

VIRGINIA STANDARDS OF LEARNING

Spring 2008 Released Test

END OF COURSE ALGEBRA II (2001 Revised)

Form M0118, CORE 1

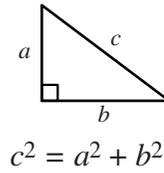
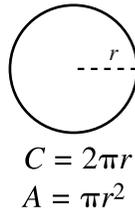
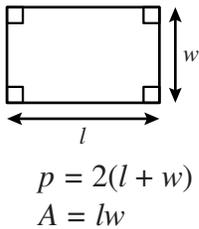
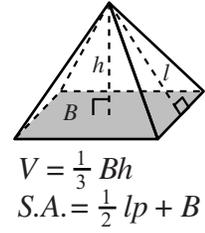
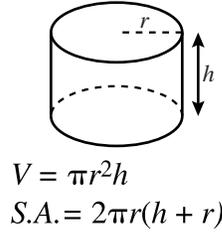
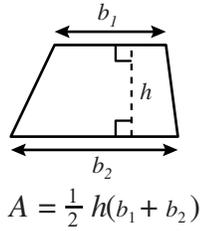
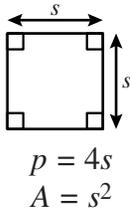
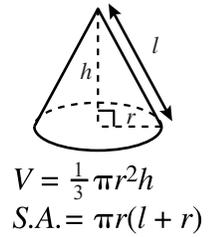
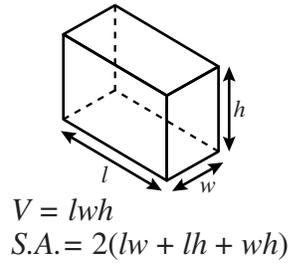
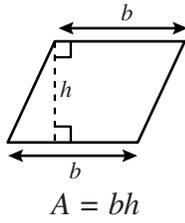
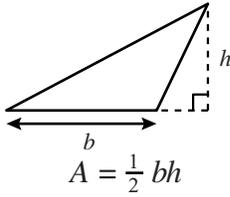
This released test contains 1 fewer test item (#1– 49 only)
than an original SOL EOC Algebra II test.

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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

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 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?

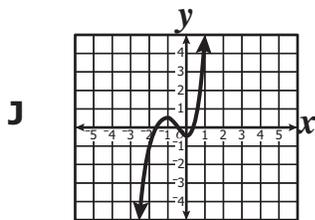
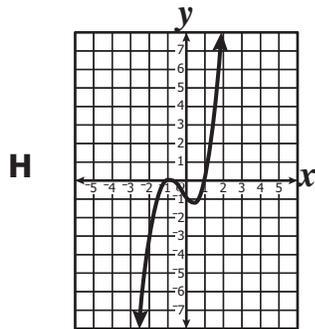
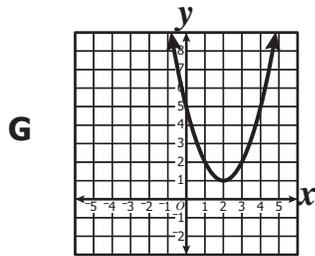
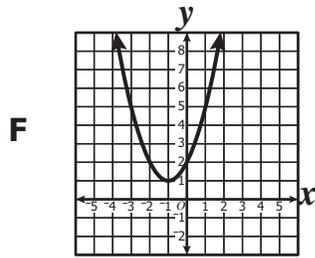
A 1, 5, 25, 125, ...

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

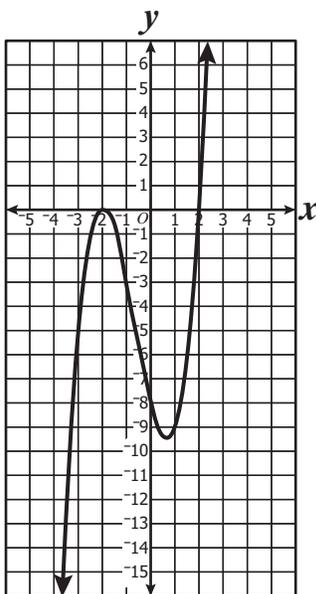
C 50, 100, 150, 200, ...

