

MATH BOWL MATCH #7
Round One - November 18, 2024

Practice Toss-Up #1

What is the largest two-digit prime number not containing the digit '9'?

Answer: 83

Practice Toss-Up #2

What type of special quadrilateral is formed if the diagonals are perpendicular?

Answer: rhombus

1. Toss-Up

If the sum of seven consecutive integers is zero, what is the largest number?

Answer: 3

Bonus

Find the smallest integral solution to the inequality $5x > 37$.

Answer: $[x =] 8$

2. Toss-Up

The area of a rectangle is 12 square meters. If the length is 4 meters, how long is the diagonal?

Answer: 5 meters

Bonus

A right triangle has legs of length 84 centimeters and 135 centimeters. What is the length of the hypotenuse?

Answer: 159 centimeters

3. Toss-Up

NO CALCULATORS. Find the product of 125,125 and 11.

Answer: 1,376,375

Bonus

What is the sum of the prime factors of one billion?

Answer: 7

4. Toss-Up

A rhombus has diagonals of lengths 10 meters and 9 meters. What is its area?

Answer: 45 square meters

Bonus

A scalene triangle has integral sides that form a geometric sequence. If the median side length is 12, and the perimeter is 38, find the length of the longest side.

Answer: 18

5. Toss-Up

What is the mathematical term for the figure formed by the locus of points equidistant from two given points in a plane?

Answer: line

Bonus

Six points lie on a circle. How many different triangles can be drawn such that each vertex of the triangle lies at one of these six points?

Answer: 20

6. Toss-Up

The remainder when a two-digit number is divided by eleven is four. What is the largest possible value for the number?

Answer: 92

Bonus

The remainder when a two-digit number is divided by three is two. The remainder when the number is divided by five is three, and the remainder when the number is divided by seven is four. What is the number?

Answer: 53

7. Toss-Up

A spinner is equally divided and numbered from 1 to 15. What is the probability of spinning a prime number on the spinner? Express your answer as a fraction in simplest form.

Answer: $\frac{2}{5}$

Bonus

A standard number cube is rolled. At the same time, a coin is flipped. What is the probability that the number rolled is at least four, or that the coin is tails? Express your answer as a fraction in simplest form.

Answer: $\frac{3}{4}$

8. Toss-Up

What is the median of the following set of numbers: 5, 18, 6, 9, 7, 12?

Answer: 8

Bonus

Henry has scored 67, 73, and 81 on his first three math tests. What average score must Henry achieve on his next two tests to have a mean score of exactly 83?

Answer: 97

9. Toss-Up

Find the largest integral solution for x : $2x - 1 = x^2$.

Answer: $[x =] 1$

Bonus

Solve over the replacement set $\{0, 1, 2, 3, 4\}$: $x^2 = 5x$.

Answer: $[x =] 0$

10. Toss-Up

NO CALCULATORS. Find the smallest three-digit perfect cube.

Answer: 125

Bonus

Use the expression 6 plus 9 divided by 3 minus 2 times 4. Sally computes the answer correctly using order of operations. Jessie computes the answer by performing each operation in the order written. What is the absolute value of the difference between their answers?

Answer: 11

11. Toss-Up

What is the sum of the degree measures of the interior angles of a hexagon?

Answer: 720 degrees

Bonus

What angle is formed by the hands of a clock at precisely 5:20?

Answer: 40 degrees

12. Toss-Up

What is the measure of the complement of the complement of a 32 degree angle?

Answer: 32 degrees

Bonus

What is the product of all integral solutions to the equation $x^2 = 36$?

Answer: -36

13. Toss-Up

What is the probability that a randomly chosen two-digit number is less than 30? Express your answer as a fraction in simplest form.

Answer: 2/9

Bonus

A president, vice president, and treasurer must be selected from the 15 members of the Math Club. In how many ways can this be done if no person can hold more than one office?

Answer: 2730

14. Toss-Up

On planet Kyrghix, there are 12 glips in one schmub, there are six schmubs in one yowek, and there are three yoweaks in one mik-muk. How many glips are in four mik-muks?

Answer: 864 (glips)

Bonus

The unladen flying speed of a Kyrghixian swallow is 30% of the speed of a Kyrghixian loon. If the loon can fly 60% of the way to its nest in four minutes, how long will it take the swallow to fly all the way to its nest, which is twice as far away as the loon's nest? Express your answer to the nearest minute.

Answer: 44 minutes

15. Toss-Up

What is the smallest number to have exactly four positive integral factors?

Answer: 6

Bonus

Find the number of positive integral factors of 2700.

Answer: 36

MATH BOWL MATCH #7
Round Two - November 18, 2024

Practice Toss-Up #1

What term refers to the number that occurs most often in a data set?

