

VIRGINIA STANDARDS OF LEARNING

Spring 2007 Released Test

# END OF COURSE ALGEBRA II

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Form M0117, CORE 1

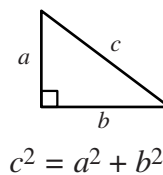
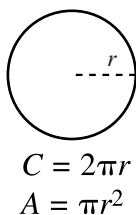
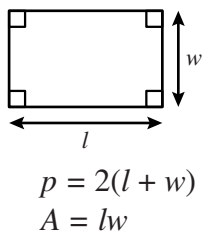
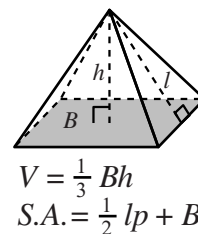
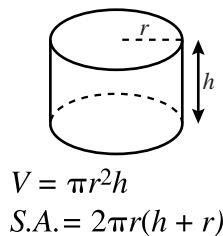
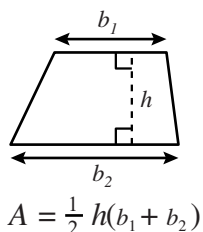
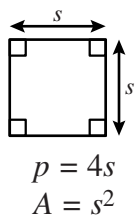
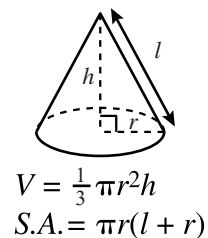
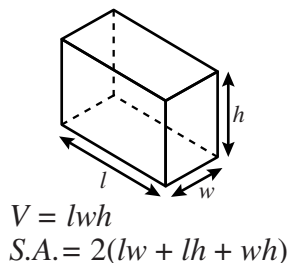
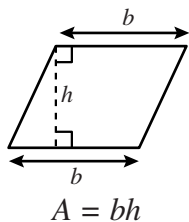
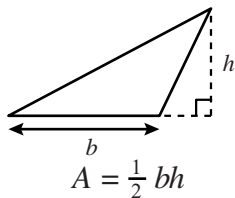
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# Algebra II Formula Sheet

## 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 <sup>2</sup>
cubic centimeter	cm <sup>3</sup>

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 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 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 a simplified form of the following expression?**

$$27^{\frac{4}{3}}$$

- A**  $\sqrt[4]{19,683}$
- B** 36
- C** 81
- D** 177,147

**2 Which is a true statement?**

- F**  $x^2 - y^2 = (x + y)(x - y)$
- G**  $x^2 - y^2 = (x - y)(x - y)$
- H**  $x^2 + y^2 = (x + y)(x + y)$
- J**  $x^2 + y^2 = (x - y)(x - y)$

**3 Which is equivalent to the following expression?**

$$\frac{2}{x-3} - \frac{x}{x-3}?$$

**A**  $\frac{2-x}{0}$

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

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

**D**  $\frac{2-x}{2(x-3)}$

**4 If no denominator is equal to zero, which is a simplified form of the following expression?**

$$\left( \frac{5xy}{(x-y)(x-y)} \right) \left( \frac{x-y}{x+y} \right)$$

**F**  $\frac{5xy}{(x+y)^2}$

**G**  $\frac{5}{(x+y)^2}$

**H**  $\frac{5}{(x-y)(x+y)}$

**J**  $\frac{5xy}{(x-y)(x+y)}$

**5 Which is equivalent to**

$$2\sqrt{27} + 3\sqrt{75} - \sqrt{18}?$$

- A**  $18\sqrt{6}$
- B**  $4\sqrt{120}$
- C**  $21\sqrt{3} - 3\sqrt{2}$
- D**  $24\sqrt{3} - 9\sqrt{2}$

**6 Which statement is a result of applying the transitive property of inequalities?**

$$\text{Given: } 2x - 1 < 7x \text{ and } 7x < x + 72$$

- F**  $2x - 1 < x + 72$
- G**  $x + 72 < 7x$
- H**  $x + 72 < 2x - 1$
- J**  $7x < 2x - 1$