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

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



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 $(-2, 0)$

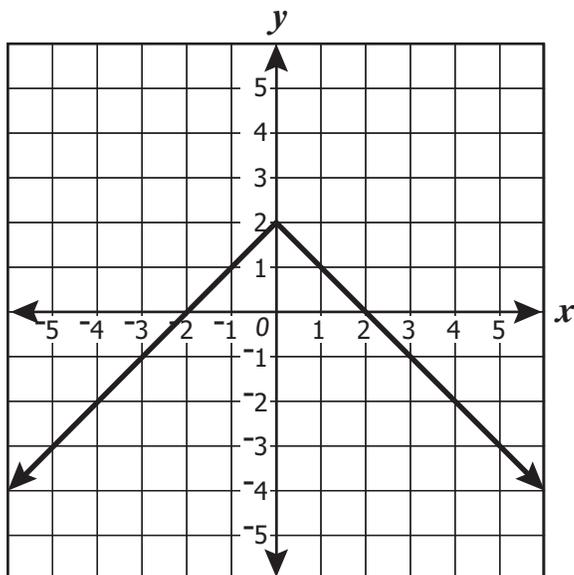
16 The formula for the sum of an infinite geometric series follows.

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

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?

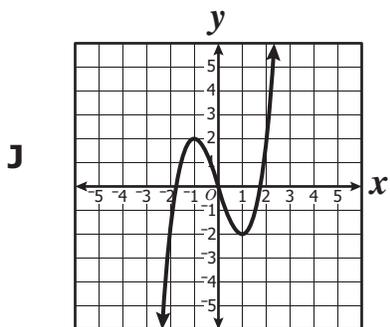
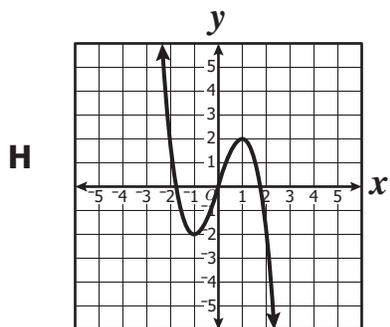
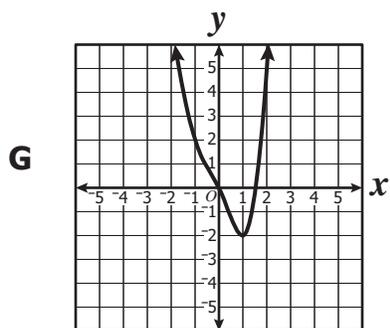
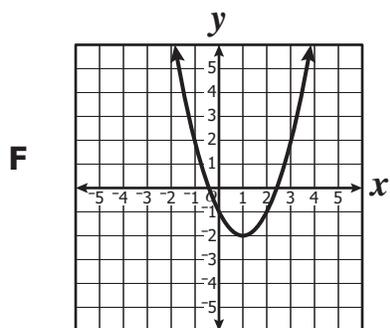
$$f(x) = \frac{1}{x}$$

- 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?

