Spring 2009 Released Test

# END OF COURSE ALGEBRA I 

## Form M0119, CORE 1

## This released test contains 3 fewer test items (\#1-47 only) than an original SOL EOC Algebra I test.

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## Algebra I Formula Sheet

## Geometric Formulas


$A=\frac{1}{2} b h$

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

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

$A=\frac{1}{2} h\left(b_{1}+b_{2}\right)$

$C=2 \pi r$
$A=\pi r^{2}$
$V=l w h$
$S . A .=2(l w+l h+w h)$
$V=\pi r^{2} h$
$S . A .=2 \pi r(h+r)$

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

Abbreviations

| milligram | mg |
| :--- | :--- |
| gram | g |
| kilogram | kg |
| milliliter | mL |
| liter | L |
| kiloliter | kL |
| millimeter | mm |
| centimeter | cm |
| meter | m |
| kilometer | km |
| square centimeter | $\mathrm{cm}^{2}$ |
| cubic centimeter | $\mathrm{cm}^{3}$ |


| ounce | oz |
| :--- | :--- |
| pound | lb |
| quart | qt |
| gallon | gal. |
| inch | in. |
| foot | ft |
| yard | yd |
| mile | mi. |
| square inch | $\mathrm{sq} \mathrm{in}$. |
| square foot | sq ft |
| cubic inch | $\mathrm{cu} \mathrm{in}$. |
| 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 |

Algebra I

## 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

If $f(x)=x^{2}+2 x+3$, what is the value of $f(x)$ when $x=6 ?$
A 27
B 42
C 51
D 60

1 What is the solution to the inequality below?

$$
2 x-7 \geq 15
$$

A $x \leq 8$
B $x \geq 8$
C $x \leq 11$
D $x \geq 11$

2 Which number is a zero of the function $f$ ?

$$
f(x)=x^{2}-x-6
$$

F 0
G 2
H 3
J 6

3 If $\mathbf{2 n}=\mathbf{6}$, what property of equality justifies writing

$$
p+2 n=4 p+15
$$

as $p+6=4 p+15$ ?
A Addition property
B Transitive property
C Symmetric property
D Substitution property

4 The equation $y=3 x$ is shown on the graph below.


Which is most likely the graph of $y=3 x+2$ ?

F

G


H


J


5 What is the slope of the line represented by the following equation?

$$
y=2 x-1
$$

A -1
B $\quad \frac{1}{2}$
C 1

D 2

6 Kristen heard that it is $82^{\circ}$ Fahrenheit outside. She knows that $F=\frac{9}{5} C+32$, where $F$ represents the temperature in degrees Fahrenheit and $C$ represents the temperature in degrees Celsius. Which is closest to the temperature outside, in degrees Celsius?

F 28
G 63
H 90
J 180

7 What is the solution to the system of linear equations below?

$$
\left\{\begin{array}{l}
x+y=5 \\
x-y=3
\end{array}\right.
$$

A $(8,-3)$
B $(6,-1)$
C $(5,2)$
D $(4,1)$

8 Which equation best describes the line whose graph is shown?


F $\quad y=x+3$
G $y=3 x$
H $y=3$
J $x=3$

9 Which graph best represents the following inequality?

$$
y \leq \frac{-1}{3} x+2
$$

A


B


C


D


10 Candice plotted the points $(2,15)$ and $(0,-1)$ and then drew a line through these two points. What is the slope of the line she drew?

F $\frac{1}{8}$
G $\frac{1}{7}$
H 7
J 8

11 Which of the following is the solution set to the equation $x^{2}-3 x-28=0$ ?
A $\{-28,1\}$
B $\{-4,7\}$
C $\{-2,14\}$
D $\{0,28\}$

12 Ralph spent $\$ 132$ to buy movie tickets for 20 students and 4 adult chaperones. Adult tickets cost $\$ 3$ more than student tickets. If $A$ is the price of an adult ticket and $S$ is the price of a student ticket, which system of equations could be used to find the price of each adult and student ticket?