**7 Which is equivalent to the expression below?**

$$(1 + 3i)(3 + i)$$

- A**  $3 - 10i$
- B**  $6 + 6i$
- C**  $6 + 10i$
- D**  $10i$



**8** What is the completely factored form of the following expression?

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

**F**  $(2x+3)(3x-1)$

**G**  $(2x-3)(3x+1)$

**H**  $(6x-3)(x+1)$

**J**  $(6x-1)(x+3)$

**9** If  $x \neq -3$ , which is an equivalent form of the following expression?

$$\frac{6x+7}{2(x+3)} - \frac{2x+5}{2(x+3)}$$

**A** 2

**B**  $\frac{x+1}{x+3}$

**C**  $\frac{2x+1}{x+3}$

**D**  $\frac{2(2x+3)}{x+3}$

**10** Which is an equivalent form of the following?

$$\sqrt{-1} - 5\sqrt{-4}$$

**F**  $-8i$

**G**  $-9i$

**H**  $i + 10$

**J**  $-9$

**11** Which equation represents the statement below?

**" $a$  is inversely proportional to  $b$ ."**

**A**  $a = k + b$

**B**  $a = kb$

**C**  $a = \frac{b}{k}$

**D**  $a = \frac{k}{b}$

**12 What type of function is**

$$f(x) = 3(x - 2)^2 + 1?$$

- F** Quadratic
- G** Linear
- H** Exponential
- J** Step

**13 Ohm's Law relates to a simple electric circuit and states:**

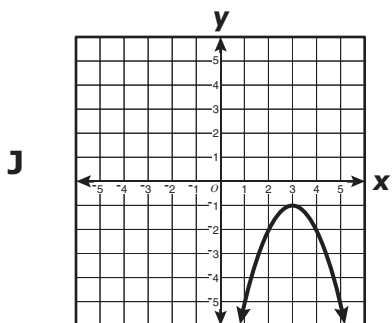
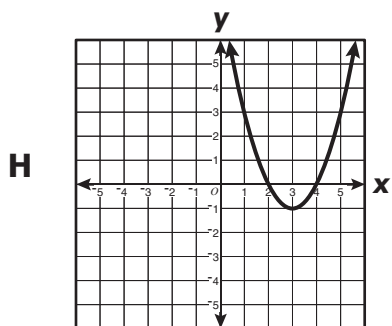
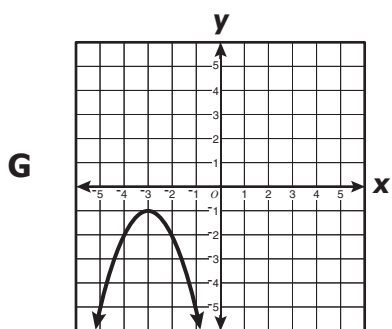
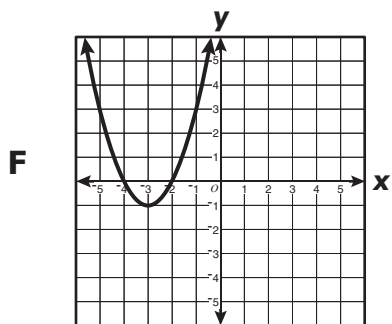
**The resistance is directly proportional to the voltage and inversely proportional to the current.**

**One circuit has a resistance of 8 ohms when the voltage is 48 volts and the current is 6 amperes. What is the resistance of a second circuit that has a voltage of 128 volts and a current of 8 amperes?**

- A** 120 ohms
- B** 64 ohms
- C** 28 ohms
- D** 16 ohms

14 Which graph best represents the following equation?

$$y = -(x-3)^2 - 1$$



**15** If  $f(x) = x^3 + x^2 - 8$ , what is  $f(-8)$ ?

- A** -568
- B** -456
- C** 456
- D** 568

**16** The table below shows the value of a certain collectible baseball card over eight years.

Year ( $x$ )	Value ( $y$ ) (in dollars)
1	3
2	5
3	9
4	18
5	29
6	43
7	51
8	69

Which exponential equation best represents the data?

- F**  $y = 2.18(6.1)^x$
- G**  $y = 14.8(9.58)^x$
- H**  $y = 0.53(1.01)^x$
- J**  $y = 2.25(1.59)^x$

- 17** What are the first three terms of the sequence defined by the following equation?

$$a_n = 7 + (n - 1)5$$

- A** 12, 17, 22  
**B** 7, 2, -3  
**C** 7, 12, 17  
**D** 7, 35, 175

- 18** This table of ordered pairs contains elements of a function of  $x$ .

