

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 1**

Find the sum of the squares of the zeroes of the graph of  $r(x) = x^3 - 6x^2 + 11x - 6$ .

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 2**

Let A be the sum of the zeroes of  $y = 2x^2 - 8x + 5$ .

Let B be the minimum value that  $y = 2x^2 - 8x + 5$  takes on.

Find A + B.

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 3**

Mrs. Irizarry has gone crazy. The number of homework problems she now assigns on a given night can be modeled by the function  $h(y) = |y^2 - 10y + 9|$ . The value of  $y$  for a given night is the sum of the day and the month (for example, on September 3rd, the value of  $y$  would be  $9 + 3 = 12$ ; since  $h(12) = 33$ , her students could expect 33 homework problems for that night). On what day in February can her students expect no homework?

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 4**

Let A and B be the slope and  $x$ -intercept of the line  $3xy = x^2 + x$

Let C be the sum of the values of  $x$  which satisfy  $x\sqrt{1-x^2} = \frac{1}{2}$ . Assume the range of the square root function is limited to the nonnegative numbers.

Let D be the number of real solutions to  $x\sqrt{1-x^2} = 1$ .

Find A + B + C + D.

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 5**

Define a **breaded** integer to have the following properties:

--It is a multiple of 1, 2, 3, and 4

--The sum of its digits is greater than 4

--It is positive

--It is either a perfect square, a perfect cube, or both.

--It has more than 9 factors

Find the smallest breaded integer.

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 6**

If  $x - y = 2$  and  $x^2 + y^2 = 5$ , then let A be the value of  $xy$ .

If  $f(x) = x^4 - 2x^2 + 6x - 5$ , then let B be the sum of the zeroes of  $f(x)$ .

If  $\frac{1}{a} + \frac{1}{b} = \frac{1}{5}$ , then let C be the least possible value of  $a + b$  given that  $a$  and  $b$  are both positive integers.

Find A + B + C.

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 7**

The points  $(x, y) = (0, 3)$ ,  $(2, 1)$ , and  $(5, 28)$  are on the quadratic polynomial  $y = Ax^2 + Bx + C$ . Find A + B + C.

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 8**

Let A be the sum of the positive integral values of  $x$  which satisfy  $2^x = x^2$

Let B be the smaller value of  $x$  which satisfies  $x^2 - 39x - 82 = 0$

Let C be the largest number of cents which cannot be made using a 5-cent coin and a 3-cent coin (pretend these exist).

Find  $ABC$ .

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 9**

Let A be the number of sides in a dodecagon.

Let B be the area, in  $\text{cm}^2$ , of a right triangle with hypotenuse 17cm and one leg 8cm.

Let C be the sum of the first 5 prime numbers.

Find  $A + B + C$ .

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 10**

Aneesh's Special Parabola is a parabola with zeroes at  $x = 13$  and  $x = 37$ . It also takes on a value of 36 at  $x = 25$ .

Let A = 1 if Aneesh's Special Parabola opens upward and -1 if it opens downward.

Let B be the value of N, when this parabola is written in  $y = Mx^2 + Nx + K$  form.

Find the value of  $A + B$ .

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 11**

Ten years ago, I was half as old as I will be in four years. At that time, my brother was one-half my age. How many years old will my brother be when I am 3 times as old as I am now?

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 12**

There is a penguin in the zoo. If it can calculate the area of its pen, then its keeper will let it go to freedom in the Antarctic. Its pen is in the shape of  $|x| + |y| = 4$ . Help it out; what's the area of its pen?

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 13**

It takes me 30 minutes to rob a bank, it takes Svetlana 10 minutes to rob a bank, and it takes Chad 20 minutes to rob a bank. If the three of us rob a bank together, how many minutes will it take us?

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 14**

The points  $(x, y) = (0, 20), (1, 27), (2, 38), (3, 53),$  and  $(4, 72)$  are on a parabola. Let the equation of this parabola be of the form  $y = Ax^2 + Bx + C$ . Find  $A + B + C$ .

**MARCH REGIONAL****ALGEBRA 1 TEAM QUESTION 15**

The square root of a certain number is three times the cube root of another number. The cube root of this second number is twice the fourth root of a third number. If all these numbers are positive even integers, find the smallest possible sum of the three numbers.