48th Lee Webb Math Field Day

California State University, Bakersfield
Department of Mathematics

February 23, 2019

Round 1

Junior Varsity Math Bowl Round 1 Sample Question

Simplify

$$\frac{9}{1} + \frac{0}{2}$$

Junior Varsity Math Bowl Round 1 Question 1

Two numbers are 9 apart and their sum is 31. What is the larger number?

Junior Varsity Math Bowl Round 1 Question 2

What is the largest whole number that is less than 1000 and is a power of 2?

Junior Varsity Math Bowl Round 1 Question 3

The squares of the lengths of the legs of a right triangle are 36 and 64. What is the length of the hypotenuse?

Junior Varsity Math Bowl Round 1 Question 4

In the last election 3 out of every 7 voters were in favor of ballot measure Z. There were 35000 voters. What is the maximum number of "NO" votes possible?

Junior Varsity Math Bowl Round 1 Question 5

The number corresponding to this year, 2019, can be factored as a product of two primes. What is the sum of the primes?

Junior Varsity Math Bowl Round 1 Question 6

Simplify

$$2^{3^2}$$

Junior Varsity Math Bowl Round 1 Question 7

Evaluate

$$998 \cdot 1002$$

Junior Varsity Math Bowl Round 1 Question 8

The graph of a tenth degree polynomial can have at most how many "humps" (local maximum points)?

Junior Varsity Math Bowl Round 1 Question 9

Alan bought 72 widgets. The first and last digits on the receipt are smudged, so we only know that the cost was \$_957.9_. What is leading digit of this number?

Junior Varsity Math Bowl Round 1 Question 10

Alice, Harry, Chloe, and Sam all either always tells the truth or always lies. You hear the following:
Alice: "Alice and Chloe lie."
Harry: "Alice lies, and Sam is truthful."
Sam: "Alice lies."
Of the four people, how many are truth tellers?

Round 2

Junior Varsity Math Bowl Round 2 Sample Question

With regard to the number 2019, what is the result if you divide the second largest digit by the second smallest digit?

Junior Varsity Math Bowl Round 2 Question 1

A line segment is divided into two subsegments whose lengths have a ratio of 3:8. The total length of the segment is 253. What is the length of the shorter subsegment?

Junior Varsity Math Bowl Round 2 Question 2

What is the sum of all possible values of x that satsify

$$(x+1)(x-5)=16?$$

Junior Varsity Math Bowl Round 2 Question 3

Simplify

$$\frac{2}{5} \cdot \frac{3}{6} \cdot \frac{4}{7} \cdot \frac{5}{8} \cdot \frac{6}{9} \cdot \frac{7}{10}$$

Junior Varsity Math Bowl Round 2 Question 4

How many different pairs of people can be chosen from a class of 25 students?

Junior Varsity Math Bowl Round 2 Question 5

How many positive even numbers are less than 2000?

Junior Varsity Math Bowl Round 2 Question 6

Simplify:

$$2019^2 - 2018^2 + 2017^1 - 2016^1$$

Junior Varsity Math Bowl Round 2 Question 7

A box manufacturer sells a rectangular box with volume 1000 cubic inches. Another one of their boxes has the width increased by 10 percent and the length decreased by 10 percent (and no change to the height). What is the volume of this second box?

Junior Varsity Math Bowl Round 2 Question 8

Suppose

$$(7^{3/2}8^{2/3}9^{1/4})^4 = 2^a 3^b 7^c$$

What is $a + b + c$?

Junior Varsity Math Bowl Round 2 Question 9

A right triangle is inscribed in a circle with radius 12.5. One of the legs has length 7. What is the length of the other leg?

Junior Varsity Math Bowl Round 2 Question 10

This term, so far, Joshua has received a 90 on each of the 8 quizzes. What does he need to average on the last two quizzes to get a 95 over all average?

Round 3

Junior Varsity Math Bowl Round 3 Sample Question

What is half of a third of a fourth of 96?

Junior Varsity Math Bowl Round 3 Question 1

Let C be a circle of area 18. In decimal form, to the nearest hundredth, what is the ratio of the circumference of C to the diameter of C?

Junior Varsity Math Bowl Round 3 Question 2

What is the largest 3 digit number that is not a multiple of 3?

Junior Varsity Math Bowl Round 3 Question 3

If $\frac{20}{19}$ is written in decimal form, what is the first digit after the decimal point?

Junior Varsity Math Bowl Round 3 Question 4

Simplify

$$|(|4 - |8 - 11||) - 7|$$

Junior Varsity Math Bowl Round 3 Question 5

A sock drawer has 5 red socks, 3 green socks, and 1 blue sock. Anne pulls out two socks. What is the probability that they are the same color?

Junior Varsity Math Bowl Round 3 Question 6

Starting with the number 2019, a robot is asked to double a number and then square the result, and then triple the result, and then cube the result, and then divide by 2019 six times. What should the robot's answer be?

Junior Varsity Math Bowl Round 3 Question 7

Calculate the sum of the numbers in the following array:

$$\begin{bmatrix} 7 & 5 & 2 & 9 & 2 \\ 3 & 5 & 2 & 1 & 8 \end{bmatrix}$$

Junior Varsity Math Bowl Round 3 Question 8

The angles in a regular polygon each measure 144 degrees. How many sides does the polygon have?

Junior Varsity Math Bowl Round 3 Question 9

Let $f(x) = x(x+1)(x+2)$. Evaluate

$$\frac{f(5)f(7)}{f(4)f(6)}$$

Junior Varsity Math Bowl Round 3 Question 10

The sides of a triangle have lengths 3, 4, and 5. If the side of length 5 is considered the base, then what is the altitude from that side?

Round 4

Junior Varsity Math Bowl Round 4 Sample Question

Today is Feruary 23. What is the next number that ends with a 3 that is prime?

Junior Varsity Math Bowl Round 4 Question 1

Today is Saturday, Feb. 23, 2019. Not counting today, how many days are left in 2019?

Junior Varsity Math Bowl Round 4 Question 2

A triangle with a horizontal base has area 25. A line perpendicular to the altitude cuts through the triangle 1/5 of the way from the base to the apex. What is the area of the triangle that is above this line?

Junior Varsity Math Bowl Round 4 Question 3

Suppose we have a sequence a_n with $a_1 = 1$ and

$$a_n = \frac{n}{a_{n-1}}.$$

What is a_5?

Junior Varsity Math Bowl Round 4 Question 4

The first term of a geometric sequence is 5. The common ratio is $2^{1/7}$. The number 40 is in the sequence. What is index of the number 40? (I.e. where in the sequence is the number 40?)

Junior Varsity Math Bowl Round 4 Question 5

Let $[x]$ denote the greatest integer that is less than or equal to x. Simplify:

$$-\left([-\sqrt{1}]+[-\sqrt{2}]+[-\sqrt{3}]+[-\sqrt{4}]\right)$$

Junior Varsity Math Bowl Round 4 Question 6

What is the sum of all the two-digit multiples of 9?

Junior Varsity Math Bowl Round 4 Question 7

How many multiples of 7 are there that are greater than 700 and less than 800?

Junior Varsity Math Bowl Round 4 Question 8

Solve for x:

$$2x^2 + 6 - x \cdot x = \frac{x^3}{x} + x$$

Junior Varsity Math Bowl Round 4 Question 9

What is the distance between the points $(2, 13, -3)$ and $(8, 6, -9)$

Junior Varsity Math Bowl Round 4 Question 10

Simplify:

$$\frac{1}{\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}$$

18

See you this afternoon
Varsity Math Bowl
2:15