

Answer on Question #56375 – Math – Algebra

Question

Which of the following is a true statement about functions.

A: If A and B are matrices, then $AB = BA$

B: If f and g are functions, then $(f \circ g)(x) = (g \circ f)(x)$

C: If f and g are functions, then $(f + g)(x) = (g + f)(x)$

D: If f is a function, then $f(a + h) = f(a) + f(h)$

Answer: C.

Question

Solve the system of equations below.

$$5x - 2y = 18$$

$$3x + 3y = 15$$

A: (1,4)

B: (-1,4)

C: (4,1)

D: (-4,1)

Solution

$$\begin{array}{l} \left\{ \begin{array}{l} 5x - 2y = 18, \\ 3x + 3y = 15; \end{array} \right. \begin{array}{l} \cdot 3 \\ \cdot 2 \end{array} \\ \left\{ \begin{array}{l} 15x - 6y = 54, \\ 6x + 6y = 30; \end{array} \right. \quad + \\ \left\{ \begin{array}{l} 21x = 84, \\ 3x + 3y = 15; \end{array} \right. \\ \left\{ \begin{array}{l} x = 4, \\ 3x + 3y = 15; \end{array} \right. \\ \left\{ \begin{array}{l} x = 4, \\ 12 + 3y = 15; \end{array} \right. \\ \left\{ \begin{array}{l} x = 4, \\ 3y = 15 - 12; \end{array} \right. \end{array}$$

$$\left\{ \begin{array}{l} x = 4, \\ 3y = 3; \end{array} \right.$$

$$\left\{ \begin{array}{l} x = 4, \\ y = 1. \end{array} \right.$$

Answer: C.

Question

Find the sum of the first 50 terms of the sequence below.

$$A_n = 3n + 2.$$

Solution

$$A_1 = 3 \cdot 1 + 2 = 5.$$

$$d = A_{n+1} - A_n = 3(n + 1) + 2 - 3n - 2 = 3.$$

This sequence is arithmetic.

The sum of the first 50 terms of the sequence is

$$S_{100} = \frac{2A_1 + d(100-1)}{2} 100 = (10 + 3 \cdot 99) \cdot 50 = 15350.$$

Answer: 15350.

Question

If you save one penny on January 1, two pennies on January 2, three pennies on January 3, and continue this pattern for one year (not a leap year), what will be the value of your entire savings, in dollars at the end of that one year? Express your answer as a decimal.

Solution

The value of the entire savings (in pennies) will be the sum of 365 first natural numbers:

$$1 + 2 + \dots + 365 = \frac{365 \cdot 366}{2} = 66795 \text{ (pennies).}$$

It is 667.95 dollars.

Answer: 667.95 dollars.