F $\left\{\begin{array}{l}S=A+3 \\ 4 A+20 S=132\end{array}\right.$
G $\left\{\begin{array}{l}A=S+3 \\ 4 A+20 S=132\end{array}\right.$
H $\left\{\begin{array}{l}A+S=3 \\ 20 A+4 S=132\end{array}\right.$
J $\left\{\begin{array}{l}A=S+3 \\ A+S=132\end{array}\right.$

13 What is the slope of the line represented by the following equation?

$$
4 x-y+3=0
$$

A -1
B $\frac{3}{4}$
C $\frac{4}{3}$
D 4

14 Which is an equation of the line that passes through the points $(5,15)$ and $(10,20) ?$

F $y=x+10$
G $y=x-30$
H $y=x+30$
J $y=x+15$

15 What is the solution of the system of equations shown?

$$
\left\{\begin{array}{l}
2 x+5 y=8 \\
6 x+4 y=-20
\end{array}\right.
$$

A $(-6,4)$
B $(6,-14)$
C $(14,-4)$
D $(-6,-4)$

16 What is the solution to the following equation?

$$
3(x+5)-10=-2(x+10)
$$

| F | -7 |
| :--- | :--- |
| $\mathbf{G}$ | -5 |
| $\mathbf{H}$ | 1 |
| J | 3 |

17 Which is an equation of a line with a slope of 3 that passes through the origin?

A $x=3$
B $y=3$
C $x=3 y$
D $y=3 x$

18 Which of the following equals $3 x^{2}-10 x-8$ when factored completely?
F $(3 x-4)(x+2)$
G $(3 x-1)(x+8)$
H $(3 x+8)(x-1)$
J $(3 x+2)(x-4)$

19 What is $\sqrt{192}$ expressed in simplest radical form?
A $8 \sqrt{3}$
B $6 \sqrt{5}$
C $4 \sqrt{12}$
D $2 \sqrt{48}$

20
What is the value of the expression $3(x+4)-2 y$, if $x=5$ and $y=-3$ ?
F -7
G 11
H 21
J 33

21 What is the value of the expression $\frac{1}{4}\left(x^{2}-y^{3}\right)$ when $x=5$ and $y=1$ ?
A $\frac{7}{4}$
B $\frac{11}{2}$
C 6

D 31

22 Which expression is equivalent to $3 x^{2}\left(4 x^{2}+2 x+1\right)$ ?
F $7 x^{2}+5 x+4$
G $7 x^{4}+5 x^{3}+4 x^{2}$
H $12 x^{2}+6 x+3$
J $12 x^{4}+6 x^{3}+3 x^{2}$

23


Based on the models for $x^{2}, x$, and 1 , which product is represented by the diagram?

A $(x+1)(x+3)$
B $(2 x+3)(x+1)$
C $\left(2 x^{2}+3\right)(x+1)$
D $\left(x^{2}+x\right)\left(2 x^{2}+3 x\right)$

24 Which labeled point on the number line is closest to the square root of $\mathbf{8 5}$ ?

$\begin{array}{ll}\mathbf{F} & W \\ \mathbf{G} & X \\ \mathbf{H} & Y \\ \mathbf{J} & Z\end{array}$

25 Which polynomial is equivalent to the following expression?

$$
\left(3 x^{2}-2 x+5\right)-\left(2 x^{2}-5 x+1\right)
$$

A $x^{2}+3 x+4$
B $x^{2}-7 x+6$
C $x^{2}-3 x-6$
D $x^{2}-7 x+4$

26 Which of the following is equivalent to $\frac{x^{4} y^{3}}{x^{3} y^{4}}$ ?

$$
\begin{array}{ll}
\mathbf{F} & \frac{x}{y} \\
\mathbf{G} & \frac{y}{x} \\
\mathbf{H} & x y \\
\mathbf{j} & x^{7} y^{7}
\end{array}
$$

27 A factored form of $x^{2}+5 x-24$ is -
A $(x-4)(x+6)$
B $(x-3)(x+8)$
C $(x-2)(x+12)$
D $(x-6)(x+4)$

28 Which is equivalent to the following expression?

$$
(-2 x y)^{3}
$$

$$
\begin{array}{ll}
\mathbf{F} & -2 x y^{3} \\
\mathbf{G} & -2 x^{3} y^{3} \\
\mathbf{H} & -6 x^{3} y^{3} \\
\mathbf{J} & -8 x^{3} y^{3}
\end{array}
$$

29 The length of a certain rectangle is six more than three times its width. If the width of the rectangle is 4 units, what is its length?

A 10
B 13
C 18
D 27

## 30 Which of the following graphs shows a direct variation?

## F



G


H


J


## 31 Which graph apparently represents a function of $x$ ?

A

B


C


D


32 If $f(x)=\frac{\sqrt{9-x}}{4}$ what is $f(5)$ ?
F $\frac{3-\sqrt{5}}{4}$
G $\frac{1}{2}$
H $\frac{\sqrt{14}}{4}$
J 1

33 What is the range of the function shown?


A $-2 \leq x \leq 7$
B $-3 \leq x \leq 6$
C $-2 \leq y \leq 7$
D $-3 \leq y \leq 6$

34 The table gives the cost for different numbers of 100 -sheet notebooks. The cost, $C$, varies directly as the number of notebooks, $n$.

| Number of <br> notebooks <br> $(\boldsymbol{n})$ | Cost <br> $(\boldsymbol{C})$ |
| :---: | :---: |
| 2 | $\$ 4.30$ |
| 4 | $\$ 8.60$ |
| 6 | $\$ 12.90$ |
| 8 | $\$ 17.20$ |

Which equation represents the relationship shown in the table?

