged score that matches a raw score of 70 ?

- A 83
- B 85
- C 87
- D 89

- 22 What is the domain of the function defined by the following equation?

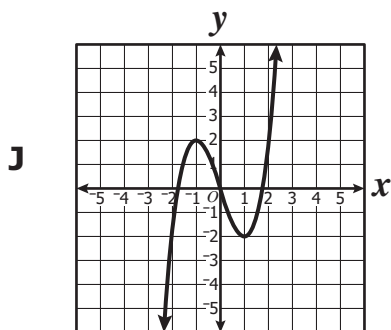
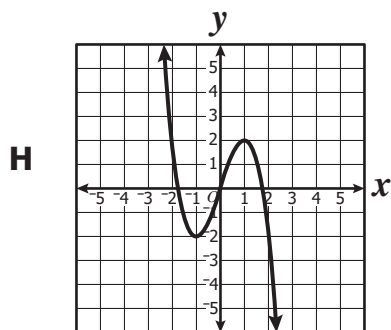
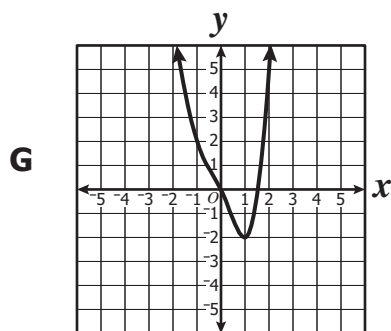
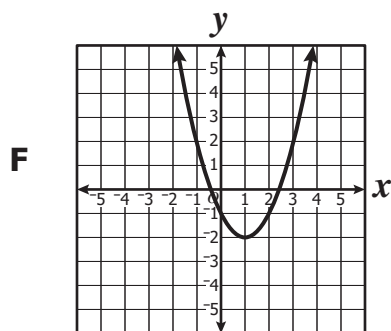
$$f(x) = \frac{1}{x}$$

- F {All real numbers}
- G {All non-zero real numbers}
- H {All real numbers greater than zero}
- J {All real numbers less than zero}

23 Each statement describes a transformation of the graph of $y = x^2$. Which statement correctly describes the graph of $y = (x - 5)^2 + 6$?

- A** It is the graph of $y = x^2$ translated 6 units down and 5 units to the right.
- B** It is the graph of $y = x^2$ translated 6 units down and 5 units to the left.
- C** It is the graph of $y = x^2$ translated 6 units up and 5 units to the right.
- D** It is the graph of $y = x^2$ translated 6 units up and 5 units to the left.

- 24 A cubic function has turning points at $(-1, 2)$ and $(1, -2)$. Which could be its graph?

