VIRGINIA STANDARDS OF LEARNING

Spring 2010 Released Test

END OF COURSE ALGEBRA II (2001 Revised)

Form M0110, CORE 1

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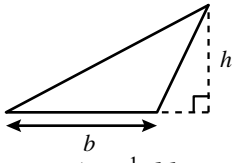
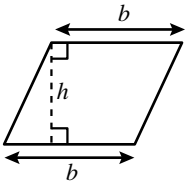
Algebra II Formula Sheet

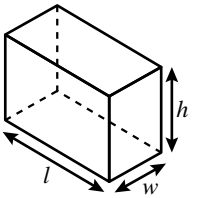
Geometric Formulas



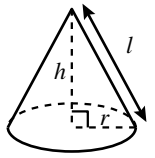
$A = \frac{1}{2}bh$



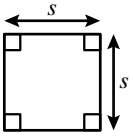
$A = bh$



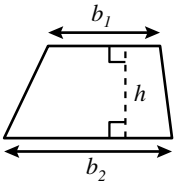
$V = lwh$
$S.A. = 2(lw + lh + wh)$



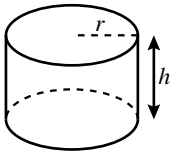
$V = \frac{1}{3}\pi r^2 h$
$S.A. = \pi r(l + r)$



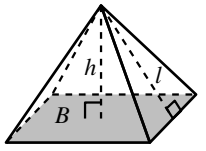
$p = 4s$
$A = s^2$



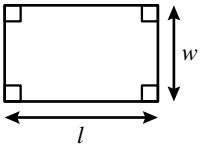
$A = \frac{1}{2}h(b_1 + b_2)$



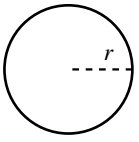
$V = \pi r^2 h$
$S.A. = 2\pi r(h + r)$



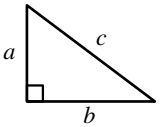
$V = \frac{1}{3}Bh$
$S.A. = \frac{1}{2}lp + B$



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



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



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

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

SAMPLE

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

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

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

C $6a^2$

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

1 For non-zero denominators, which of the following is equivalent to $\frac{3a^3 - 75a}{a(a+5)(a+5)}$?

A -3

B $-\frac{1}{a^2}$

C $\frac{(a-5)}{(a+5)}$

D $\frac{3(a-5)}{(a+5)}$

2 What is the factored form of $x^2 - 36z^2$?

F $(x+6z)(x-6z)$

G $(x+z)(x-36z)$

H $(x+6z)^2$

J $(x-6z)^2$

3 Which of these is equivalent to 1 ?

A i^{24}
B i^{42}
C i^{66}
D i^{82}

4 Which complex number is equivalent to $(7-9i)-(^{-}1+3i)$?

F $6-6i$
G $6-12i$
H $8-6i$
J $8-12i$

5 What is the simplified form of $\sqrt{6}\cdot\sqrt{21}$?

A $3\sqrt{14}$
B $14\sqrt{3}$
C 21
D 63

6 The equation $(2\cos^{-1}\theta - 17\pi)(1) = 2\cos^{-1}\theta - 17\pi$ is an example of which property of real numbers?

F Associative property
G Transitive property
H Identity property
J Reflexive property

7 Which expression is equivalent to $\sqrt[5]{32x^{10}y^2}$?

A $2x^2y^{\frac{2}{5}}$

B $2x^5y^{-3}$

C $\frac{32}{5}x^{\frac{1}{2}}y^{\frac{5}{2}}$

D $\frac{32}{5}x^{50}y^{10}$

8 Which is equivalent to $13 - \sqrt{-81}$?

F 4
G $13 - 9i$
H $13 + 9i$
J 22

9 Which property would justify the following statement?

If $x + 2 = y$ and $y = 20$, then $x + 2 = 20$.

