

Question #1

Mav Invitational 2014

Algebra 1 Team

Let A = the slope of the line that passes through the points (8, -3) and (20, 15)

Let B = the slope of the line that is perpendicular to $5x + 2y = 29$

Let C = the x-intercept of the line whose equation is $5x + 3y = 15$

Let D = the y-intercept of the line whose equation is $7x + 2y = 3$

Find $A + B + C + D$

Question #2

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Mrs. Smith gave her Algebra class a quiz yesterday. The grades were as follows:

90 92 100 96 92 86 90 99 100 90 80 77

Let A = the mean grade for the class

Let B = the median grade for the class

Let C = the range of the grades for the class

Let D = the mode of the grades for the class

Find $\frac{A - C}{B - D}$

Question #3

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Below are six statements.

If a statement is true, its value appears next to it in parenthesis.

If a statement is false, its value is 0.

Find the sum of the values that correspond to the true statements.

If there are no true statements, then the sum is 0.

(11) All natural numbers are whole numbers.

(8) If q and r are integers and $q > r$, then $q^2 > r^2$.

(14) 1,000 is a perfect square.

(2) For any numbers a and b , $a + b = b + a$.

(19) For all whole numbers x and y , $x^y = y^x$.

(5) π is an irrational number.

Question #4

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Let A = $(x + 2y)^2 - 2y$ when $x = 7$ and $y = 2$

Let B = $x^{2/3} + y^{3/2}$ when $x = 27$ and $y = 4$

Let C = $\left(\frac{x}{y}\right)^{-2}$ when $x = -2$ and $y = 20$

Find $\frac{A - C}{B}$

Question #5

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Academic High School has only three clubs (Mu Alpha Theta, Beta Club, and Robotics), and every student must be in at least one club. Mu Alpha Theta has 56 members. There are 43 students in Beta Club, and 28 students in Robotics. Twenty-one students are in both Mu Alpha Theta and Beta Club. Fourteen students are in both Beta Club and Robotics. Nineteen students are in both Mu Alpha Theta and Robotics. Eleven students are in all three clubs. How many students are there at Academic High School?

Question #6

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Given that $f(x) = x^2 - 4x$ and $g(x) = 4x + 7$

Let $A = f(-5)$

Let $B = g\left(\frac{1}{2}\right)$

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

Let $D = g\left(f\left(g\left(-\frac{5}{4}\right)\right)\right)$

Find $\frac{AC + B^2}{D}$

Question #7

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Let A = the value of the x -coordinate of the point at which the lines $2x + 2y = 10$ and $3x - 5y = 23$ intersectLet B = the value of the y -coordinate of the point at which the lines $3y = 5x + 9$ and $y + 6 = 2(x + 5)$ intersect

Find B^A

Question #8

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Let A = the sum of the coefficients of the product of $(x^2 + 5x - 2)$ and $(4x^2 + 3x + 1)$.Let B = the sum of the coefficients of the product of $(3x^2 + 2x + 1)$ and $(x^2 - 2x - 3)$.

Find $A - B$

Question #9

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I. A collection of dimes and nickels consists of 46 coins with a value of \$3.65.

Let A = the number of coins that are dimes

II. Jessica built a rectangular patio in her backyard. The patio is twice as long as it is wide. The perimeter of the patio is equal to 72 feet. Jessica wants to tile the patio with square tiles that are 1 foot by 1 foot.

Let B = the minimum number of tiles Jessica needs to buy in order to completely cover the patio

III. The sum of Jackie and Teague's ages is 50. Seven years ago, Jackie was twice as old as Teague.

Let C = Jackie's current age

Find $B - (A + C)$

Question #10

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If $x \oplus y = 2x + y$ and $x \star y = x - 2y$ then find the value of the following:

$$[30 \star (4 \oplus 1)] \star [(2 \oplus 3) \star 5]$$

Question #11

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Consider the function $f(x) = 2x^2 - 5x + 2$.Let A = the sum of the x -intercepts of $f(x)$ Let B = the value of the y -coordinate of the vertex of $f(x)$

Let C = the value of $f\left(\frac{1}{4}\right)$

Find $C - B + 2A$

Question #12

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Solve each equation below. Use your solutions to find the value of the expression $\frac{1}{2}A + C + \frac{D}{B}$

$$6(A-3) - (3A-5) = 2A-1$$

$$\frac{C}{6} + \frac{5}{2} = 5 + C$$

$$\frac{2B-17}{6} = \frac{4B-15}{50}$$

$$\frac{1}{5}D + \frac{1}{2}D = \frac{2}{3}D + 2$$

Question #13

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Let A = the least positive integer that is divisible by all whole numbers from 1 to 9

Let B = the least common multiple of 180 and 144

Find A - B

Question #14

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$$\text{Let } A = -|-5 + 6 \cdot 2| + 5^2 - \sqrt{3^2 + 4^2}$$

$$\text{Let } B = 1^0 + 2^1 + 3^2 + 4^3 + 5^4$$

$$\text{Let } C = 12 \left(\frac{1}{2} + \frac{2}{3} + \frac{3}{4} \right)$$

Find A + B + C

Question #15 Mav Invitational 2014 Algebra 1 Team

A trapezoid on a coordinate plane has the following vertices: (-1, 2), (2, 6), (2, -12), and (-1, -8).

Find the perimeter of the trapezoid.