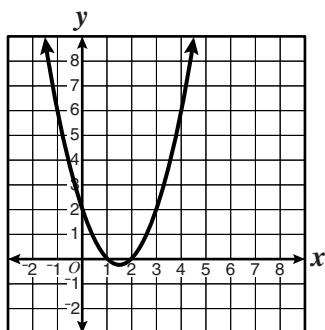
$x$	$y$
0	11
1	6
2	3
3	2
4	3

**Which equation could define the function?**

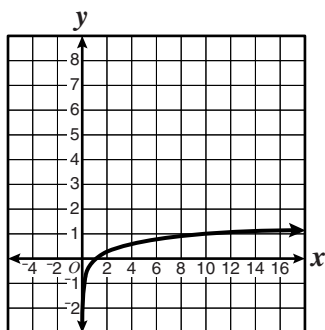
- F**  $y = -5x + 11$   
**G**  $y = -2x + 11$   
**H**  $y = (x - 3)^2 + 2$   
**J**  $y = (x - 2)^2 + 7$

**19** Which appears to be the graph of a quadratic function?

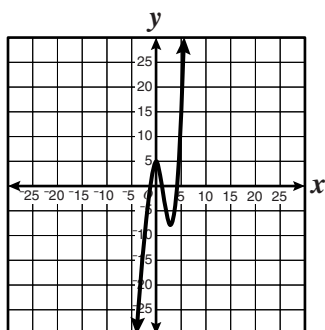
**A**



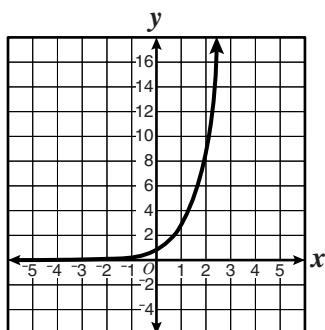
**B**



**C**



**D**



**20** Which lists four consecutive terms of a geometric sequence?

- F** 1, 4, 8, 16
- G** 6, 9, 12, 15
- H** 12, 48, 192, 768
- J** 7, 14, 42, 168

**21** Which is a root of  $f(x) = 0$  if

$$f(x) = (x + 5)(x - 4)?$$

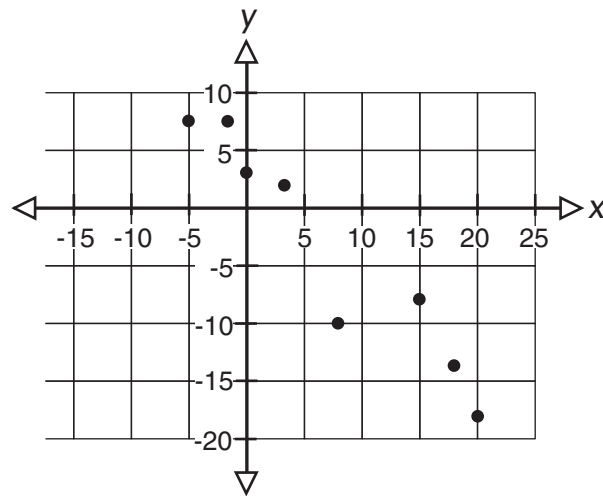
- A** -5
- B** -4
- C** 0
- D** 5

**22**  $f(x) = 2x - 1$   
 $g(x) = 3x$

Given the functions defined above, the composite function  $g(f(x))$  is equal to —

- F**  $5x - 1$
- G**  $6x - 3$
- H**  $6x - 1$
- J**  $6x^2 - 3$





Which equation best represents the line of best fit for the data in the scatterplot above?

- A  $y = 4x - 1$
- B  $y = -x + 4$
- C  $y = -9x + 3$
- D  $y = x$

24 Assuming the domain is the set of all real numbers, what is the range of the following function of  $x$ ?

$$y = x^2 + 2$$

- F All integers
- G All real numbers
- H All real numbers greater than or equal to 0
- J All real numbers greater than or equal to 2

<b>x</b>	4	4.5	5	5.5	6
<b>y</b>	0.5	0.6	0.8	0.9	1.2

Which is most likely the equation of the line of best fit for the data given in the table?