A Distributive property
B Reflexive property of equality
C Symmetric property of equality
D Transitive property of equality

10 **Which expression is equivalent to** $\dfrac{\dfrac{2x^8}{5y}}{\dfrac{4x^2}{25y^3}}$**, where** $x \neq 0$ **and** $y \neq 0$ **?**

F $\dfrac{2x^8}{4x^2} \cdot \dfrac{5y}{25y^3}$

G $\dfrac{2x^8}{5y} \cdot \dfrac{25y^3}{4x^2}$

H $\dfrac{2x^8}{5y} \cdot \dfrac{4x^2}{25y^3}$

J $\dfrac{4x^2}{25y^3} \cdot \dfrac{5y}{2x^8}$

11 **Using** $a_n = a_1 r^{n-1}$**, what is the 10th term in this geometric sequence?**

0.2, 1, 5, 25, 125, . . .

A 78,125
B 390,625
C 1,953,125
D 9,765,625

GO ON

12 If $f(x) = 2x^2 - 7x$, what is the value of $f(^-4)$?

F $^-44$

G $^-4$

H 60

J 92

13 Given: $f(x) = (x - 4)^2 - 1$

What is the vertex of the graph for this function?

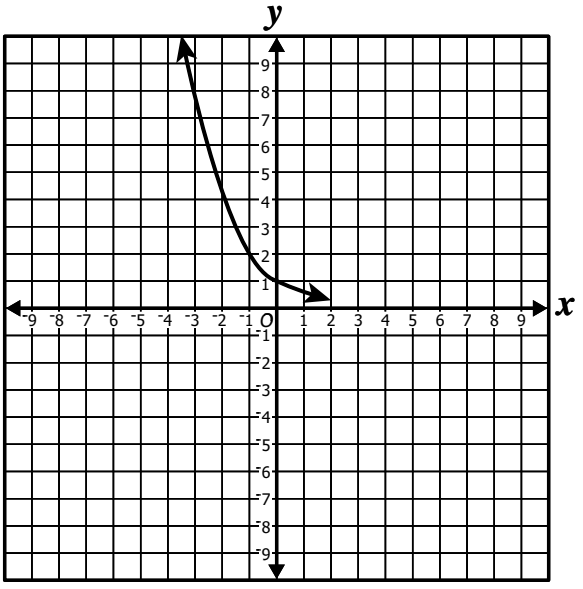
A $(^-4, ^-1)$

B $(^-4, 1)$

C $(4, ^-1)$

D $(4, 1)$

14 The graph shown *most* accurately represents which of the following functions?



F $f(x) = -\left(\frac{1}{2}\right)^x$

G $f(x) = \left(\frac{1}{2}\right)^x$

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

J $f(x) = 2^x$

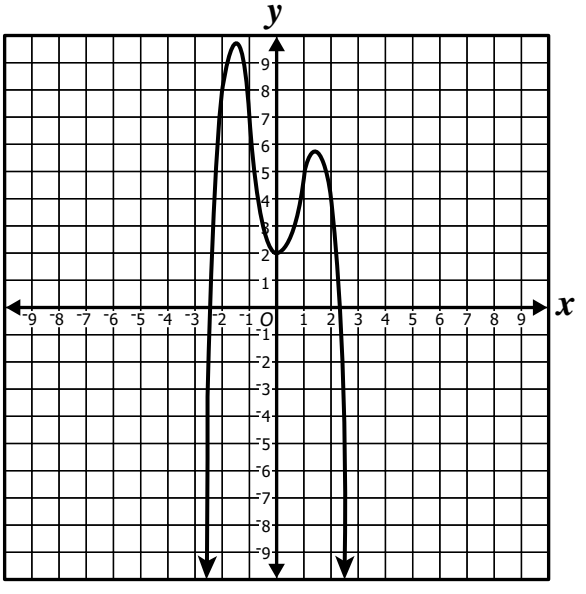
GO ON

15 **Given:** $S_n = \frac{1}{2}n\left[\, 2a_1 + (n-1)d \,\right]$

An outdoor theater has 37 seats in the first row, 40 seats in the second row, and 43 seats in the third row. If this pattern continues, what is the total number of seats in the first 10 rows?