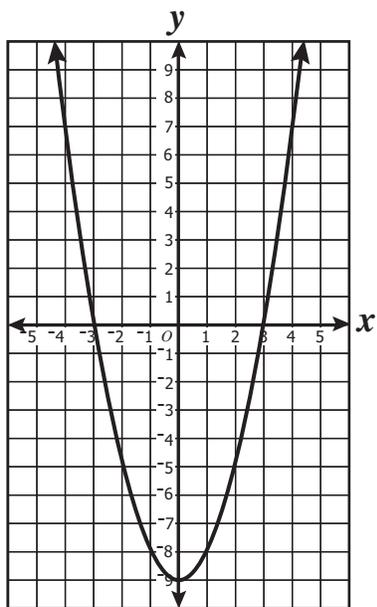


25 What is a_5 in the sequence defined as follows?

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

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

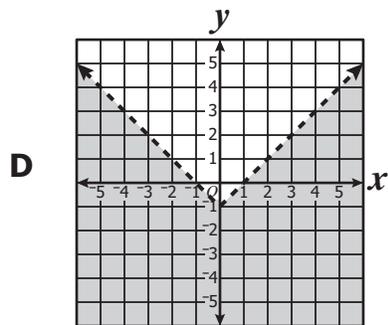
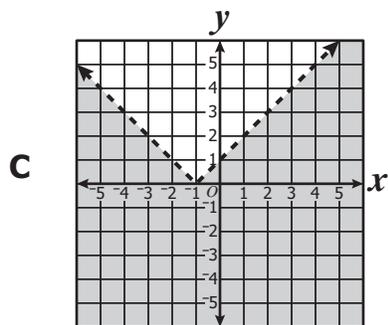
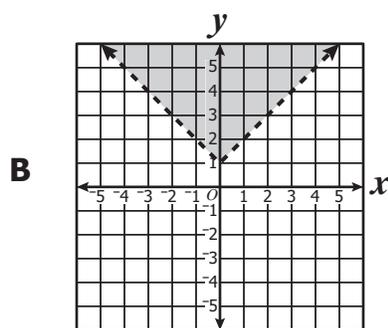
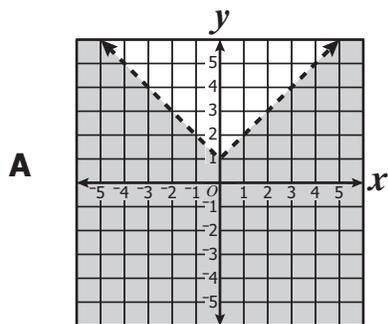
26 What is the apparent solution set for the equation associated with the following graph?



- 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** $\{-22, -14\}$

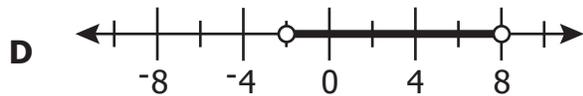
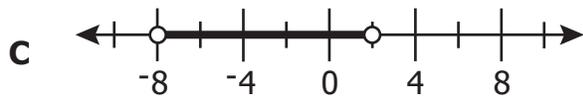
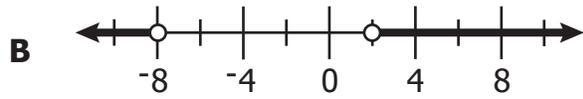
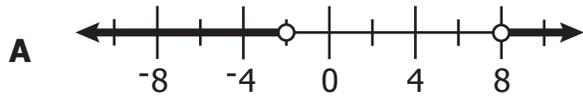
32 What is the solution to the following equation?