**A**  $y = 0.34x - 0.9$

**B**  $y = 0.25x - 0.7$

**C**  $y = 0.45x - 1$

**D**  $y = 0.50x - 0.6$

**26** Assuming  $k$  is a constant of variation, which equation represents a situation in which  $y$  varies jointly as  $a$  and  $b$ ?

**F**  $y = kab$

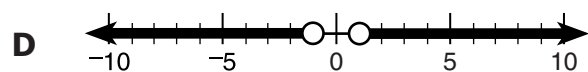
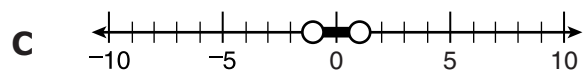
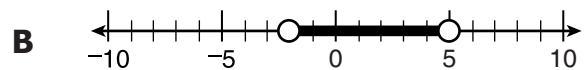
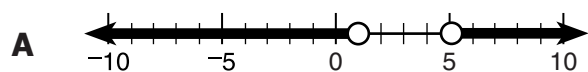
**G**  $y = \frac{ab}{k}$

**H**  $y = \frac{k}{ab}$

**J**  $y = \frac{ka}{b}$

27 Which shows the solution to the following inequality?

$$|x - 3| > 2$$



28 What is the solution set for the equation below?

$$\frac{x-2}{8} - \frac{x-2}{x} = -\frac{1}{4}$$

**F**  $\{2, 8\}$

**G**  $\left\{\frac{10}{3}\right\}$

**H**  $\{4\}$

**J**  $\{6\}$

**29** What is the solution to the equation?

$$\frac{x+4}{x} = \frac{3}{7}$$

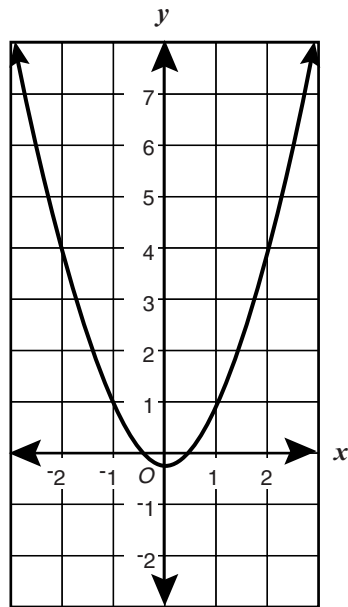
**A**  $x = -7$

**B**  $x = -4$

**C**  $x = -1$

**D**  $x = \frac{14}{5}$

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



- F**  $\{-2, 2\}$
- G**  $\left\{-\frac{1}{2}, \frac{1}{2}\right\}$
- H**  $\left\{-\frac{1}{4}\right\}$
- J**  $\{-1, 1\}$