A 120
B 320
C 505
D 520

16 **The graph of a 4th-degree polynomial is shown.**



Exactly how many real zeros does this function have?

F 1
G 2
H 3
J 4

GO ON

17 **What is the value of $\sum_{n=1}^{3}(17n-15)$?**

A 2
B 19
C 36
D 57

18 **Which of the following equations *best* models the data in this table?**

x	y
−2	5
−0.5	2
0	1
1.5	0.5
2.5	1.5
3	2.5

F $y = 2\left(\frac{4}{5}\right)^x$

G $y = x^2 + 1$

H $y = \frac{-3}{4}x + 2$

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

19 The time it takes to do a job is inversely proportional to the number of workers. If 8 workers can do a job in 6 days, then 16 workers can do the same job in —

A 1.5 days

B 3 days

C 6 days

D 12 days

20 What type of function is $y = 2^x + 8$?

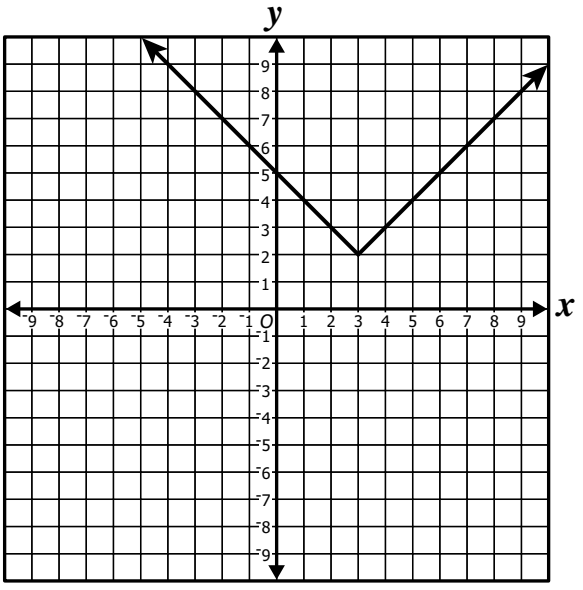
F Exponential

G Quadratic

H Linear

J Step

21 The graph *most* accurately represents which of the following functions?



A $y = |x + 3| + 2$

B $y = |x - 3| + 2$

C $y = |x - 2| + 3$

D $y = |x + 2| + 3$

22 The graph of $y = 4x - 11$ is translated up 8 units. Which equation represents the translated graph?

F $y = 4x - 19$

G $y = 12x - 3$

H $y = 12x - 11$

J $y = 4x - 3$

23 Which equation represents the statement

"r is inversely proportional to s and directly proportional to the cube of t"?

A $r = \frac{kt^3}{s^3}$

B $r = \frac{k}{st^3}$

C $r = \frac{ks}{t^3}$

D $r = \frac{kt^3}{s}$

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

x	y
0.5	−0.75
1	0
1.5	0.5
2	0.75
3	1

F $y = \ln x$

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

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

J $y = \sqrt{x+1}$

25 **Given $f(x) = -3x + 4$ and $g(x) = x + 7$, what is the value of $g(f(2))$?**

A -23
B -18
C 5
D 7

26 **Which lists four consecutive terms of an arithmetic sequence?**

F 3, 10, 17, 24
G 1, 4, 9, 16
H 1, 2, 4, 8
J $-5,\ 6,\ 10,\ 13$

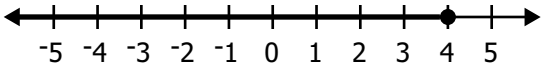
27 **What are all the roots for the equation $3|w - 14| - 6 = 21$?**

