Minnesota MCA Grade 8 Math Practice

Reference Materials
Page 2

Exam Materials
Pages 3 - 15

Grade 8 Formula Sheet

You may use the following formulas to solve problems on this test.

Pythagorean theorem	$a^2 + b^2 = c^2$
Distance formula	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Slope of a line	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Slope-intercept form	$y = mx + b$
Point-slope form	$y - y_1 = m(x - x_1)$
Standard form	$Ax + By = C$
Arithmetic sequence	$f(x) = mx + b$
Geometric sequence	$f(x) = a(b)^x$

Minnesota

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Minnesota Comprehensive Assessments-Series III

Mathematics Item Sampler
Grade 8

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DEPARTMENT OF EDUCATION

Mathematics Test — Segment 1

1. Which expression results in a rational number?

A. $1.5+\sqrt{1.5}$

B. $12-\sqrt{12}$

C. $\frac{3}{4}\cdot\sqrt{\frac{3}{4}}$

D. $25\div\sqrt{25}$

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2. Simplify.

$$(4x)^2-4x^3$$

A. x^{-1}

B. $12x^{-1}$

C. $16x^2-4x^3$

D. $16x^2-64x^3$

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3. Simplify.

$$\frac{1.2\times10^{-6}}{4.8\times10^{4}}$$

A. 2.5×10^{-2}

B. 2.5×10^{-9}

C. 2.5×10^{-10}

D. 2.5×10^{-11}

Go on to the next page.

4. Which table of values does **not** represent a function?

A.

x	*y*
−1	0
0	0
1	2

B.

x	*y*
−1	−2
0	0
1	2

C.

x	*y*
−1	−2
0	0
0	2

D.

x	*y*
−1	−1
0	0
1	1

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5. The number of cakes needed for a party, c, is dependent upon the number of guests at the party, g. Which equation shows the number of cakes as a function of the number of guests?

A. $f(c) = \frac{g}{12}$

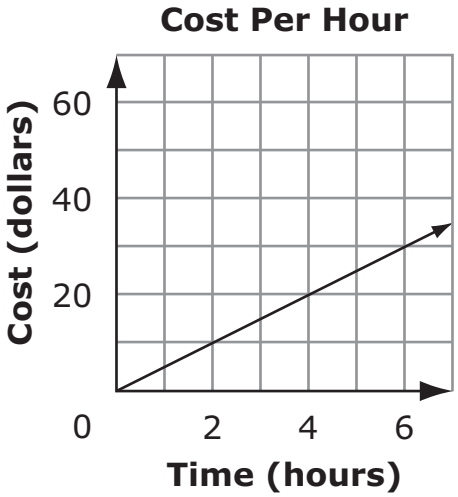
B. $f(g) = \frac{g}{12}$

C. $f(c) = \frac{c}{12}$

D. $f(g) = \frac{c}{12}$

1

6. A graph is shown.



Which situation is represented by the graph?

A. It costs $2 per hour to rent a bike for 10 hours.
B. It costs $60 to rent a boat for 8 hours.
C. It costs $5 per hour to rent ice skates.
D. It costs $40 to rent a snowboard.

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7. Ann sells bracelets for $4 each and necklaces for $8 each. Which inequality shows x, the number of bracelets, and y, the number of necklaces Ann must sell to make at least $100?

A. $4x + 8y \leq 100$
B. $4x + 8y \geq 100$
C. $8x + 4y \leq 100$
D. $8x + 4y \geq 100$

1

8. A rectangle is drawn on a coordinate grid. The equation for 1 side of the rectangle is $3x - 2y = 12$. Which could be an equation for another side of the rectangle?

