51st Lee Webb Math Field Day

California State University, Bakersfield
Department of Mathematics

February 17, 2024

Round 1

Junior Varsity Math Bowl Round 1 Sample Question

Simplify

$$\frac{2}{2} \cdot \frac{0}{4}$$

Junior Varsity Math Bowl Round 1 Question 1

A class has 33 students. The teacher notices that the number of students who wear glasses is twice the number who do not. How many of the students wear glasses?

Junior Varsity Math Bowl Round 1 Question 2

1000 years ago, the year number was a power of 2. How many years from now, will this happen again?

Junior Varsity Math Bowl Round 1 Question 3

Blood type is determined by the absence or presence of antigens A and B: the types are A, B, AB, and O. At *Blood R Us* blood bank, 35% of the donors are type A, 10 % are type B, and 5% are type AB. What is the probability that a randomly chosen donor is type O?

Junior Varsity Math Bowl Round 1 Question 4

When Michael drives to work, he averages 40 mph. On his way home, traffic is much lighter and he averages 60 mph. What is Michael's average speed for the round trip?

Junior Varsity Math Bowl Round 1 Question 5

Simplify

$$\sqrt{13^2 - 12^2}$$

Junior Varsity Math Bowl Round 1 Question 6

Which of the following numbers is divisible by 3?

1234 2345 3456 4567

Junior Varsity Math Bowl Round 1 Question 7

Evaluate

$$14 \cdot 18$$

Junior Varsity Math Bowl Round 1 Question 8

Suppose $f(x)$ is a function that satisfies the functional equation

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

Evaluate $f(2024)$.

Round 2

Junior Varsity Math Bowl Round 2 Sample Question

With regard to the number 2024, what is the result if you divide the second largest digit by the second smallest digit?

Junior Varsity Math Bowl Round 2 Question 1

How many real solutions are there to

$$|x^2 + 1| + 2|x^2 + 2| < 5?$$

Junior Varsity Math Bowl Round 2 Question 2

What is the 2024th term of the sequence that starts

$3, 2, 5, 0, 7, 9, 3, 2, 5, 0, 7, 9, 3, 2, 5, 0, 7, ...$

and continues with this pattern?

Junior Varsity Math Bowl Round 2 Question 3

In a certain Bakersfield neighborhood, a survey showed that 40 % of the households have a dog, 30% have a cat, and 15% have both a dog and a cat. If a household is selected randomly, what is the probability that it has neither a dog nor a cat?

Junior Varsity Math Bowl Round 2 Question 4

What is the measure of the angle (in degrees) between the hour and minute hands of an analog clock at 3:30 pm?

Junior Varsity Math Bowl Round 2 Question 5

A class of 10 students took a test and the mean score was found to be 70 out of 100. Later it was found that one page of one student's test was not graded. That student's score subsequently went from 50 to 80. What is the new mean score for the class?

Junior Varsity Math Bowl Round 2 Question 6

One drawer contains 8 blue socks and 6 white socks. Another drawer contains 4 blue socks and 2 white socks. If one sock is chosen randomly from each drawer, what is the probability they are the same color?

Junior Varsity Math Bowl Round 2 Question 7

The shorter side of a rectangle is increased by 3 units, making the new figure a square with an area that is twice the area of the original rectangle. What is the area of the original rectangle?

Junior Varsity Math Bowl Round 2 Question 8

What is the area of square inscribed in a circle of radius r?

Round 3

Junior Varsity Math Bowl Round 3 Sample Question

What is half of a third of a fourth of 24?

Junior Varsity Math Bowl Round 3 Question 1

Let C be a circle of diameter 2π. In decimal form, to the nearest hundredth, what is the ratio of the circumference of C divided by 2π?

Junior Varsity Math Bowl Round 3 Question 2

Two standard six sided dice are rolled. What is the probability that their sum is 8?

Junior Varsity Math Bowl Round 3 Question 3

The repeating decimal $0.2323232323\ldots$ is equal to $\frac{23}{D}$. What is the value of the denominator D?

Junior Varsity Math Bowl Round 3 Question 4

X Cookie's Old Timey Key-Limey Pie Recipe calls for 8 ounces of lime juice per pie. It takes 12 limes to squeeze out 8 ounces of juice. How many limes will Cookie need to make 300 pies?

Junior Varsity Math Bowl Round 3 Question 5

What is the unit's digit of

$$7^{39}?$$

Junior Varsity Math Bowl Round 3 Question 6

Solve

$$20|x^2 + 3x + 2| + 24|x^2 - 1| = 0$$

Junior Varsity Math Bowl Round 3 Question 7

Calculate the sum

$$\frac{4!}{3!} + \frac{5!}{4!} + \frac{6!}{5!}$$

Junior Varsity Math Bowl Round 3 Question 8

The angles in a regular polygon each measure 179 degrees. How many sides does the polygon have?

Round 4

Junior Varsity Math Bowl Round 4 Sample Question

Today is February 17. 17 is prime. What is the next number that ends with a 7 that is prime?

Junior Varsity Math Bowl Round 4 Question 1

A rectangular box has pairs of faces that have areas equal to 15, 18, and 30. What is the volume of the box?

Junior Varsity Math Bowl Round 4 Question 2

How many different combinations of pennies and nickels are there such that the total value is $ 5.00?

Junior Varsity Math Bowl Round 4 Question 3

An octagon is formed from a square of area 1 by marking each side into thirds and then cutting off the corners along the lines formed by these marks. What is the area of the octagon?

Junior Varsity Math Bowl Round 4 Question 4

Suppose the entrance road to CSUB has a traffic light set to cycle every 120 seconds. The light is green for 80 seconds, yellow for 10 seconds, and then red for 30 seconds. Driving to and from Math Field Day, what is the probability that the light will be red both times?

Junior Varsity Math Bowl Round 4 Question 5

Suppose that $3^{z+1} = 243$.
What is 3^z?

Junior Varsity Math Bowl Round 4 Question 6

A regular square pyramid has base length 12 and height 8. The top is sliced off parallel to the base at a level 2 units from the apex. After the top is removed, what is the ratio of the remaining volume to the original volume?

Junior Varsity Math Bowl Round 4 Question 7

Suppose

$$2^{x+y} = 16$$

and

$$3^{x-y} = 27$$

What is x/y?

Junior Varsity Math Bowl Round 4 Question 8

Suppose $xy = 2024$ and $x - y = 2$.
What is $x + y$?

See you this afternoon
Varsity Math Bowl
2:15