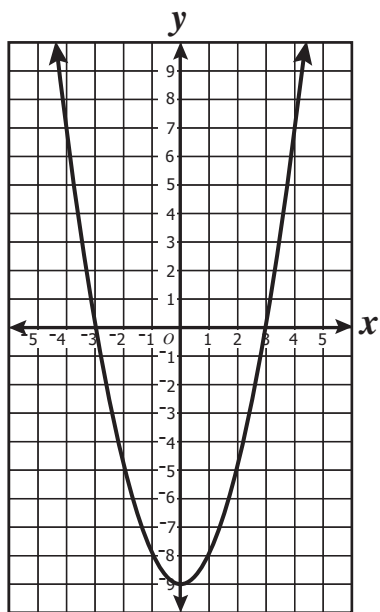


25 What is a_5 in the sequence defined as follows?

$$a_n = 5 \cdot 2^{(n-1)}$$

- A $a_5 = 160$
- B $a_5 = 80$
- C $a_5 = 40$
- D $a_5 = 10$

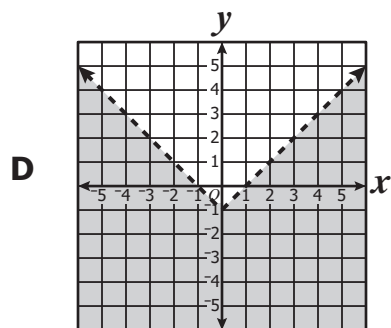
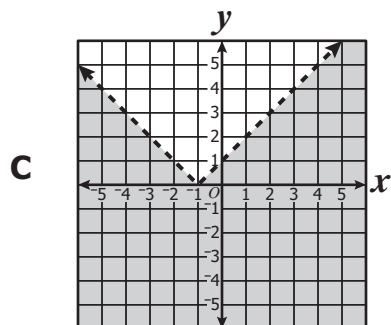
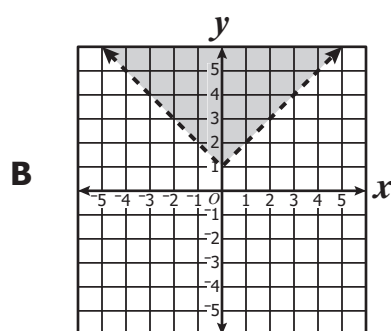
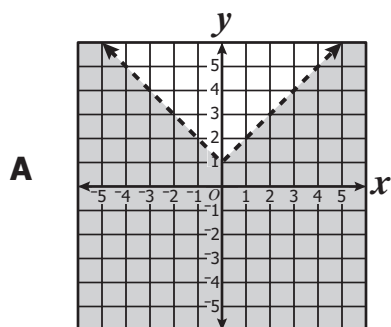
26 What is the apparent solution set for the equation associated with the following graph?



- F $\{-3\}$
- G $\{3\}$
- H $\{-9, 0\}$
- J $\{-3, 3\}$

27 Which graph best represents the following inequality?

$$y < |x| + 1$$



28 Which is a solution to the following equation?

$$\sqrt{x+4} = -2 - x$$

- F** $x = -4$
- G** $x = -3$
- H** $x = -2$
- J** $x = -1$

29 If s represents the length of one edge, the following formula may be used to determine the surface area of a cube.

$$S.A. = 6s^2$$

To the nearest tenth of a centimeter, what is the length of one edge of a cube with a surface area of 140 square centimeters?

- A** 4.8 cm
- B** 7.6 cm
- C** 12.3 cm
- D** 23.4 cm

30 What is the solution to the following equation?

$$(x - 3)^2 = 14$$

- F** $x = -5$ or $x = -1$
- G** $x = 1$ or $x = 5$
- H** $x = -3 \pm \sqrt{14}$
- J** $x = 3 \pm \sqrt{14}$

31 What is the solution set for the given equation?

$$3|x + 4| = 18$$

- A** $\{-10, 2\}$
- B** $\{-2, 2\}$
- C** $\{-19, 11\}$
- D** $\{-22, -14\}$

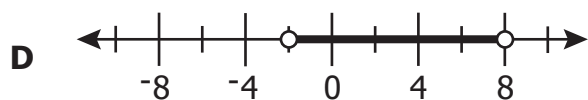
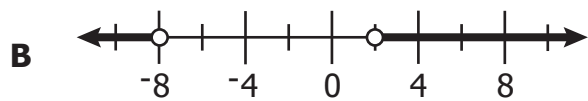
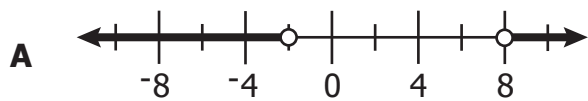
32 What is the solution to the following equation?