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

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

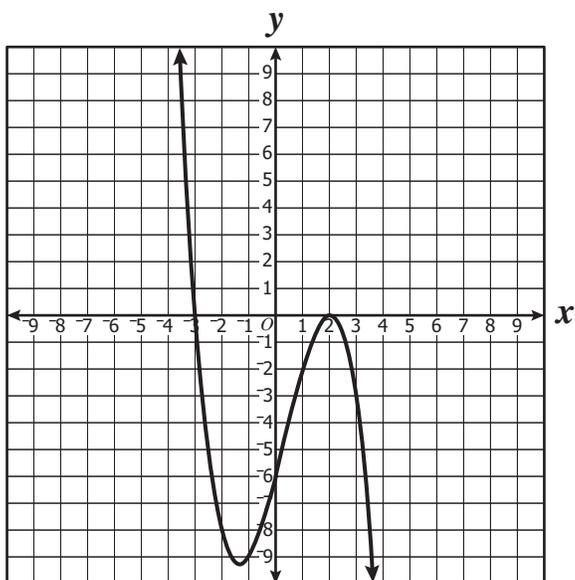
H $x = \frac{5}{3}$

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



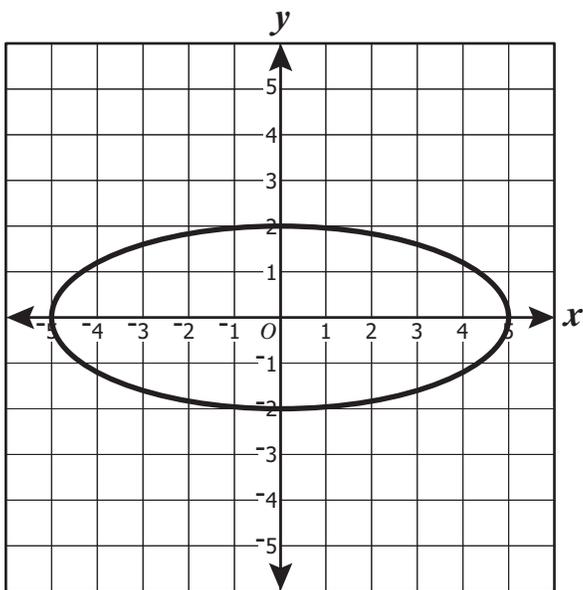
Which is an apparent zero of the function graphed?

- 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 —

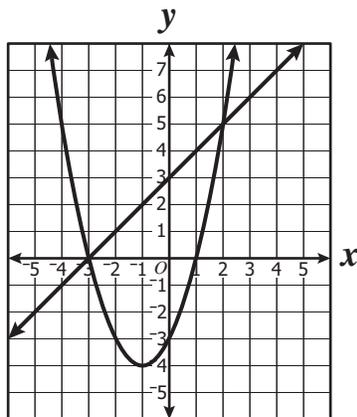
F $\begin{bmatrix} 0 & 20 \\ 30 & -6 \end{bmatrix}$

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

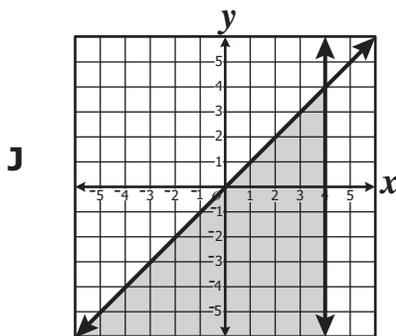
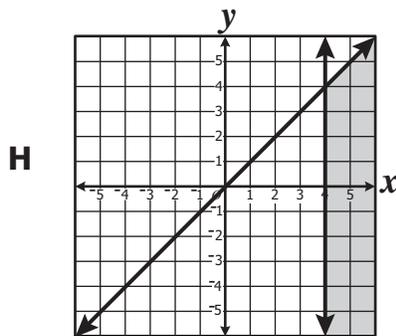
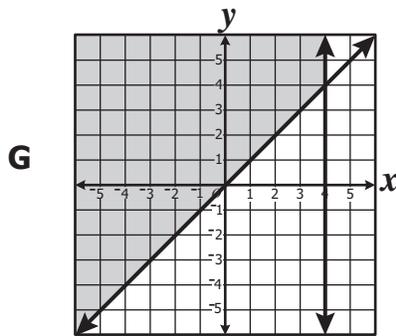
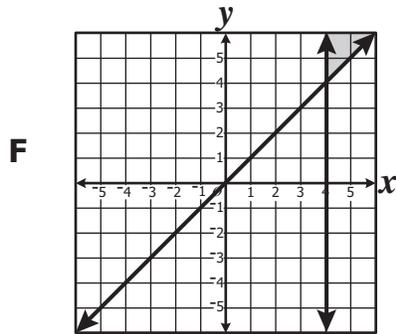
C $\{(-3, 0), (1, 0), (2, 5)\}$

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?