A 19
B 23
C 5 and 23
D 9 and 19

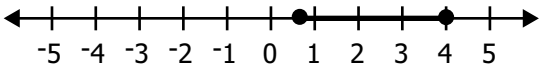
GO ON

28 Which graph *best* represents the solutions to the inequality $|3x - 7| \leq 5$?

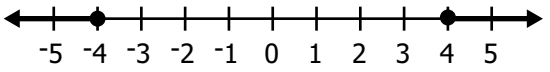
F



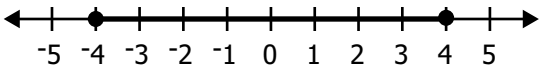
G



H



J



29 What is the solution set for $\sqrt{k + 64} - 8 = -2$?

A $\{-28\}$

B $\{-124\}$

C $\{4\}$

D $\{\ \}$

30 **What is the solution set of the equation $x^2 - 2x + 5 = 0$?**

F $\{ -3, 1 \}$

G $\{ -1, 3 \}$

H $\{ 1 - 2i, 1 + 2i \}$

J $\{ -1 - 2i, -1 + 2i \}$

31 **What is the solution to $\sqrt[3]{x - 4} = -5$?**

A $x = -121$

B $x = -1$

C $x = 29$

D $x = 129$

32 **Which is the solution set for $(x + 5)^2 = 0$?**

F $\{ 25 \}$

G $\{ 5 \}$

H $\{ -5 \}$

J $\{ -5, 5 \}$

33 **What is the solution set for $\frac{5}{3}-\frac{2}{x}=\frac{8}{x}$ if $x \neq 0$?**

A $\{2\}$

B $\left\{\frac{18}{5}\right\}$

C $\left\{\frac{26}{5}\right\}$

D $\{6\}$

34 **Which of the following represent the solutions to $|4x+9|>11$?**

F $x < -5$ or $x > \frac{1}{2}$

G $-5 < x < \frac{1}{2}$

H $x < -\frac{1}{2}$ or $x > 5$

J $-\frac{1}{2} < x < 5$

35 **What is the solution set of $\sqrt{2x+7}=6$?**

A $\left\{\frac{5}{2}\right\}$

B $\left\{\frac{19}{2}\right\}$

C $\left\{\frac{29}{2}\right\}$

D $\left\{\frac{43}{2}\right\}$

36 **What is the solution set of $2x^2+7x+5=0$?**

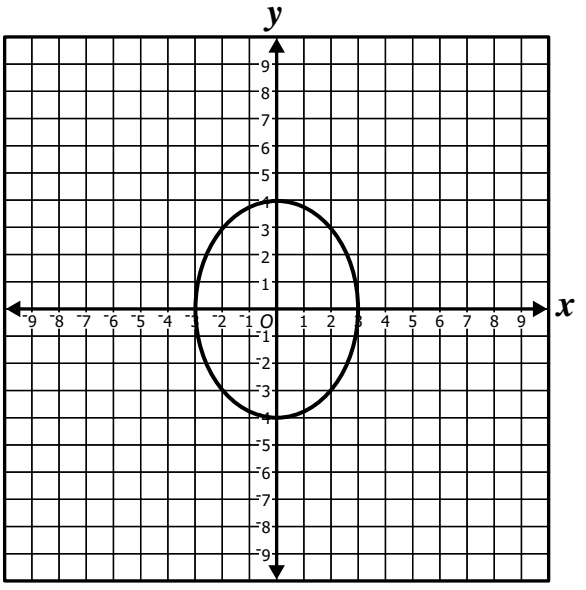
F $\left\{-5, -\frac{1}{2}\right\}$

G $\left\{-\frac{5}{2}, -1\right\}$

H $\left\{1, \frac{5}{2}\right\}$

J $\left\{\frac{1}{2}, 5\right\}$

37



Which best represents the equation of the graphed conic section?

