

February Regional 2004**Algebra I Team round****Question #1**

Let A be the solution of $5(a + 1) = 3(a + 2)$

Let B be the solution of $\frac{2b}{3} + 7 = 5$

Let C be the solution of $\frac{3c-1}{-4} + 2 = 1$

Let D be the solution of $5 - 3(d - 2) = 4(d + 3)$

Find the value of $6A - BC + 7D$

Question #2

A = the y-intercept of $3x - 3y = 7$

B = the slope of a line perpendicular to $5x + 2y = 6$

C = the x-intercept of $y = \frac{5}{2}x - \frac{9}{2}$

D = the abscissa of the point $(\frac{1}{2}, 0)$

What is the value of $A \div B \cdot C + D$?

Question #3

If 7 is added to both the numerator and denominator of a fraction, the result equals $\frac{4}{5}$. If 7 is

subtracted from both numerator and denominator, the result equals $\frac{2}{3}$. What is the original fraction?

Question #4

Let $A = -|3 - 2(5 + 1) - 4(-2)|$

Let B = the opposite of the reciprocal of the absolute value of the square of $-\frac{2}{5}$.

Let C = the sum of the smallest digit, the largest negative integer, and the smallest prime number.

Let D = the fraction that is exactly halfway between $\frac{7}{10}$ and $\frac{5}{2}$ on the numberline.

Find the value of $A \cdot B \cdot C \cdot D$

Question #5

Let (A, B) be the solution of the system: $x + 4y = 3$

$$2x - 3y = 17$$

Let (C, D) be the solution of the system $2x + 5y = 28$

$$3x + 2y = 31$$

Let (E, F) be the solution of the system $x + 4y = 27$

$$x + 2y = 21$$

Find the value of $AB - CD + EF$

Question #6

Half the sum of two numbers is $-\frac{1}{2}$. Half their difference is $\frac{3}{2}$. Find the product of the two numbers.

Question #7

Multiply the given fractions. Express your answer in simplest form using only positive exponents.

$$\left(\frac{-3x^3y^2}{12x^5y^5}\right)^3 \cdot \left(\frac{2x^7y^3}{5x^2y}\right)^2 \cdot \left(\frac{10y^4}{xy^2}\right)^3$$

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Given that $f(x) = 5x - 1$ and $g(x) = x^2 - 3x + 2$

Let $A = f(3)$ Let $B = g(2)$ Let $C = f(-\frac{1}{2})$ Let $D = g(4)$ What is the value of $(A + C)(B + 2D)$?

Question #9

Find the area of the triangle formed by the following 3 lines: $x = 2$ $y = 5$ $y = \frac{1}{2}x + 10$

Question #10

Factor $36x^2 - 13x - 40$ into the form $(Ax + B)(Cx + D)$

Factor $196x^2 - 289$ into the form $(Ex + F)(Gx + H)$

Find the value of $A + B + C + D + E + F + G + H$

Question #11

A certain 3-digit number has the following characteristics:

The value of the number is 28 times the sum of its 3 digits.

The units' and hundreds' digits are the same.

The tens' digit is one more than the sum of the other two digits.

What is the 3-digit number?

Question #12

If $3x + 4y = 29$ and $9x^2 - 16y^2 = 377$, what is the value of $20x + 30y$?

Question #13

$A =$ the solution of $4(a + 5) - (a - 1) = 69$

$B =$ the solution of $2b - \frac{2}{3}(4b + 12) = b + 7$

$C =$ the solution of $c + 36 = 1 - 4(c - 5)$

What is the value of the expression $A + BC$?

Question #14

Let $A =$ the square of $(3x - 4)$

Let $B =$ the conjugate of $(5x + 6)$

Let $C =$ the opposite of $(9x + 1)$

Let $D =$ the linear term of the product $(2x - 4)(3x + 5)$

What is $A + B + C + D$?

Question #15

Bob has 38 coins in nickels and dimes. In all he has \$2.70. How many nickels does he have?