Answer: mode

Practice Toss-Up #2

What is the solution to the equation $x + 3 = x$?

Answer: there is no solution

1. Toss-Up

A number has digits 3, 5, 4, 8, 0, 6, 1, 7, and x , in that order. If the number is to be divisible by four, what is the largest possible value for x ?

Answer: 6

Bonus

If eight mice can eat six ounces of cheese in fifteen minutes, how long would it take twelve mice to eat fifteen ounces of cheese?

Answer: 25 minutes

2. Toss-Up

If $x=6$, then $f(x)=10$. If $x=10$, then $f(x)=16$. Assuming the function is linear, what is $f(x)$ if $x=16$?

Answer: 25

Bonus

What is the fortieth term in the arithmetic sequence that begins 2, 7, 12, 17, and so on?

Answer: 197

3. Toss-Up

Find the mean of the following numbers: 3, 3, 3, 3, 3.

Answer: 3

Bonus

The mean of four positive integers is 20, and the median is 16. What is the largest possible value for the range of the integers?

Answer: 46

4. Toss-Up

What decimal number may be expressed in base 4 as 1-0-1-2?

Answer: 70

Bonus

Convert the base 6 number 2-5-1 into base 7.

Answer: 2-0-5

5. Toss-Up

In which quadrant does the point (3, -6) lie?

Answer: (Quadrant) IV [OR fourth quadrant]

Bonus

Express in simplest form the fraction whose numerator is the smallest two-digit perfect cube and whose denominator is the largest two-digit perfect square.

Answer: 1/3

6. Toss-Up

The sum of three consecutive odd integers is 21. What is the mean of these numbers?

Answer: 7

Bonus

A marching band can line up evenly in rows of six if three members are absent. The band can line up evenly in rows of five if one member is absent. If all members are present, the band can line up in a square formation. Assuming there are no more than 100 members in the band, how many members must be absent for the band to line up evenly in rows of seven?

Answer: 4

7. Toss-Up

Triangle ABC has median AD. What is the ratio of the area of triangle ADB to the area of triangle ADC?

Answer: 1 : 1

Bonus

A quadrilateral is inscribed in a circle. The vertices of the quadrilateral divide the circle into distinct arcs of measures 40 degrees, 80 degrees, 100 degrees, and 140 degrees. What is the largest possible measure for an angle of the quadrilateral?

Answer: 120 degrees

8. Toss-Up

The product of two consecutive odd integers is 12,995. What is the difference of the two numbers?

Answer: 2

Bonus

If one second of latitude is approximately 100 feet, how many miles are in one degree of latitude? Express your answer to the nearest ten miles.

Answer: 70 (miles)

9. Toss-Up

What is the mode of the following data: 10, 12, 16, 8, 9, 5, 13, 12?

Answer: 12

Bonus

Jodi asks 20 other students which candidate they want to be class president. Twelve of these students said they preferred Janice for president. What percent of the students surveyed did not prefer Janice?

Answer: 40 [percent]

10. Toss-Up

NO CALCULATORS. Find the product of the two smallest even two-digit numbers.

Answer: 120

Bonus

There are ten books on a library shelf. Six are identical copies of *The Good Earth*, and four are identical copies of *Pride and Prejudice*. In how many ways can these books be arranged on the shelf?

Answer: 210

11. Toss-Up

A standard clock reads three o'clock. After 77 hours, what time will be shown on the clock?

Answer: eight o'clock

Bonus

A Pythagorean triple is a set of three numbers that satisfy the Pythagorean Theorem. Find the third integer in a Pythagorean triple including the numbers 24 and 25.

Answer: 7

12. Toss-Up

A spinner is equally divided and numbered from 1 to 12. What is the probability of spinning a composite number on the spinner? Express your answer as a fraction in simplest form.

Answer: $1/2$

Bonus

Two standard number cubes are rolled. What is the probability that at least one die shows a result of '5'? Express your answer as a fraction in simplest form.

Answer: $11/36$

13. Toss-Up

NO CALCULATORS. How many prime numbers are between 70 and 80?

Answer: 3

Bonus

Find the number of ways to rearrange the letters in the word "BALLOON."

Answer: 1260

14. Toss-Up

A parallelogram can be inscribed in a circle. Therefore, the parallelogram must be what special type of quadrilateral?

Answer: rectangle

Bonus

April knows that the solution to a problem is greater than 12. Beth knows that the solution is less than 30. Charles knows that the solution is a whole number. How many different numbers satisfy all of these conditions?

Answer: 17

15. Toss-Up

What is the smallest number that is the product of three different prime numbers?

Answer: 30

Bonus

Eighty cards are numbered 1 through 80 and placed in a bag. One card is drawn at random. What is the probability that the digit '2' is on the card somewhere?

Answer: $17/80$