A $\frac{x^2}{16} + \frac{y^2}{9} = 1$

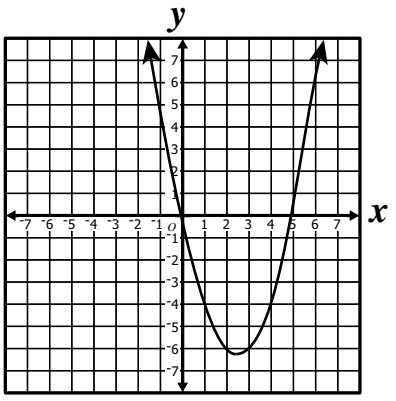
B $\frac{x^2}{16} - \frac{y^2}{9} = 1$

C $\frac{x^2}{9} + \frac{y^2}{16} = 1$

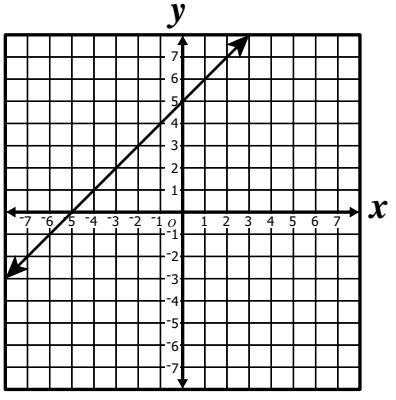
D $\frac{x^2}{9} - \frac{y^2}{16} = 1$

38 Which graph *most* likely represents a function with a zero of 5 ?

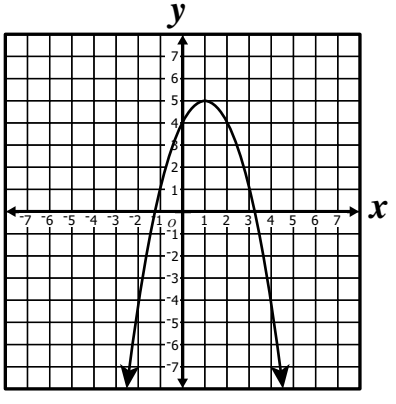
F



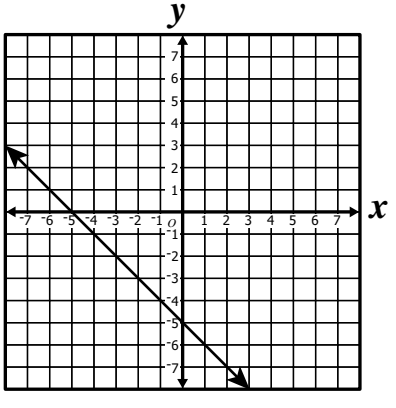
G



H



J



39 **Which is a zero of the function $f(x) = (x + 3)(2x - 1)(x + 2)$?**

A 3
B 0
C $^{-}1$
D $^{-}2$

40 **What are the coordinates of the vertex of the graph of the function $^{-}2(x - 1)^2 = y + 5$?**

F $(^{-}1, 5)$

G $(2, 5)$

H $(1, ^{-}5)$

J $(^{-}2, ^{-}5)$

GO ON

41 **A polynomial function has a zero at $x = 3$. Which of the following expressions *must* be one factor of the polynomial?**