$$\frac{3y + 4}{2} + \frac{2y - 5}{3} = \frac{31}{2}$$

- F** $y = 1$
- G** $y = 6$
- H** $y = 7$
- J** $y = 13$

33 Which graph *best* represents the solution to the following inequality?

$$|x - 3| < 5$$



34 What is the solution to the following equation?

$$\frac{2}{5} + \frac{2}{x} = 1$$

F $x = \frac{3}{10}$

G $x = \frac{3}{5}$

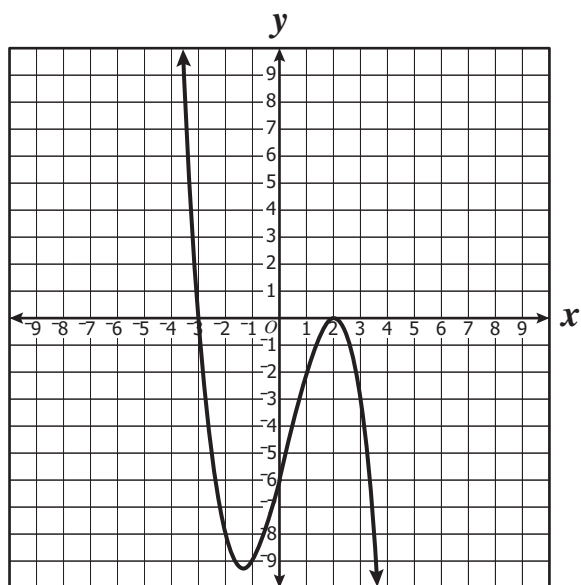
H $x = \frac{5}{3}$

J $x = \frac{10}{3}$

35 Which is a root of $x^2 - 11x + 30 = 0$?

- A** 3
- B** 6
- C** 10
- D** 11

36



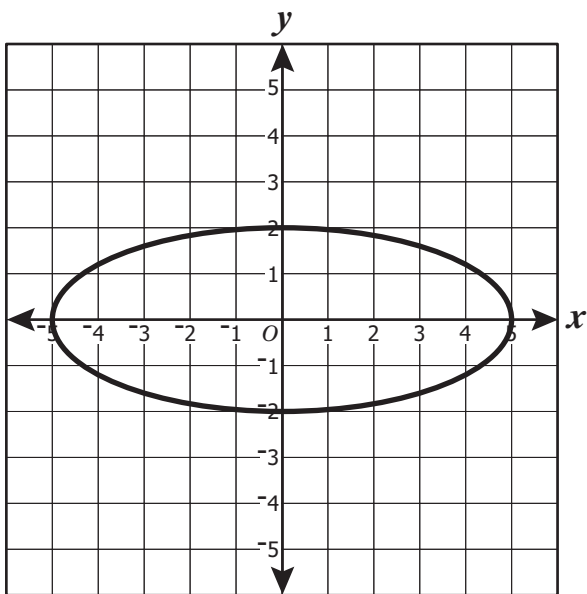
Which is an apparent zero of the function graphed?

- F** -9.25
- G** -6
- H** -3
- J** 0

37 Which conic section describes the graph of $\frac{(x-2)^2}{9} + \frac{(y+1)^2}{4} = 1$?

- A Circle
- B Ellipse
- C Parabola
- D Hyperbola

38



Which equation is best represented by the graph?

F $\frac{x^2}{25} + \frac{y^2}{4} = 1$

G $\frac{x^2}{5} + \frac{y^2}{2} = 1$

H $\frac{x^2}{4} + \frac{y^2}{25} = 1$

J $x^2 + y^2 = 25$

- 39** Where does the graph of the function $f(x) = (x + 1)(x - 2)$ cross the x -axis?
- A** $(0, 0)$
 - B** $(1, -2)$
 - C** $(-1, 0)$ and $(2, 0)$
 - D** $(1, 0)$ and $(-2, 0)$
- 40** The graph of $y = \frac{1}{2}(x + 6)^2 - 5$ is —
- F** a circle
 - G** an ellipse
 - H** a parabola
 - J** a hyperbola
- 41** The zeros of a polynomial function are $\frac{1}{2}$ and -1 . Which could be the function?
- A** $f(x) = (x - 1)(x + 2)$
 - B** $f(x) = (x + 1)(x - 2)$
 - C** $f(x) = (x - 1)(2x + 1)$
 - D** $f(x) = (x + 1)(2x - 1)$

42 If $P = \begin{bmatrix} -1 & 4 \\ 6 & 3 \end{bmatrix}$ and $Q = \begin{bmatrix} 0 & 5 \\ 5 & -2 \end{bmatrix}$ then $P \times Q$ is equal to —

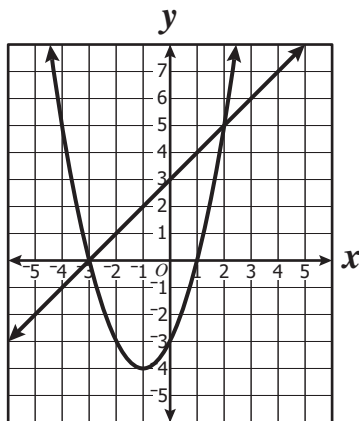
F $\begin{bmatrix} 0 & 20 \\ 30 & -6 \end{bmatrix}$

G $\begin{bmatrix} -1 & 9 \\ 11 & 1 \end{bmatrix}$

H $\begin{bmatrix} 20 & -13 \\ 15 & 24 \end{bmatrix}$

J $\begin{bmatrix} 20 \\ 24 \end{bmatrix}$

43



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

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

B $\{(-3, 0), (2, 5)\}$

C $\{(-3, 0), (1, 0), (2, 5)\}$

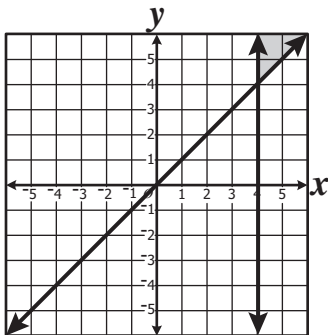
D $\{(-3, 0), (-1, -4), (1, 0), (2, 5)\}$

44

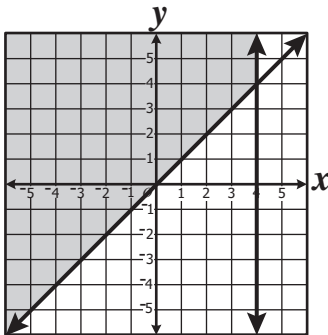
$$\begin{cases} y \geq x \\ x \leq 4 \end{cases}$$

Which graph best shows the solution to the system of inequalities above?

