
QUESTION 1

Let

A = the next term in the sequence 1, 1, 2, 3, 5, ...

B = the next term in the sequence 1, 4, 9, 16, 25, ...

C = the next term in the sequence 2, -4, 8, -16, 32, ...

D = the next term in the sequence 1, 3, 5, 7, 9, ...

Compute the value of $A + B + C + D$.

QUESTION 2

Let

$$A = \text{the sum of the roots of } 4x^2 - 8x + 3 = 0$$

$$B = \text{the product of the roots of } 7x^3 + 21x^2 - 4x + 14 = 0$$

$$C = \text{the discriminant of } 2x^2 + 6x + 21 = 12$$

$$D = \text{the sum of the roots of } 12x^3 + 5x - 1 = 0$$

Compute the value of $A - B + C - D$.

QUESTION 3

Let $a \& b = ab^2 - 3a + 2b$. Then

A = the value of $(5 \& (3 \& (2 \& 1)))$.

B = the negative value of b such that $1 \& b = 0$.

C = the value of $5 \& 7$

Compute the value of $A + B + C$.

QUESTION 4

Sonia is in Japan looking for a bento box to buy for her best friend Taemin. She has three boxes to choose from:

- Box S has width 4, length 3, and height 5.
- Box H has width 2, length equal to 2 times the height, and height equal to 3 times the width.
- Box I has width 5.5, length equal to half the width, and height 1.

Sonia wants to buy the box with the largest surface area. What is the surface area of this box?

QUESTION 5

Let

$$A = 4 + 7 \cdot 4 \div 2 + 3(3)$$

$$B = \frac{5}{3} - \left(\frac{1}{6}\right) (4 \cdot 3 + 5 \cdot 20)$$

$$C = 10.5 + 4.0 \cdot 50 \div 2.5$$

$$D = \left(\frac{2}{5} + \frac{7}{10}\right) \cdot 100 + 49.1$$

Compute the value of $A + B + C + D$ (in simplest terms).

QUESTION 6

Let A be the positive difference of the positive solutions of $|x^2 - 13| - 5 = 7$.

Let B be the greatest common factor of $48x^4y^7$ and $66x^3y$.

Let C be the simplification of $\frac{x^9z^3}{y^{-7}x^{-4}}$

Compute the value of ABC .

QUESTION 7

Lalitha is playing a game of Quidditch. She is the Seeker, so she is trying to catch the Golden Snitch. Unfortunately, Lalitha and the Snitch were cursed so that they can only travel on straight lines.

- Lalitha is traveling on a straight line that has an x intercept of 2 and passes through the point $(8, -12)$.
- The Snitch is traveling on a straight line that has a y intercept of 6 and is perpendicular to the line $2x - 3y = 1$.

Let A equal the sum of the coordinates of the point where Lalitha's path and the Snitch's path will intersect.

After Lalitha catches the Snitch and wins the game, Lalitha and her friends go to the Three Broomsticks to drink butterbeer. The Three Broomsticks is located on a line that passes through the point where Lalitha caught the Snitch and the origin. If the Three Broomsticks has coordinates $(B, 3B + 6)$ find B .

Compute $A + B$

QUESTION 8

- Nidhi is on a boat traveling to the market. She rows the boat upstream and travels the 7.5 miles to the market in 2.5 hours. Her return trip, traveling downstream, takes only 1.5 hours. Let A equal the rate of the water's current, and let B equal the rate of Nidhi's boat. Assume Nidhi's speed and the speed of the current are both constant.
- The amazing Fernando Muslera makes 5 saves every 8 seconds. Let C be how many saves Muslera makes in 168 seconds if his rate remains constant.
- S.S. Lazio played 30 games and won 24. The percent of games that Lazio lost is $D\%$.

Compute $AB + CD$.

QUESTION 9

$$A = \text{the degree of the polynomial } x^4(x^{45} + 8 + x^{51} + x^2 + x).$$

$$B = x, \text{ where } \frac{x+5}{3x+2} + \frac{10x+5}{15x+10} = 2.$$

$$C = \text{the coefficient of } x \text{ in the expansion of } (x+2)(3x+3)(x+4).$$

$$D = \frac{2}{55} + 1$$

Compute $AD + BC$.

QUESTION 10

- Pamela wants to buy a Pikachu costume from the Store of Non-Digimon Things. The costume is priced at \$150.00. Being a coupon crazy girl, Pamela has a coupon for 15% off. Let A equal the final cost of the costume if sales tax is 6.0%. (Sales tax is calculated after discounts.)
- Pamela then goes next door to the Store of Sushiness. She decides to buy a pack of sushi flavored gum, priced at \$10.00. Pamela uses a coupon for 20% off. Let B equal the final cost of the gum if sales tax is 6.0%. (Sales tax is calculated after discounts.)

Find the total cost of the costume and gum, or $A + B$.

QUESTION 11

In Annie's model of AnnieWorld, 1 inch represents 4 feet. Annie needs your help with the following measurements:

- If the actual newstand in AnnieWorld is 2 feet, let A be how many inches it is in the model.
- If the actual swimming pool in AnnieWorld is 50 feet, let B be how many inches it is in the model.
- If the statue of Annie in the model is 1 foot, let C be how many feet it is in AnnieWorld.
- If the model version of the park is 60 inches by 35 inches, let D be the value of the area in squared feet in AnnieWorld.

Disregarding units, find $A + B + C + D$.

QUESTION 12

Harry Potter is competing in the Triwizard Tournament. In the maze task, he encounters a sphinx. The wise sphinx gives him the following riddle in order to let him pass:

The number of times I blink is directly proportional to the number of riddles I make, but is inversely proportional to the number of hours I sleep. For instance, if I sleep for 8 hours, and make 24 riddles, I blink 42 times.

How many times do I blink if I sleep for 4 hours and make 14 riddles?

(The constant is the same in both situations.)

Help Harry find the answer!

QUESTION 13

For the following statements, assign a value of 3 to true statements and -1 to false statements.

- According to the Associative Property of Addition, $3 + 4 + x = 4 + 3 + x$.
- The principal square root of an integer is always positive.
- If ninjas are better than peaches, and peaches are better than pirates, then pirates are better than ninjas.
- If A and B are positive numbers, then $\sqrt{A - B} = \sqrt{A} - \sqrt{B}$.

Find the sum of the values of the statements.