A $(x - 3)$

B $(x + 3)$

C $3x$

D x^3

42 **Where does the graph of $f(x) = (3x - 5)(x + 9)$ cross the x-axis?**

F $\left(\frac{5}{3}, 0\right)$ and $(^{-}9, 0)$

G $\left(\frac{5}{3}, 0\right)$ and $(^{-}3, 0)$

H $\left(\frac{-5}{3}, 0\right)$ and $(9, 0)$

J $\left(\frac{-5}{3}, 0\right)$ and $(^{-}45, 0)$

43 If $M = \begin{bmatrix} -7 & 1 \\ 0 & 3 \end{bmatrix}$, which matrix represents M^2 ?

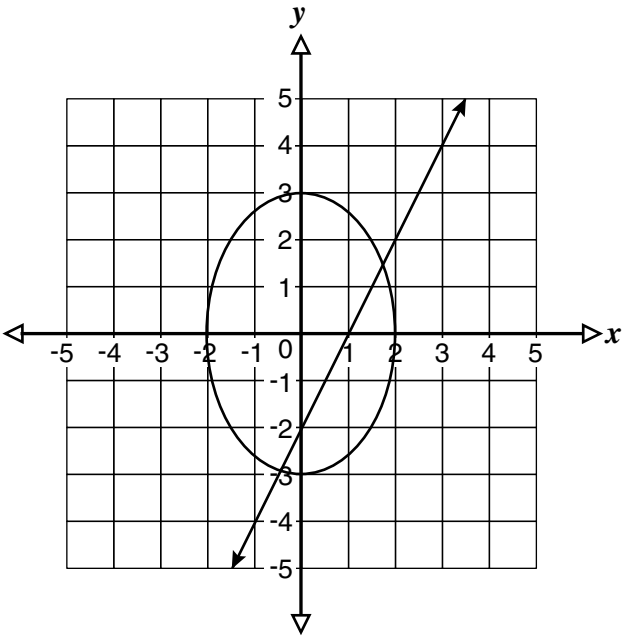
A $\begin{bmatrix} 49 & -4 \\ 0 & 9 \end{bmatrix}$

B $\begin{bmatrix} -14 & 2 \\ 0 & 6 \end{bmatrix}$

C $\begin{bmatrix} 49 & 1 \\ 0 & 9 \end{bmatrix}$

D $\begin{bmatrix} -14 & 2 \\ 0 & 9 \end{bmatrix}$

44



Apparently, the system of equations graphed above has —

F exactly 1 solution
G exactly 2 solutions
H exactly 3 solutions
J no solutions

45 The dimensions of matrix P are 6×5. The dimensions of matrix Z are 5×1. What are the dimensions of matrix PZ ?

A 30×5
B 6×1
C 5×5
D 1×6

46 If $P = \begin{bmatrix} 4 & -3 \\ -2 & 1 \end{bmatrix}$ and $P \cdot Q = \begin{bmatrix} 20 & -30 \\ -10 & 12 \end{bmatrix}$, then what is the value of Q ?

F $\begin{bmatrix} 110 & -156 \\ -50 & 72 \end{bmatrix}$

G $\begin{bmatrix} 20 & 30 \\ -7 & -9 \end{bmatrix}$

H $\begin{bmatrix} 5 & 10 \\ 5 & 12 \end{bmatrix}$

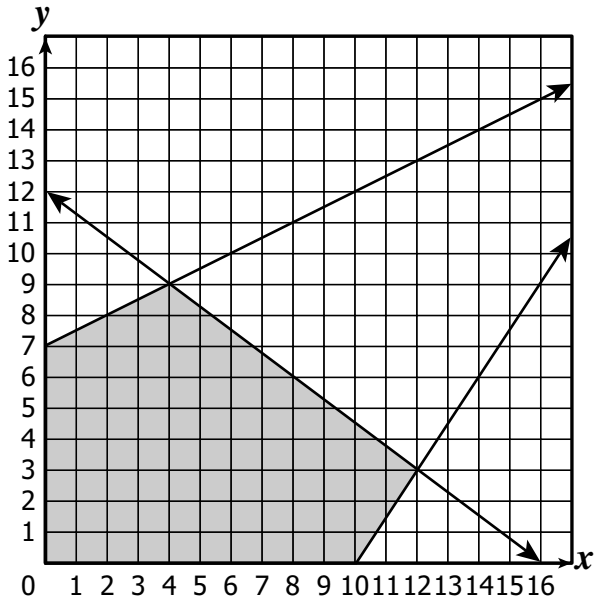
J $\begin{bmatrix} 5 & -3 \\ 0 & 6 \end{bmatrix}$

