January Regional ***Algebra I Team*** ***Question #1***

Find the value of the expression $a^b\left(b^a \cdot a^a \cdot 7 - 1\right)$, given $a = 2$ *and* $b = 3$.

January Regional ***Algebra I Team*** ***Question #2***

What is the power of x in the simplified form of:

$$\frac{\left(-3x^5y^{10}z^7\right)^4 \cdot \left(25x^8y^6z^3\right)^6}{\left(9x^2y^6z^8\right)^3 \cdot \left(-5x^9y^3z^{11}\right)^5}$$

January Regional ***Algebra I Team*** ***Question #3***

What is the sum of the solutions of the three equations below?

$5x-(12x-8)+3=2x+29$ $\qquad$ $\frac{2x+7}{2}=\frac{-5x-2}{4}$ $\qquad$ $9x^2-16x+7=0$

January Regional ***Algebra I Team*** ***Question #4***

Let ***A*** = the value of a such that the line containing $(a, 3)$ and $(-2, 7)$ has slope $^5/_3$.

Let ***B*** = the y-intercept of the line containing $(-3, 3)$ and parallel to $2x-3y=10$.

Let ***C*** = the x-intercept of the line containing $(10, 1)$ and perpendicular to $2x-y=-4$.

What is the value of $\boldsymbol{A \cdot B + C}$?

January Regional ***Algebra I Team*** ***Question #5***

A: A fraction has a value of ¾. When the numerator is increased by 7, the resulting fraction equals the reciprocal of the original fraction.
What is the denominator of the original fraction?

B: The numerator of a certain fraction is a 2-digit number. The denominator is that number with the digits reversed. The value of the fraction is $^4/_7$. What is the numerator of the largest fraction that fits this description?

Find the value of $\frac{\mathbf{A}}{\mathbf{B}}$.

January Regional ***Algebra I Team*** ***Question #6***

Find the sum of the integral solutions of each of the following:

i) $|3x+2|=7$

ii) $-5x+3\geq 10$ *and* $4x-9<5x-4$

iii) $(3x+8)(x-5)(x+1)(x-10)=0$

January Regional ***Algebra I Team*** ***Question #7***

Simplify: $\sqrt{7,840,800}$

January Regional ***Algebra I Team*** ***Question #8***

Solve each of the following equations, and find the value of $r \cdot w - n + k$.

$\frac{n+5}{12} - \frac{n+3}{8} = 1$

$\frac{3}{4}(2r+5) - \frac{5}{8}(3r-1) = 1$

$\frac{3w+5}{3} = 3w + 2 - \frac{3w-4}{6}$

$.03k + .05(1,000 - k) = 34$

January Regional ***Algebra I Team*** ***Question #9***

Use long division to find the indicated quotients ***A*** and ***B***. Find the sum ***A + B.***

A = $\frac{m^3 - 3m - 2}{m^2 + 2m + 1}$ ***B*** = $\frac{8m^3 - 27}{2m - 3}$

January Regional ***Algebra I Team*** ***Question #10***

Andy counted up some m&m's. He noticed that whether he sorts them in groups of 4's, 5's, or 7's, there are always 3 m&m's left over. What is the least number of m&m's that are possible for Andy to have?

January Regional ***Algebra I Team*** ***Question #11***

Find the sum of the abscissa and ordinates of the intersection points of each of the following pairs of lines:

$4x - 7y = 8$
$5x + 9y = 81$

$5x - 4y = 2$
$2x + 4y = 40$

The horizontal line containing (4, -5).

The vertical line containing (-8, 2).

January Regional ***Algebra I Team*** ***Question #12***

If $(x + y) = 4$ and $(x^2 - y^2) = 12$, find the value of *xy*.

January Regional ***Algebra I Team*** ***Question #13***

Find the *y*-intercept of the line which contains the point (-6, 8) and which is also parallel to the line with equation $5x + 2y = 7$.

January Regional ***Algebra I Team*** ***Question #14***

Using x = the smallest even prime number, and y = the smallest odd prime number,

find the value of the expression $xy^{y}\left[(xy)^{x}+1\right]+x^{xy}-xy^{y}$