

QUESTION 1

Let $f(x) = 3x^2 + 2x + 7$, and let $g(x) = 2x^2 + 3x + 2$. Let

$$A = f(1)$$

$$B = g(2)$$

$$C = f(g(1))$$

$$D = g(f(1))$$

Find $A + B + C + D$.

QUESTION 2

Let $f(x) = x^2 + 2x - 3$. Let

A = the sum of the roots of $f(x)$

B = the product of the roots of $f(x)$

C = the sum of the reciprocals of the roots of $f(x)$

D = the degree of $f(x)$

Find $A + B + C + D$.

QUESTION 3

Let

$$A = -5^3$$

$$B = \frac{8}{4} + 7 + 15 \times 2 - 9$$

$$C = \left(3 + \frac{8}{4}\right)^2 - \frac{9}{3} \times (-2^2) - 2^3$$

$$D = \frac{\sqrt{4^2 \times \frac{8}{2}}}{2^{-3}} - 2^3 \times 5$$

Find $5B - A - 20C - 3D$.

QUESTION 4

The following table has Lionel Messi's statistics:

Year	Goals
2007	16
2008	38
2009	47
2010	53
2011	73
2012	91

Let

A = the range of the number of his goals scored per year

B = the median of the number of goals scored per year

C = the average number of goals scored from 2007 to 2012

D = the number of goals that Messi has to score in 2013 to increase his average number of scored goals by 5

Find $A + B + C + D$.

QUESTION 5

Let

A = the area of a circle with diameter 25

B = the area of a triangle with base 4 and corresponding height 6

C = the surface area of a cube with side length 3

D = the perimeter of an isosceles trapezoid with bases of lengths 5 and 21, and legs of length 17

Find $\frac{4A}{\pi} + B + C + D$.

QUESTION 6

Simplify:

$$A = \sqrt{52}$$

$$B = \sqrt{80}$$

$$C = \sqrt{18}$$

$$D = \sqrt{8}$$

Find $\frac{AC}{BD}$ as a fraction in simplest form, with a rationalized denominator.

QUESTION 7

Mihir was too lazy to write this team round. Siddarth and Jenny need to write 15 questions, each with four parts. Siddarth can write three parts in 20 minutes and Jenny can write four parts in 40 minutes. Let

A = the amount of time in minutes it would take for Siddarth and Jenny to write the team round together if they both start at the same time without pause

B = the amount of time in minutes it takes for the team round to be completed if Jenny writes the team round alone for 2 hours, after which she is joined by Siddarth and they finish together

Find $A + B$.

QUESTION 8

Let

$$A = \text{the slope of the line } 3x + 4y = 12$$

$$B = \text{the slope of the line } 5x - 17y = 5$$

$$C = \text{the slope of } \frac{y}{2x+5} = \frac{2}{3} \text{ for } x \neq -\frac{5}{2}$$

$$D = \text{the slope of } \frac{x}{y} = \frac{2}{5} \text{ for } y \neq 0$$

Find $ABCD$.

QUESTION 9

Let

 $A =$ the greatest common factor of $12x^3y^2$ and $4xy^2$ $B =$ the greatest common factor of $9x^3y^2$ and $3xy^7$ $C =$ the greatest common factor of $13x^3y^2$ and $7x^5y^2$ $D =$ the greatest common factor of $6x^3y^2$ and $2x^3y^3$ Find $\frac{AB}{CD}$

QUESTION 10

Jenny has 20 blue marbles, 30 red marbles, and 50 green marbles in a velvet magic bag. Let

A = the probability that Jenny chooses a blue marble out of the bag if she draws one marble out

B = the probability that Jenny chooses one marble of each color if she picks three marbles out of the bag with replacement

Find AB .

QUESTION 11

Abhinav, Awnish, and Evan run at constant speeds of 4.5 mph, 5 mph, and 7 mph, respectively.

Let A be the time in hours it would take for Abhinav to run 117 miles.

Abhinav and Awnish start from the beginning of a 40 mile track at the same time. When Awnish reaches the finish line, let B be the distance in miles that Abhinav is from the finish line.

Let C be the total number of miles that Abhinav, Awnish, and Evan run in 3 hours and 20 minutes.

Find $A - 2B + C$.

QUESTION 12

The currency in Fairwarts is exchanged in Siddarths, Johns, Abhis, Stephens, and Tejas. 1 Siddarth is equal to 10 Johns, 1 John is equal to 6 Abhis, 3 Abhis is equal to 4 Stephens, and 2 Stephens is equal to 100 Tejas. Let

- A = the number of Abhis equivalent to 100 Siddarths
- B = the number of Tejas equivalent to 40 Johns
- C = the number of Siddarths equivalent to 20 Stephens
- D = the number of Siddarths equivalent to 30 Tejas

Find $A + B + 12C + 100D$.

QUESTION 13

Let

$$A = 3.\overline{8}$$

$$B = 4.\overline{25}$$

$$C = 7.\overline{71}$$

Find $A + B + C$ as a fraction in simplest form.

QUESTION 14

Let

A = the sum of the first 10 positive integers

B = the sum of the first 5 positive even integers

C = the sum of the first 5 positive odd integers

Find $A + B + C$.