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

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

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

48 What appears to be the maximum value of $P = 5x + 6y$ for the feasible region in the graph?



F 72

G 74

H 78

J 80

49 Which ordered pair represents a solution to the following system of inequalities?

$$\begin{cases} 2x + 4y \leq 12 \\ 3x - y < 2 \end{cases}$$

A (6, 4)

B (2, 6)

C ($^{-}$3, 2)

D ($^{-}$4, $^{-}$14)

50 **The matrix equation** $\begin{bmatrix} 4 & -3 \\ -1 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} -2 \\ 6 \end{bmatrix}$ **represents which system of linear equations?**

F $\begin{cases} 4x-y=-2 \\ -3x+y=6 \end{cases}$

G $\begin{cases} 4x-3y=-2 \\ -x+y=6 \end{cases}$

H $\begin{cases} 4x+3y=-2 \\ -x-y=6 \end{cases}$

J $\begin{cases} 4x+y=-2 \\ -x-3y=6 \end{cases}$

STOP

Answer Key-EOC041-M0110

Test Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	D	001	Expressions and Operations
2	F	001	Expressions and Operations
3	A	001	Expressions and Operations
4	J	001	Expressions and Operations
5	A	001	Expressions and Operations
6	H	001	Expressions and Operations
7	A	001	Expressions and Operations
8	G	001	Expressions and Operations
9	D	001	Expressions and Operations
10	G	001	Expressions and Operations
11	B	002	Relations and Functions
12	H	002	Relations and Functions
13	C	002	Relations and Functions
14	G	002	Relations and Functions
15	C	002	Relations and Functions
16	G	002	Relations and Functions
17	D	002	Relations and Functions
18	J	002	Relations and Functions
19	B	002	Relations and Functions
20	F	002	Relations and Functions
21	B	002	Relations and Functions
22	J	002	Relations and Functions
23	D	002	Relations and Functions
24	F	002	Relations and Functions
25	C	002	Relations and Functions
26	F	002	Relations and Functions
27	C	003	Equations and Inequalities
28	G	003	Equations and Inequalities
29	A	003	Equations and Inequalities
30	H	003	Equations and Inequalities
31	A	003	Equations and Inequalities
32	H	003	Equations and Inequalities
33	D	003	Equations and Inequalities
34	F	003	Equations and Inequalities
35	C	003	Equations and Inequalities
36	G	003	Equations and Inequalities
37	C	004	Analytical Geometry
38	F	004	Analytical Geometry
39	D	004	Analytical Geometry
40	H	004	Analytical Geometry
41	A	004	Analytical Geometry
42	F	004	Analytical Geometry
43	A	005	Systems of Equations/Inequalities
44	G	005	Systems of Equations/Inequalities
45	B	005	Systems of Equations/Inequalities
46	J	005	Systems of Equations/Inequalities
47	D	005	Systems of Equations/Inequalities
48	H	005	Systems of Equations/Inequalities
49	C	005	Systems of Equations/Inequalities
50	G	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		168
2		204
3		226
4		242
5		255
6		266
7		275
8		284
9		291
10		298
11		305
12		311
13		317
14		322
15		328
16		333
17		338
18		343
19		347
20		352
21		357
22		361
23		366
24		370
25		375
26		379
27		383
28		388
29		393
30		397
31		**402**
32		406
33		411
34		416
35		421
36		427
37		432
38		438
39		444
40		451
41		458
42		465
43		474
44		483
45		494
46		**507**
47		523
48		545
49		581
50		600

A total raw score (left column) is converted to a total scaled score (right column). The total scaled score may range from 0 to 600.

A scaled score of 400 or more means the student passed the SOL test, while a scaled score of 399 or less means the student did not pass the test. A scaled score of 500 or more indicates the student passed the SOL test at an advanced level.