**31** What is the solution for the equation below?

$$\sqrt{x-6} + 5 = 8$$

- A**  $x = 9$
- B**  $x = 15$
- C**  $x = 19$
- D**  $x = 65$

**32** What is the solution set for the following equation?

$$x^2 + 6x - 7 = 0$$

- F**  $\{-1, 7\}$
- G**  $\{-2, 3\}$
- H**  $\{-3, 2\}$
- J**  $\{-7, 1\}$

**33** What is the solution set for the following equation?

$$6 = x^2 - x$$

**A**  $\left\{ \frac{1}{2} \pm \frac{i\sqrt{23}}{2} \right\}$

**B**  $\left\{ \frac{-1}{2} \pm \frac{i\sqrt{23}}{2} \right\}$

**C**  $\{-2, 3\}$

**D**  $\{-3, 2\}$

**34** If  $|-6x + 11| = 4$ , then —

**F**  $x = -\frac{5}{2}$  or  $x = -\frac{7}{6}$

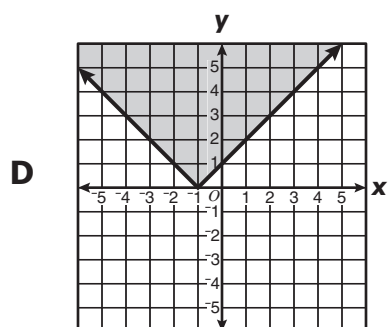
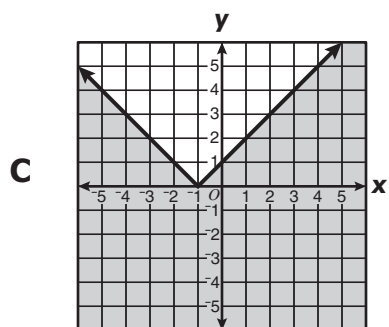
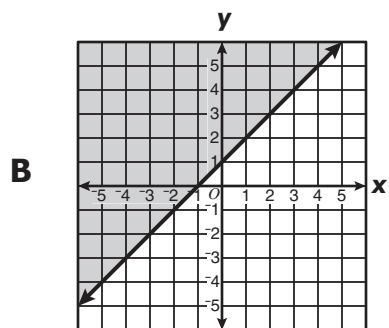
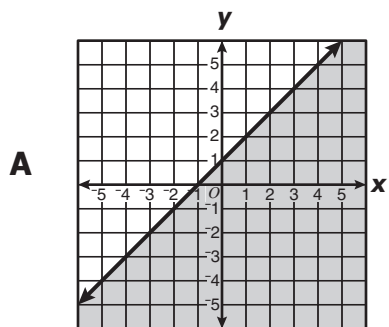
**G**  $x = -\frac{7}{6}$  or  $x = \frac{5}{2}$

**H**  $x = -\frac{5}{2}$  or  $x = \frac{7}{6}$

**J**  $x = \frac{7}{6}$  or  $x = \frac{5}{2}$

35 Which graph *best* represents the given inequality?

$$y \geq |x + 1|$$

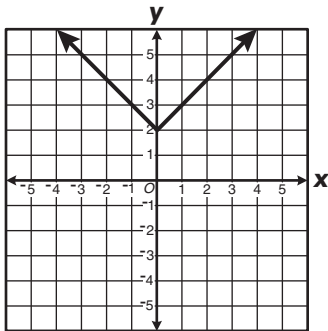




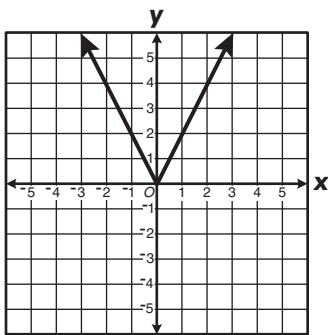
36 Which graph best represents the following equation?

