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Learning by Design

Diagnostic Assessment
Algebra 1

1. Which equation describes the relationship between *x* and *y* as shown in the table below?

x	y
3	7
4	10
5	13
6	16

   a)   y = x + 2
   b)   y = 2x − 3
   c)   y = 3x − 2
   d)   y = 4x + 1

2. What is the value of 'x' when $2x - \dfrac{3}{5} = \dfrac{2}{5}$?

   (a) 1
   (b) ½
   (c) 2
   (d) $\dfrac{1}{10}$

3. An equation of a line is $y = 3$. Then which one of the following statement is correct?

   (a) The line is parallel to y – axis
   (b) The line is parallel to x – axis
   (c) The line intersects the x – axis
   (d) The line does not intersect the y – axis

4. What is the value of the expression $3x - 2$ is equal to, when *x* satisfies the equation $2x - 8 = 10$ is
   (a) 25
   (b) 9
   (c) $\dfrac{5}{3}$
   (d) 29

5. An equation is represented by: 3x + 5 = 14. What is the value of x?
   a)   3
   b)   4
   c)   6
   d)   14

6. Which description shows the relationship between a term and *n*, its position in the sequence?

Position	1	2	3	4	5	*n*
Value of Term	1	4	7	10	13	?

a) 2n - 3
b) 3n - 2
c) n + 2
d) 4n - 1

7. What is the value of *y* in the equation: *12 = y (3 ÷ 2)* ?
   a) 2
   b) 3
   c) 8
   d) 12

8. Which of the ordered pairs satisfy the linear equation *5x = 3y - 18*?
   a) (-1, 1)
   b) (-1, 3)
   c) (-3, 1)
   d) (3, -1)

9. What is the value of *n* in the inequality *162.5 + 2.5 n ≥ 3500*?
   a) 1335
   b) 1625
   c) 3500
   d) 6250

10. The rectangular floor of a room is 2 times as long as it is wide. The area of the floor is 32 square feet. What is the width, **in feet**, of the floor?

   a) 2
   b) 4
   c) 8
   d) 16

11. The verbal expression equivalent to the algebraic expression **3x - 5** is
   (a) Thrice a number subtracted from five
   (b) Five subtracted from a number is
   (c) Five subtracted from three times a number
   (d) Three times a number and five

12. Which one of the following statement correctly describes the sequence of operations to get the value of 'x' from **5x − 2 = 13** ?

   (a) divide by 5 and subtract 2 from 13
   (b) divide by 2 and subtract 5 from 13
   (c) add 2 to 13 and then divide by 5
   (d) subtract 2 from 13 and divide by 5

13. When simplified, the following expression $3x^2 + 5x + 2xy - 5x^2 + 8yx + 10x$, the coefficient of the term containing 'xy' is
   (a) 2
   (b) 8
   (c) 6
   (d) 10

14. The expanded form of the given expression **$3x(4x^2 - 2y - xy)$** is
   (a) $12x^3 - 9xy$
   (b) $12x^3 - 6xy + 3x^2y$
   (c) $12x^3 - 6xy - 3x^2y$
   (d) $12x^3 + 6xy + 3x^2y$

15. Which of the following statement(s) is correct? (Additive identity and inverse are over the set of integers, and multiplicative identity and inverse are over the set of non-zero integers)

   (a) The additive inverse and multiplicative inverse of 1 are equal.

   (b) The product of additive identity and multiplicative identity is one

   (c) The difference of additive identity and multiplicative identity is one

   (d) The sum of additive inverse of a number and its multiplicative identity is zero

Answer key and Explanations:

1. (c): Substitute values of x and y in the given equations
2. (b): by adding 3/5 to 2/5 and then dividing the sum by 2
3. (b): answer can be obtained by plotting a rough graph of the line y=3
4. (a): answer obtained by first finding the value of x from the equation and then substituting that value in the given expression
5. (a): add 5 to 14 and then divide the sum by 3
6. (b): n=6 and value of term=16. Hence we simply pick the most suitable option
7. (c): by solving the equation we can obtain the value of y
8. (c): answer obtained by substituting the values of x and y from the options and seeing which option satisfies the given condition
9. (a): answer obtained through substitution of options in the place of n
10. (b): if width is taken as x, then length will be 2x. We also know that area of rectangle= length x breadth
11. (c)
12. (c): Solve using 2-step linear equations method
13. (d): simplification
14. (c): answer obtained by multiplying 3x with the terms inside the bracket
15. (c): Additive identity = 0 and Multiplicative identity = 1; |1-0| = 1