

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 1**

Which of the following statements are true?

- A. The graphs of $y = x$ and $y = |x|$ are the same.
- B. The graphs of $y = x^0$ and $y = \frac{x}{x}$ are the same.
- C. All whole numbers are natural numbers.
- D. All integers are rational.
- E. If $a = 0.1234$, then $a^2 \geq a$.
- F. If $b < 0$ then $-|-b|=b$.
- G. 2 is the only even prime number.

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 2**

Let $A = -|-6 + 7 \times 2| - 3^2 + \sqrt{17-1}$ $B = 1^0 + 2^1 + 3^2 + 4^3$

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

Find $A+B+C$

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 3**

A is the number of values for x such that $30 > x > 40$ and $\frac{5}{x}, \frac{8}{x}$, and $\frac{13}{x}$ are all in simplest terms.

B is the fractional part of a week that has 98 hours.

C is the number of integers that makes $t^2 \leq 6t$. ($t > 0$)

There are two electronic beepers. One of them beeps every 8 seconds; the other beeps every 9 seconds. If they are turned on at exactly the same time, let D be the times during the next hour that both beepers will beep at the same time.

Find $A + B \times C + D$

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 4**

If $2 + \frac{2}{3} = 2^2 \times \frac{2}{3}, 3 + \frac{3}{8} = 3^2 \times \frac{3}{8}, 4 + \frac{4}{15} = 4^2 \times \frac{4}{15} \dots 10 + \frac{a}{b} = 10^2 \times \frac{a}{b}$, Find $a + b$.

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 5**

A is the maximum of $y = 2008 - \sqrt{5 - x}$

B is the value of x such that $0 = \sqrt{x-2} + \sqrt{2-x}$

If $|x + y - 3| + (xy - 2)^2 = 0$,

$$C = x^2 + y^2$$

$$D = (x - y)^2$$

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

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 6

A is the greater zero of $(2005x)^2 - 2004 \cdot 2006x - 1 = 0$.

B is the smaller zero of $2006x^2 - 2007x + 1 = 0$

Find $A - B$

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 7

Find one possible set of (x, y) such that $x, y > 0$, $x \neq y$ and $\sqrt{x} + \sqrt{y} = \sqrt{1088}$.

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 8

$$A = \frac{2004}{2004^2 - 2003 \times 2005}$$

B = $x + y$ given that $x^2 + 4y^2 + 2x - 4y + 2 = 0$

Find $A + B$.

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 9

Compare the following numbers and determine which is bigger.

A. 3^{100} ___ 5^{60}

(Hint: When comparing 2^{100} and 3^{75} , change them to $(2^4)^{25}$ and $(3^3)^{25}$.

B. $\sqrt{5} - \sqrt{3}$ ___ $\sqrt{7} - \sqrt{5}$

C. $\sqrt{2003 \times 2006}$ ___ $\sqrt{2004 \times 2005}$ (Hint: Try setting $x = 2003, 2004, 2005$ or 2006 .)

D. $\frac{997}{999}$ ___ $\frac{775}{777}$ (Hint: Try to use the magic number "1".)

Which letter(s) should use " $>$ " to describe their relation? (Write down the letter(s) on the answer sheet.)

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 10

If x is an odd positive number and $\sqrt{\frac{x-6}{9-x}} = \frac{\sqrt{x-6}}{\sqrt{9-x}}$, find $\sqrt{x^2 + 2x + 1} \times \sqrt{\frac{x^2 + 7x - 8}{x-1}}$.

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 11

$$A = \sqrt{a^2 + \frac{1}{a^2} + 6} \text{ given that } \sqrt{a} - \frac{1}{\sqrt{a}} = 2.$$

B is the zero of $(a + 2)x + b^2 = a - 1$ given that a and b are real numbers and $\sqrt{2a + 6} + |b - \sqrt{2}| = 0$,

Find $A + B$

MARCH REGIONAL ALGEBRA 1 TEAM QUESTION 12

$$\underbrace{(99 \dots 9)}_{\text{there are } m \text{ "9"s}} \times \underbrace{(99 \dots 9)}_{\text{there are } m \text{ "9"s}} + \underbrace{(199 \dots 9)}_{\text{there are } m \text{ "9"s}} = 10^x$$

Find x .

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 13**

If x is a positive integer and satisfies the inequality $(3x + 2)(3x - 4) > 9(x - 2)(x + 3)$, then find the sum of all the possible values of x .

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 14**

If $\frac{1}{2}x^{2m^2-m}y$ and $-4x^{4m-2}y$ are like-terms, find the sum of the values of $(m - 1)^{-2}$.

MARCH REGIONAL**ALGEBRA 1 TEAM QUESTION 15**

$$A = \sqrt[4]{81 \times \sqrt{9^{\frac{2}{3}}}} \quad B = 2\sqrt{3} \times \sqrt[3]{1.5} \times \sqrt[6]{12}$$

Find $A + B$