$$y = |2x|$$

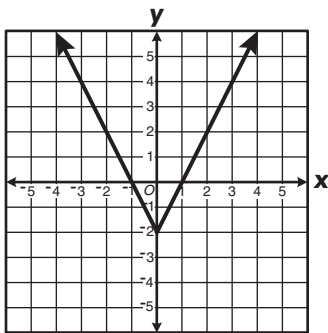
F



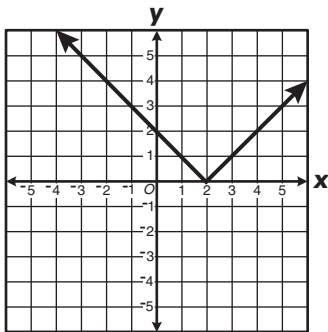
G

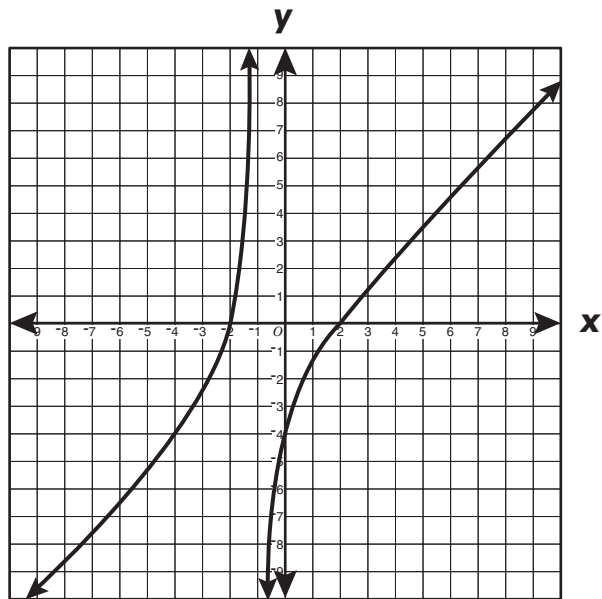


H



J



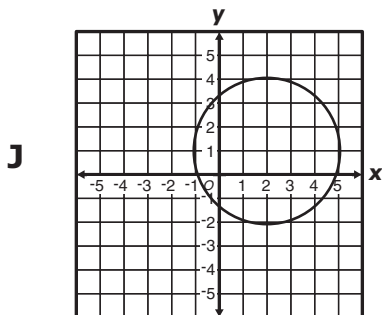
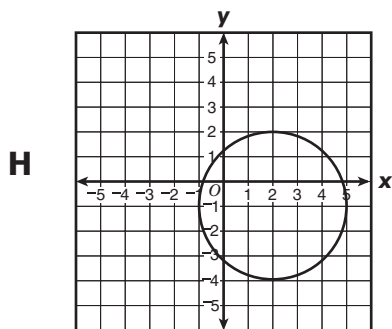
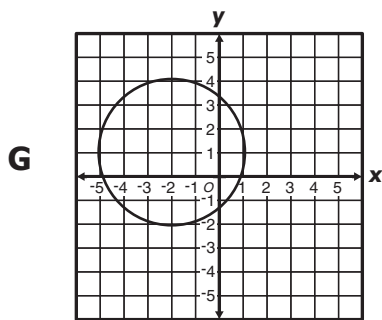
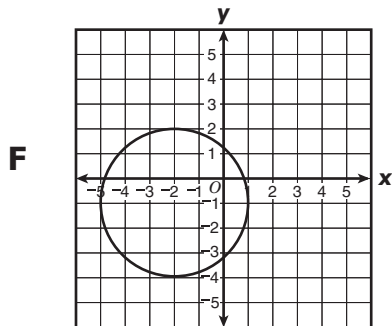


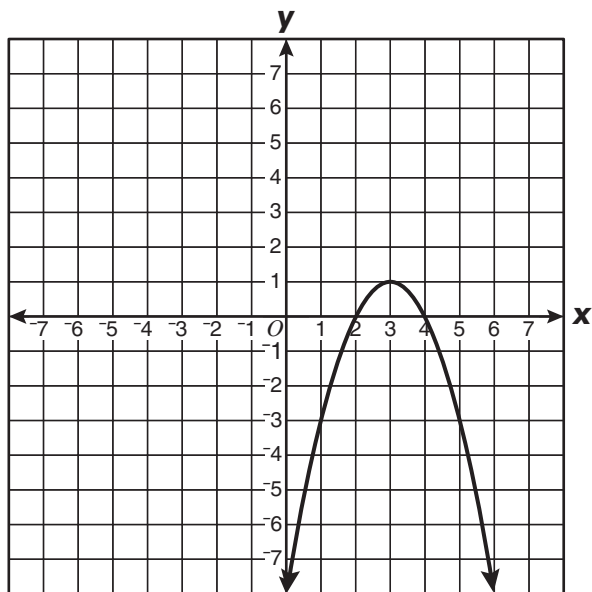
Which appears to be an  $x$ -intercept of the graph shown?