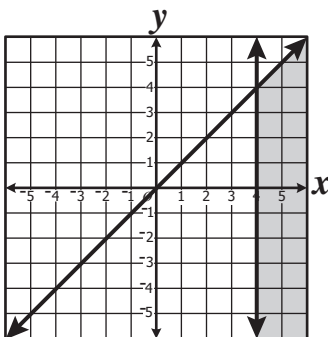
F



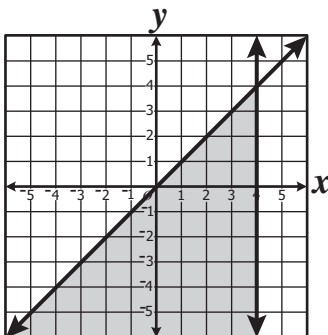
G



H



J



45 What is the solution set to the following system of equations?

$$\begin{cases} y = 2x - 3 \\ y = -x^2 + 5x + 1 \end{cases}$$

- A** $\{(-1, -5), (4, 5)\}$
- B** $\{(1, 5), (4, 5)\}$
- C** $\{(-6, -15), (9, 15)\}$
- D** $\{(1.5, 0)\}$

46 Which is a matrix form of the following equations?

$$\begin{cases} -3x + y = 11 \\ 5x - 2y = -16 \end{cases}$$

F $\begin{bmatrix} 11 & 1 \\ -16 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 \\ 5 \end{bmatrix}$

G $\begin{bmatrix} -3 & 5 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ -16 \end{bmatrix}$

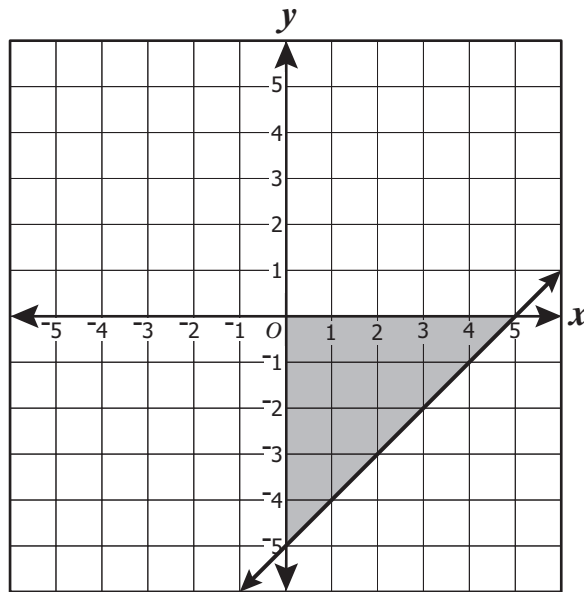
H $\begin{bmatrix} -3 & 1 \\ 5 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ -16 \end{bmatrix}$

J $\begin{bmatrix} -3 & 11 \\ 5 & -16 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$

47

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

The graph of the system of inequalities follows.



Over the feasibility region shown, what is the maximum value of $P = 4x + 2y$?

- A $P = 0$
- B $P = 10$
- C $P = 20$
- D $P = 30$

48 Which product *cannot* be determined using the given matrices?

$$A = \begin{bmatrix} 2 & 4 & 6 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 4 \\ 4 \end{bmatrix}$$

F AB

G BC

H BA

J CA

49 Bernard spent \$5,100 replacing the flooring in his 1,800-square-foot house. He paid \$5 per square foot for carpeting and \$2 per square foot for vinyl tile. If c represents a square foot of carpeting, and v represents a square foot of vinyl tile, which is a system of equations that could be used to determine the amount of each material he used?

A $\begin{cases} c + v = 1,800 \\ 5c + 2v = 5,100 \end{cases}$

B $\begin{cases} c + 5v = 5,100 \\ c + 2v = 1,800 \end{cases}$

C $\begin{cases} c + 5v = 1,800 \\ c + 2v = 5,100 \end{cases}$

D $\begin{cases} c + v = 5,100 \\ 5c + 2v = 1,800 \end{cases}$