A. $y = \frac{3}{2}x + 5$

B. $y = 3x + 12$

C. $y = -\frac{3}{2}x - 12$

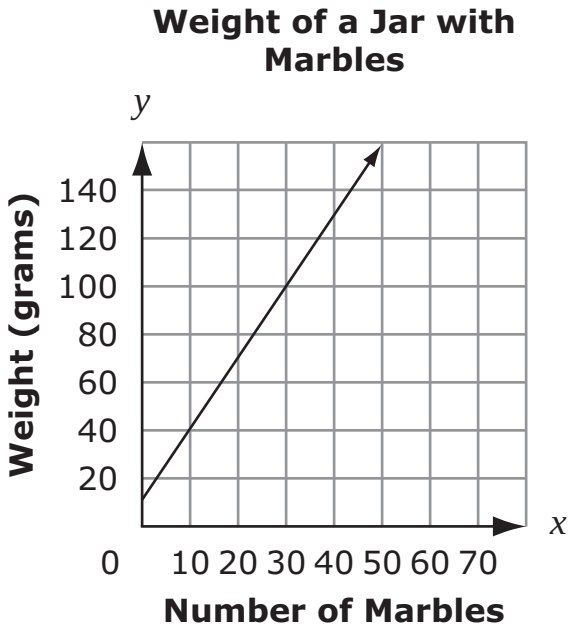
D. $y = 2x - 5$

9. Which sequence is arithmetic?

A. 4 8 16 32 64 ....
B. 11 12 14 17 21 ....
C. 28 15 2 −11 −24 ....
D. 30 −25 20 −15 10 ....

2

10. Jayda makes a graph to show the weight of a jar when it contains different numbers of marbles.



What does the *y*-intercept represent?

A. The weight of each marble
B. The weight of the jar by itself
C. The number of marbles when the weight is 0 grams
D. The number of marbles when the weight is 10 grams

Go on to the next page.

11. An equation is shown.

$$m = 4p + 3$$

When p is increased by 2, how much does m increase?

A. 2
B. 4
C. 7
D. 8

2

12. A sequence is shown.

1.5 4.5 13.5 40.5 ....

What is the seventh term in the sequence?

A. 121.5
B. 364.5
C. 1,093.5
D. 3,280.5

13. Which property is used in the equation $mg + mh = m(g + h)$?

A. Associative
B. Commutative
C. Distributive
D. Identity

14. Which is the equation of the same line as $y = 3x - 8$?

A. $3x - 2y = 8$

B. $-3x - 2y = -8$

C. $6x - y = 16$

D. $6x - 2y = 16$

Please write your answer in the space below the question. You may use the digits: 0–9 and the symbols: slash for a fraction bar (/), a decimal (.), and a negative sign (–). If your answer is a mixed number, you must change it to an improper fraction or a decimal.

2

15. An equation is shown.

$$|2x - 4| = 6$$

The equation has 2 solutions. One solution is $x = 5$. What is the other solution?

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16. Lisa has 5 more green marbles than blue marbles. She has a total of 40 green and blue marbles. Which system of equations represents this situation if x is the number of green marbles and y is the number of blue marbles?

A. $\begin{cases} y = x + 5 \\ x + y = 40 \end{cases}$

B. $\begin{cases} x = y + 5 \\ x + y = 40 \end{cases}$

C. $\begin{cases} y = x + 5 \\ y = x + 40 \end{cases}$

D. $\begin{cases} x = y + 5 \\ x = y + 40 \end{cases}$

17. What is the distance between $(4, 7)$ and $(-3, 9)$ on a coordinate grid?

A. $\sqrt{5}$

B. $\sqrt{45}$

C. $\sqrt{53}$

D. $\sqrt{305}$

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18. Which function forms a geometric sequence when $x = 1, 2, 3, \ldots$?

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

B. $f(x) = x^2$

C. $f(x) = x^2 + 2$

D. $f(x) = 2^x$

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19. A sequence is shown.

$$-1 \quad -7 \quad -13 \quad -19 \quad -25 \quad \ldots$$

What is the function rule for the sequence?

A. $f(x) = x - 6$

B. $f(x) = -6x$

C. $f(x) = 5x - 6$

D. $f(x) = -6x + 5$

20. What is the value of $-3|-2x-y|$ when $x=-4$ and $y=5$?

A. -27
B. -9
C. 9
D. 27

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21. Leon plants 3 rows of tomatoes with n plants in each row. He also plants 1 row of beans with 5 plants in the row. Which equation can be used to find t, the total number of plants Leon planted?

A. $t=n+8$
B. $t=3n+1$
C. $t=3n+5$
D. $t=5n+3$

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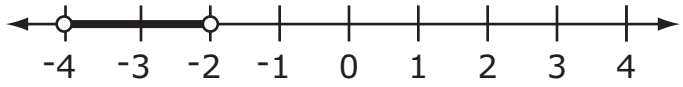
22. What is the value of p when $2p+10=24$?

A. $p=7$
B. $p=12$
C. $p=17$
D. $p=28$

23. A number line is shown.



Which equation has the solution shown on the number line?

