

February Regional**Algebra I Team: Question #1**

Solve for x in the following equation:

$$(2x - 3)(4x + 1) + (x + 3)(2x - 1) = (2x + 3)(3x - 2) + (2x + 1)(2x - 4)$$

February Regional**Algebra I Team: Question #1**

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Algebra I Team: Question #2

Find the perimeter of a triangle whose vertices are located at $X(-3, 0)$, $Y(0, 3)$, and $Z(3, 0)$.

What is the distance (in simplest form) around a triangle whose perimeter is three times larger than the above triangle?

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Algebra I Team: Question #2

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February Regional**Algebra I Team: Question #3**

Divide each of the following:

$$\text{Let } A = (2x^3 - 5x^2 + 5x + 3) \div (2x + 1)$$

$$\text{Let } B = (x^3 - 18x - 42) \div (x - 5)$$

$$\text{Let } C = (4x^3 + x + 7) \div (2x + 3)$$

What is the product of the three remainders, ABC?

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February Regional**Algebra I Team: Question #4**

$Ax + By = C$ (where A , B , and C are integers and $A > 0$) is the Standard Form of a linear equation. Write the equation of a line (in Standard Form) for each of the following scenarios:

- 1) Parallel to the line $2x - 3y = -3$ and passing through the point $(2, -2)$.
- 2) Perpendicular to the line $2x - 3y = -3$ and passing through the point $(2, -2)$.
- 3) Having a slope of $\frac{3}{2}$ and passing through the point $(4, 3)$.
- 4) Passing through the points $(3, -2)$ and $(-5, -1)$.

Find the sum of the four values of “C” from the above equations.

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Algebra I Team: Question #5

L_1 has a slope of -2 and passes through the point $(6, -3)$.

L_2 has y -intercept of 5 and is perpendicular to the line $y = \frac{1}{3}x + 7$.

Find the product of the x - and y -coordinates of the point of intersection of L_1 and L_2 .

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Algebra I Team: Question #5

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Find the product of the x - and y -coordinates of the point of intersection of L_1 and L_2 .

February Regional**Algebra I Team: Question #6**

Solve each of the following radical equations.

$$\sqrt{6x+7}-1 = x+1$$

$$y = \sqrt{3y+3} + 5$$

$$\sqrt{4z+5} = 2z-5$$

What is the value of $3x^2y - 5z$ if x , y , and z are all odd integers greater than one?

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February Regional**Algebra I Team: Question #7**

Let S equal the value of $2 + \left(\frac{3}{2} - \frac{4}{3}\right) + \left(\frac{4}{3} - \frac{5}{4}\right) + \left(\frac{5}{4} - \frac{6}{5}\right) + \left(\frac{6}{5} - \frac{7}{6}\right)$.

Let T equal the value of 10 percent of 20 percent of 35.

Find the value of ST.

February Regional**Algebra I Team: Question #7**

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February Regional**Algebra I Team: Question #8**

I. If $R < 0$ and $(4R - 4)^2 = 36$, what is the value of R ?

II. If $\frac{(L^2)^3}{2} = 32$, what is the positive value of L ?

III. Felicity earns \$10 an hour for the first 40 hours she works each week. For every hour she works over 40, she earns \$15. How many hours did she work in a week where she earned \$505? (Let F be the number of hours Felicity worked.)

Let your final answer be the sum of the above solutions ($R + L + F$) in the form of a decimal.

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Algebra I Team: Question #9

A street vendor sells two types of newspapers. One newspaper sells for 75 cents. The other sells for 90 cents. If the vendor sold 100 newspapers for \$84, how many newspapers did she sell for 75 cents?

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Algebra I Team: Question #10

Let **N** be the answer to the following problem:

Machine A can produce one ton of nails in 8 hours. Machine B can produce one ton of nails in 12 hours. Working together at their respective rates, how many hours would it take the two machines to produce one ton of nails?

Let **P** be the answer to the following problem:

A copier can make 150 copies per minute. At this rate, how many minutes would it take to make 4500 copies?

As your final answer, find the value of $5N - 4P$.

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Algebra I Team: Question #10

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Algebra I Team: Question #11

If $(x + y)^2 = 144$ and $(x - y)^2 = 36$, what is the value of $x^2 + xy + y^2$?

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February Regional**Algebra I Team: Question #12**

Solve each system of equations.

$$3a + 2b = 19$$

$$4a - 5b = 10$$

$$4c + 5d = 3$$

$$5c + 2d = 8$$

Using the solutions to the above systems, find $ab - cd$.

February Regional**Algebra I Team: Question #12**

Solve each system of equations.

$$3a + 2b = 19$$

$$4a - 5b = 10$$

$$4c + 5d = 3$$

$$5c + 2d = 8$$

Using the solutions to the above systems, find $ab - cd$.

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Algebra I Team: Question #13

Find the sum of all integer solutions of the inequality $|5 - 3v| < 8$.

Take two-thirds of four less than the amount of the sum.

What is the last letter in the remaining quantity when it is spelled out?

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Algebra I Team: Question #14

Given $3^{2x-5} = 243^{x-1}$ and $4^{5y-8} = 64^{y-2}$, find $x \div y$.

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Given $3^{2x-5} = 243^{x-1}$ and $4^{5y-8} = 64^{y-2}$, find $x \div y$.

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Algebra I Team: Question #15

If Sue's test scores in French were 92, 78, 92, 77, and 86, which of the following would be greater than 85?

- I. The mode of the test scores.
- II. The median of the test scores.
- III. The arithmetic mean of the test scores.

Give all answers that apply.

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Give all answers that apply.