F $C=\frac{2.15}{n}$
G $\quad C=4.30 n$

H $C=2.15 n$

J $C=2.15+n$

35 A function of $x$ consists of five ordered pairs of the form $(x, y)$. Four of the ordered pairs are shown below.

$$
(1,9),(3,19),(5,29),(7,39)
$$

Which could be the 5th ordered pair of the function?
A $(9,8)$
B $(1,49)$
C $(5,19)$
D $(3,9)$

36 The number of miles, $m$, a car can travel varies directly with the amount of gas, $g$, in its fuel tank. If $k$ is the constant of variation, which equation represents that situation?

F $m=\frac{k}{g}$
G $m=\frac{g}{k}$
H $m=k g$
J $m=g+k$

37 The function $f(x)=1,200-50 x$ gives the distance left to travel after driving $x$ hours. What is $f(9)$, the distance left to travel after driving 9 hours?

A 450 miles
B 691 miles
C 750 miles
D 850 miles

38 Which is a zero of the function defined by the following equation?

$$
f(x)=x(x+2)
$$

```
F -2
G -1
H 1
J 2
```

39 The relationship shown in the table is a direct variation.

| $x$ | $y$ |
| :---: | :---: |
| 5 | 15 |
| 6 | 18 |
| 7 | 21 |
| 8 | 24 |

## Which equation best represents this relationship?

A $y=4 x-5$

B $\quad y=x+10$

C $y=3 x$
D $y=\frac{1}{3} x$

40 Which of the following represents the domain of the relation shown?


F $\quad\{A, B, C, D\}$
G $\{\mathrm{A}, \mathrm{B}, 150,250\}$
H $\{150,250,350,450\}$
J $\{A, 150, B, 250, C, 350, D, 450\}$

41 Christy and Claire take piano lessons. Their practice times for the past week are shown in the matrix.

$$
\begin{gathered}
\\
\text { Christy } \\
\text { Claire }
\end{gathered}\left[\begin{array}{rrrr}
\text { M } & \mathbf{W} & \mathbf{F} & \text { Sa } \\
20 & 10 & 15 & 20 \\
0 & 5 & 15 & 30
\end{array}\right]
$$

Which matrix could represent the new practice schedule if their teacher wants them to practice twice as much this week?
A $\left[\begin{array}{rrrr}10 & 5 & 7.5 & 10 \\ 0 & 2.5 & 7.5 & 15\end{array}\right]$
B $\left[\begin{array}{rrrr}40 & 20 & 30 & 40 \\ 0 & 5 & 15 & 30\end{array}\right]$
C $\left[\begin{array}{rrrr}40 & 20 & 30 & 40 \\ 0 & 10 & 30 & 60\end{array}\right]$
D $\left[\begin{array}{rrrr}22 & 12 & 17 & 22 \\ 2 & 7 & 17 & 32\end{array}\right]$

42

$$
\begin{aligned}
& {\left[\begin{array}{ll}
\mathbf{1} & \mathbf{7} \\
\mathbf{6} & \mathbf{3}
\end{array}\right]-\left[\begin{array}{ll}
\mathbf{4} & -\mathbf{8} \\
\mathbf{2} & -\mathbf{1}
\end{array}\right]=} \\
& \mathbf{F}\left[\begin{array}{rr}
3 & 15 \\
-4 & 4
\end{array}\right] \\
& \mathbf{G}\left[\begin{array}{rr}
-3 & 15 \\
4 & 4
\end{array}\right] \\
& \mathbf{H}\left[\begin{array}{rr}
-4 & 56 \\
-12 & 3
\end{array}\right] \\
& \mathbf{J}\left[\begin{array}{rr}
-3 & -1 \\
4 & 2
\end{array}\right]
\end{aligned}
$$

43 This table shows the wind chill at $40^{\circ} \mathrm{F}$ for various wind speeds.

| Wind Speed <br> (miles per hour) $s$ | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Wind Chill <br> (${ }^{\circ}$ F), $t$ | 36 | 34 | 32 | 30 | 29 | 28 | 27 | 26 | 25 |

Which equation most closely represents a line of best fit for the data?
A $t=-0.2 s+35$
B $t=0.2 s-35$
C $t=-35 s+0.2$
D $t=35 s-0.2$