- A -4
- B 0
- C 1
- D 2

**38 Which graph most closely represents**

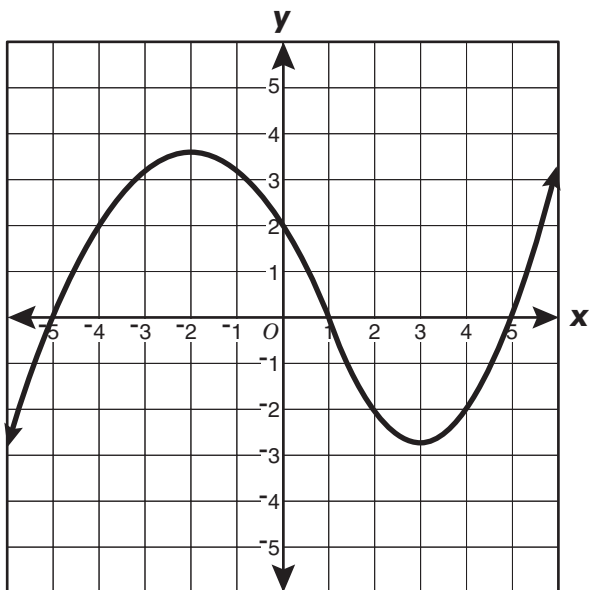
$$(x+2)^2 + (y+1)^2 = 9?$$





Which equation is best represented by the graph?

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

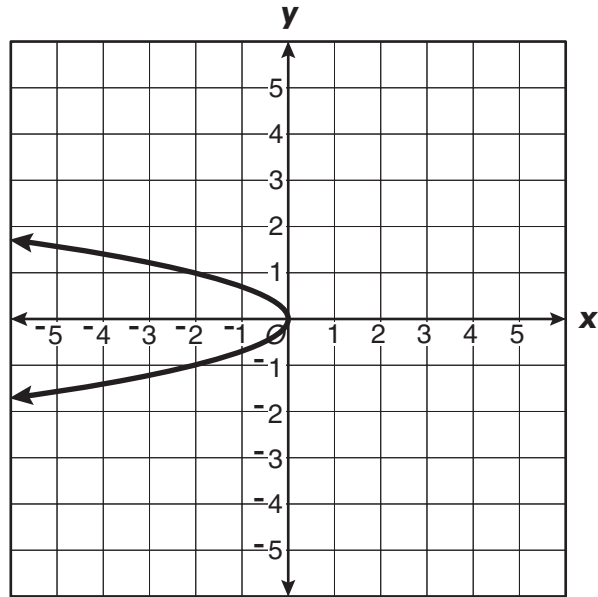


Which is an apparent factor of the polynomial graphed above?

- F  $(x - 1)$
- G  $(x - 2)$
- H  $(x - 2.5)$
- J  $(x + 2)$

41 A polynomial function has zeros  $-3$  and  $4$ . Which is one of the factors of the polynomial?

- A  $(x + 1)$
- B  $(x - 3)$
- C  $(x + 3)$
- D  $(x + 4)$



This is a portion of the graph of a conic section. Which equation *most* likely represents this graph?

- F**  $y = 2x^2$
- G**  $x = 2y^2$
- H**  $y = 3x^2$
- J**  $x = -2y^2$

43 
$$\begin{bmatrix} 4 & 5 \\ 9 & 10 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 20 \\ 30 \end{bmatrix}$$

Which system of linear equations is equivalent to the matrix equation above?

A 
$$\begin{cases} 4x + 9y = 20 \\ 5x + 10y = 30 \end{cases}$$

B 
$$\begin{cases} 4x + 5y = 20 \\ 9x + 10y = 30 \end{cases}$$

C 
$$\begin{cases} 4x + 5x = 20 \\ 9y + 10y = 30 \end{cases}$$

D 
$$\begin{cases} 4x + 5y = 20 \\ 5x + 10y = 30 \end{cases}$$

44 Which matrix is equivalent to

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 1 \end{bmatrix} ?$$

F 
$$\begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

G 
$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

H 
$$\begin{bmatrix} 2 \\ 2 \end{bmatrix}$$

J 
$$\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$$

- 45 Charlie bought jeans,  $j$ , and T-shirts,  $t$ , at a clothing store. The receipt showed that a total of seven items was purchased and that the jeans were \$28 each and the T-shirts were \$12 each. If he spent a total of \$116 before tax, which system of equations could be used to determine the number of jeans he purchased?

A 
$$\begin{cases} 7j + 12t = 28 \\ j + t = 116 \end{cases}$$

B 
$$\begin{cases} 28j + 12t = 116 \\ j + t = 7 \end{cases}$$

C 
$$\begin{cases} 28j + 12t = 7 \\ j + t = 116 \end{cases}$$

D 
$$\begin{cases} 12j + 28t = 116 \\ j + t = 7 \end{cases}$$

46 
$$\begin{cases} y \geq -x - 6 \\ y \leq x + 2 \\ y \geq \frac{11}{3}x - 6 \end{cases}$$

What are the corner points of the feasibility region for the given system of inequalities?

