Algebra

1. If $x = -3$, what is the value of $\frac{x^2 - 1}{x + 1}$?

    A. -4

    B. -2

    C. 2

    D. $3\frac{2}{3}$

    E. 5

2. Doctors use the term *maximum heart rate* (*MHR*) when referring to the quantity found by starting with 220 beats per minute and subtracting 1 beat per minute for each year of a person's age. Doctors recommend exercising 3 or 4 times each week for at least 20 minutes with your heart rate increased from its *resting heart rate* (*RHR*) to its *training heart rate* (*THR*), where

    $$THR = RHR + .65(MHR - RHR)$$

    Which of the following is closest to the *THR* of a 43-year-old person whose *RHR* is 54 beats per minute?

    A.   197
    B.   169
    C.   162
    D.   134
    E.   80

3. When getting into shape by exercising, the subject's maximum recommended number of heartbeats per minute (*h*) can be determined by subtracting the subject's age (*a*) from 220 and then taking 75% of that value. This relation is expressed by which of the following formulas?

    A. $h = .75(220 - a)$
    B. $h = .75(220) - a$
    C. $h = 220 - .75a$
    D. $.75h = 220 - a$
    E. $220 = .75(h - a)$

4. An airplane flew for 8 hours at an airspeed of x miles per hour (mph), and for 7 more hours at 325 mph. If the average airspeed for the entire flight was 350 mph, which of the following equations could be used to find x ?

A. $x +$ $325 = 2(350)$
B. $x + 7(325) = 15(350)$
C. $8x - 7(325) = 350$
D. $8x + 7(325) = 2(350)$
E $8x + 7(325) = 15(350)$

5. Which of the following is equivalent to
$3a + 4b - (-6a - 3b)$?

A. $16ab$
B. $-3a + b$
C. $-3a + 7b$
D. $9a + b$
E. $9a + 7b$

6. What is the sum of the polynomials $3a^2b + 2a^2b^2$ and $-ab^2 + a^2b^2$?

A. $3a^2b - ab^2 + 3a^2b^2$
B. $3a^2b - ab^2 + 2a^2b^2$
C. $2a^2b + 3a^2b^2$
D. $2a^2b^3 + 2a^4b^4$
E. $-3a^3b^3 + 2a^4b$

7. Which of the following is a factor of the polynomial
$x^2 - x - 20$?

A. $x - 5$
B. $x - 4$
C. $x + 2$
D. $x + 5$
E. $x + 10$

8. Which of the following is a factor of $x^2 - 5x - 6$?

A. $(x + 2)$
B. $(x - 6)$
C. $(x - 3)$
D. $(x - 2)$
E. $(x - 1)$

9. If $2(x - 5) = -11$, then $x = ?$

    A. $-\frac{21}{2}$

    B. -8

    C. $-\frac{11}{2}$

    D. -3

    E. $-\frac{1}{2}$

10. If $\frac{4}{5} + \left(-\frac{3}{10}\right) = x + 1\frac{1}{2}$, then $x = ?$

    A. 2
    B. 1
    C. -1
    D. -2
    E. -10

11. For all nonzero r, t, and z values, $\frac{16r^3tz^5}{-4rt^3z^2} = ?$

    A. $-\frac{4z^3}{r^2t^2}$

    B. $-\frac{4r^2z^3}{t^2}$

    C. $-\frac{4rz}{t}$

    D. $-4r^4t^4z^7$

    E. $-4r^2t^2z^3$

12. For all $x > 0$ and $y > 0$, the radical expression $\frac{\sqrt{x}}{3\sqrt{x} - \sqrt{y}}$ is equivalent to:

    A. $\frac{3x - \sqrt{xy}}{9x + y}$

    B. $\frac{3x - \sqrt{xy}}{3x + y}$

    C. $\frac{3x + \sqrt{xy}}{9x - y}$

    D. $\frac{3x + \sqrt{xy}}{3x - y}$

    E. $\frac{x}{3x - y}$

13. For all $x \neq -4$, which of the following is equivalent to the expression below?

$$\frac{x^2 + 12x + 32}{x + 4}$$

A. $x + 3$
B. $x + 8$
C. $x + 11$
D. $x + 16$
E. $x + 28$

14. Which of the following is a simplified expression equal to $\frac{9 - x^2}{x - 3}$ for all $x < -3$?

A. $3x$
B. $x + 3$
C. $x - 3$
D. $-x + 3$
E. $-x - 3$

15. What is the slope of the line with the equation $2x + 3y + 6 = 0$?

A. -6
B. -3
C. -2
D. $-\frac{2}{3}$
E. $\frac{2}{3}$

16. Point A $(-4,1)$ is in the standard (x,y) coordinate plane. What must be the coordinates of point B so that the line $x = 2$ is the perpendicular bisector of $\overline{AB}$?

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

Answers

Correct Answers for Sample Algebra Questions

Item Number	Correct Answer	Content Category
1	A	Substituting Values into Algebraic Expressions
2	D	Substituting Values into Algebraic Expressions
3	A	Setting Up Equations for Given Situations
4	E	Setting Up Equations for Given Situations
5	E	Basic Operations with Polynomials
6	A	Basic Operations with Polynomials
7	A	Factoring Polynomials
8	B	Factoring Polynomials
9	E	Linear Equations in One Variable
10	C	Linear Equations in One Variable
11	B	Exponents
12	C	Exponents
13	B	Rational Expressions
14	E	Rational Expressions
15	D	Linear Equations in Two Variables
16	E	Linear Equations in Two Variables