44 Which matrix is equivalent to $3\left[\begin{array}{r}6 \\ -3 \\ -9\end{array}\right]$ ?
F $\left[\begin{array}{r}2 \\ -1 \\ -3\end{array}\right]$
$\mathbf{G}\left[\begin{array}{r}18 \\ -3 \\ -9\end{array}\right]$

H $\left[\begin{array}{r}18 \\ -9 \\ -27\end{array}\right]$

J $\left[\begin{array}{r}6 \\ -9 \\ -9\end{array}\right]$

45 The chart below shows the scores for each of the first $\mathbf{1 0}$ basketball games for the Hawks and the Blue Jays.

| Hawks | Blue Jays |
| :---: | :---: |
| 95 | 91 |
| 93 | 103 |
| 93 | 93 |
| 93 | 76 |
| 82 | 91 |
| 81 | 95 |
| 80 | 90 |
| 103 | 104 |
| 87 | 95 |
| 98 | 95 |

## Which of the following is true?

A The mode for the Hawks is less than the mode for the Blue Jays.
B The mean for the Blue Jays is less than the mean for the Hawks.
C The median for the Hawks is greater than the median for the Blue Jays.
D The range for the Hawks is greater than the range for the Blue Jays.

46 Easy Street Deli serves sandwiches with 3 choices of bread and 3 choices of meat. The tables show the number of each type of sandwich sold on Monday and Tuesday.

| Monday |  |  |  |
| :---: | :---: | :---: | :---: |
|  | White <br> Bread | Wheat <br> Bread | Rye <br> Bread |
| Ham | 41 | 55 | 43 |
| Roast Beef | 29 | 56 | 21 |
| Turkey | 50 | 30 | 28 |


| Tuesday |  |  |  |
| :---: | :---: | :---: | :---: |
|  | White <br> Bread | Wheat <br> Bread | Rye <br> Bread |
| Ham | 56 | 70 | 34 |
| Roast Beef | 67 | 54 | 40 |
| Turkey | 50 | 32 | 29 |

Which matrix shows the difference between the number of different sandwiches sold on Tuesday and the number sold on Monday?

F $\left[\begin{array}{c}21 \\ 55 \\ 3\end{array}\right]$
G $\left[\begin{array}{rrr}15 & 15 & -9 \\ 38 & -2 & 19 \\ 0 & 2 & 1\end{array}\right]$
H $\left[\begin{array}{rrr}97 & 125 & 77 \\ 96 & 110 & 61 \\ 100 & 62 & 57\end{array}\right]$
J $\left[\begin{array}{rrr}15 & 15 & 9 \\ 38 & 2 & 19 \\ 0 & 2 & 1\end{array}\right]$

47 The male and female teachers at Mountainview School recorded the number of years they have been teaching at the school. The box-and-whisker plots summarize the data.

Female Teachers


## Which statement is false?

A The teacher with the least number of years teaching is female.
B The range in the years teaching is greater for male teachers than for female teachers.
C The difference in the maximum number of years teaching for male and female teachers is 1.
D The median number of years teaching for female teachers is 2 less than the median for male teachers.

Answer Key-EOC020-M0119

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

Algebra I, Core 1

| If you get this many items correct: | Then your converted scale score is: |
| :---: | :---: |
| 0 | 000 |
| 1 | 207 |
| 2 | 240 |
| 3 | 260 |
| 4 | 275 |
| 5 | 287 |
| 6 | 297 |
| 7 | 306 |
| 8 | 314 |
| 9 | 322 |
| 10 | 328 |
| 11 | 335 |
| 12 | 341 |
| 13 | 346 |
| 14 | 352 |
| 15 | 357 |
| 16 | 362 |
| 17 | 367 |
| 18 | 371 |
| 19 | 376 |
| 20 | 380 |
| 21 | 385 |
| 22 | 389 |
| 23 | 393 |
| 24 | 398 |
| 25 | 402 |
| 26 | 406 |
| 27 | 410 |
| 28 | 415 |
| 29 | 419 |
| 30 | 423 |
| 31 | 428 |
| 32 | 432 |
| 33 | 437 |
| 34 | 442 |
| 35 | 446 |
| 36 | 451 |
| 37 | 457 |
| 38 | 462 |
| 39 | 468 |
| 40 | 474 |
| 41 | 480 |
| 42 | 488 |
| 43 | 495 |
| 44 | 504 |
| 45 | 514 |
| 46 | 526 |
| 47 | 540 |
| 48 | 560 |
| 49 | 593 |
| 50 | 600 |