A. $-4 > x > -2$

B. $4 < -2x < 8$

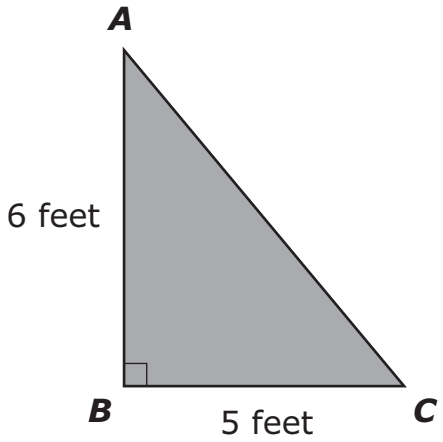
C. $4 > -2x > 8$

D. $-4 < 2x < -8$

2

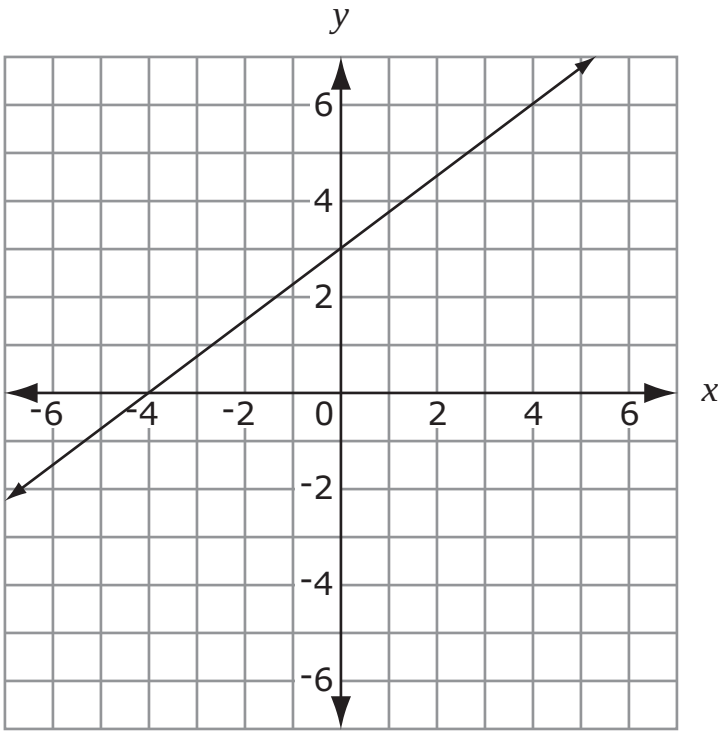
Please write your answer in the space below the question. You may use the digits: 0–9 and the symbols: slash for a fraction bar (/), a decimal (.), and a negative sign (–). If your answer is a mixed number, you must change it to an improper fraction or a decimal.

24. A triangle is shown.



What is *AC*?

25. The graph of a line is shown.



What is the equation of a line that is perpendicular to the line shown and goes through the point (3, −1)?

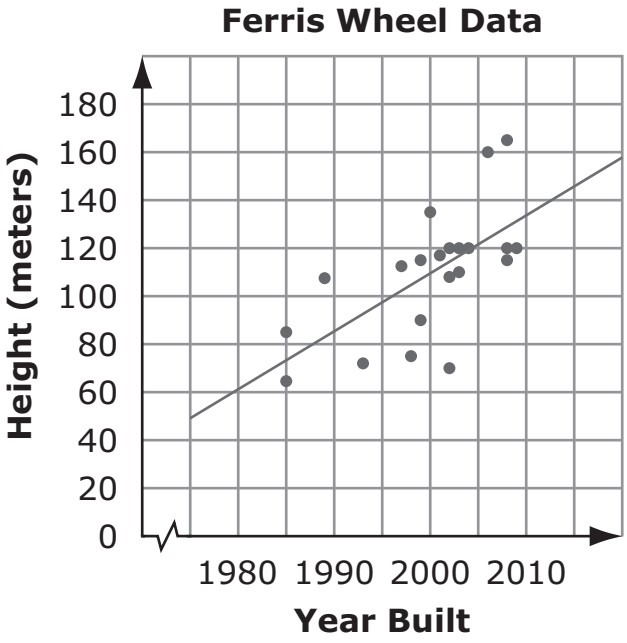
A. $y = -\frac{4}{3}x - 5$

B. $y = -\frac{4}{3}x + 3$

C. $y = \frac{4}{3}x - 5$

D. $y = \frac{4}{3}x + 3$

26. The scatterplot shows the heights of Ferris wheels and the years they were built.



Which statement is true about the scatterplot?

A. All Ferris wheels built before 1980 must have been less than 60 meters high.

B. Based on the line of best fit, Ferris wheel heights increase about 25 meters every 10 years.

C. Each Ferris wheel is taller than all Ferris wheels that were built earlier.

D. Each year, more Ferris wheels were built than the year before.