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?

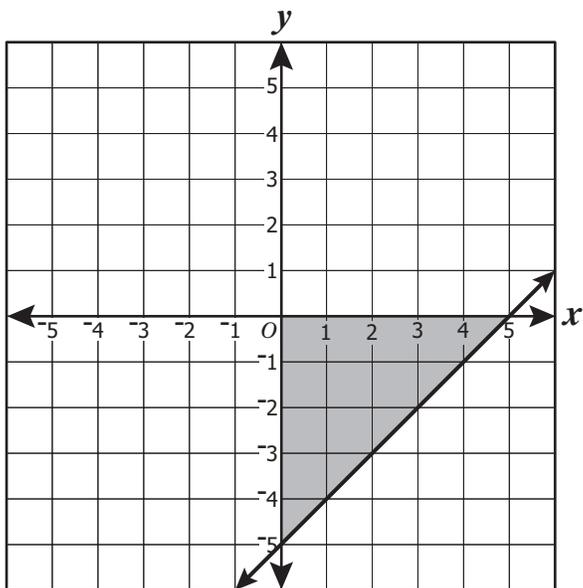
$$\begin{cases} -3x + y = 11 \\ 5x - 2y = -16 \end{cases}$$

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



Answer Key-EOC041-M0118

Test Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	D	001	Expressions and Operations
2	J	001	Expressions and Operations
3	A	001	Expressions and Operations
4	J	001	Expressions and Operations
5	B	001	Expressions and Operations
6	J	001	Expressions and Operations
7	A	001	Expressions and Operations
8	G	001	Expressions and Operations
9	A	001	Expressions and Operations
10	H	001	Expressions and Operations
11	D	002	Relations and Functions
12	H	002	Relations and Functions
13	A	002	Relations and Functions
14	H	002	Relations and Functions
15	D	002	Relations and Functions
16	G	002	Relations and Functions
17	A	002	Relations and Functions
18	F	002	Relations and Functions
19	B	002	Relations and Functions
20	H	002	Relations and Functions
21	A	002	Relations and Functions
22	G	002	Relations and Functions
23	C	002	Relations and Functions
24	J	002	Relations and Functions
25	B	002	Relations and Functions
26	J	003	Equations and Inequalities
27	A	003	Equations and Inequalities
28	G	003	Equations and Inequalities
29	A	003	Equations and Inequalities
30	J	003	Equations and Inequalities
31	A	003	Equations and Inequalities
32	H	003	Equations and Inequalities
33	D	003	Equations and Inequalities
34	J	003	Equations and Inequalities
35	B	003	Equations and Inequalities
36	H	004	Analytical Geometry
37	B	004	Analytical Geometry
38	F	004	Analytical Geometry
39	C	004	Analytical Geometry
40	H	004	Analytical Geometry
41	D	004	Analytical Geometry
42	H	005	Systems of Equations/Inequalities
43	B	005	Systems of Equations/Inequalities
44	G	005	Systems of Equations/Inequalities
45	A	005	Systems of Equations/Inequalities
46	H	005	Systems of Equations/Inequalities
47	C	005	Systems of Equations/Inequalities
48	H	005	Systems of Equations/Inequalities
49	A	005	Systems of Equations/Inequalities

**Algebra II (2001 Revised),
Core 1**

If you get this many items correct:	Then your converted scale score is:
0	000
1	171
2	208
3	230
4	246
5	259
6	269
7	279
8	287
9	295
10	302
11	308
12	314
13	320
14	326
15	331
16	336
17	341
18	346
19	351
20	355
21	360
22	364
23	369
24	373
25	378
26	382
27	387
28	391
29	396
30	400
31	405
32	410
33	415
34	420
35	425
36	430
37	436
38	442
39	448
40	454
41	462
42	469
43	478
44	487
45	498
46	511
47	528
48	550
49	587
50	600