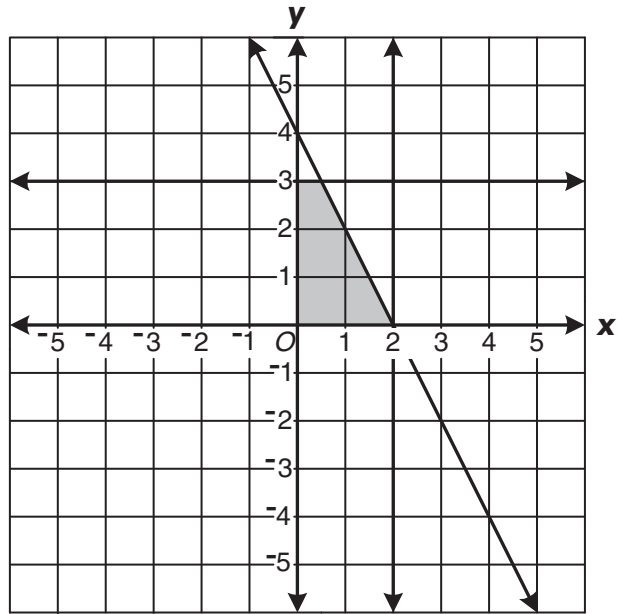
F  $(-2, -4), (0, -2), \left(\frac{1}{2}, -\frac{1}{2}\right)$

G  $(-4, -2), (0, -6), (3, 5)$

H  $(0, -2), (1, -1), \left(\frac{1}{2}, -\frac{1}{2}\right)$

J  $(-2, -4), \left(\frac{3}{2}, -\frac{1}{2}\right), (2, 0)$





Which system of inequalities is best represented by the graph above?

**A** 
$$\begin{cases} x \geq 0 \\ y \leq 3 \\ y \leq 4 - 2x \end{cases}$$

**B** 
$$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 3 \\ y \geq 4 - 2x \end{cases}$$

**C** 
$$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 4 - 2x \end{cases}$$

**D** 
$$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 3 \\ y \leq 4 - 2x \end{cases}$$

48 
$$\begin{cases} y = x^2 + 6x + 1 \\ y = -2x - 14 \end{cases}$$

What is the solution set for the given system of equations?

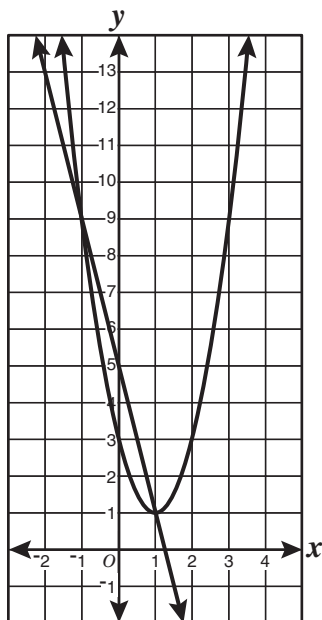
F  $\{(-3, -8), (-5, -4)\}$

G  $\{(-7, 0), (0, 1)\}$

H  $\{(-5, -4), (0, 1)\}$

J  $\{(-3, -8)\}$

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



A  $\{(3, 9), (-1, 9)\}$

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

C  $\{(-1, 9), (1, 1)\}$

D  $\{(-1, 9)\}$

50      Given:  $A = \begin{bmatrix} 5 & 10 \\ 25 & 30 \end{bmatrix}$  and  $B = \begin{bmatrix} 25 & 30 \\ 5 & 10 \end{bmatrix}$

Which matrix is the product  $B \times A$ ?

**F**       $\begin{bmatrix} 175 & 250 \\ 775 & 1,050 \end{bmatrix}$

**G**       $\begin{bmatrix} 250 & 600 \\ 425 & 1,050 \end{bmatrix}$

**H**       $\begin{bmatrix} 125 & 300 \\ 125 & 300 \end{bmatrix}$

**J**       $\begin{bmatrix} 875 & 1,150 \\ 275 & 350 \end{bmatrix}$

