DICK SCHAFF SUPERBOWL XLI
2014 Junior High School Bomb Exam – Page 1 of 5

School _____ Team _____

Team Members 1. _____ 2. _____

3. _____ 4. _____ 5. _____

Directions: **(1) Label answers with appropriate units.**
(2) Do not round or approximate answers.
(3) Write fully simplified answers on the lines provided.

1. Find the digit that is in the one's place in the value of the following expression:

$$2^{2014} + 0^{2014} + 1^{2014} + 4^{2014}$$

Ans: _____

2. What is the sum of the interior angles of a regular octagon?

Ans: _____

3. The mystery number is one less than a multiple of 2, one less than a multiple of 3, one less than a multiple of 4, one less than a multiple of 6, one less than a multiple of 8, and one less than a multiple of 9. It is less than 100. What is the mystery number?

Ans: _____

4. What is the largest prime factor of 658,944?

Ans: _____

5. Assuming that when a baby is born that the probability of it being a boy is 0.5 and the probability of it being a girl is 0.5, what is the probability that a family with 3 children has 2 girls and a boy?

Ans: _____

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1. What is the sum of all positive divisors of 128?

Ans: _____

2. Laura can rake the yard in 3 hours. Andrew can rake the yard in 5 hours. Ben can rake the yard in 6 hours. If they all work together, what fraction of the lawn can they rake in one hour?

Ans: _____

3. Three models - Miss Pink, Miss Green, and Miss Blue - are on the catwalk. Their dresses are solid pink, solid green, and solid blue. "It's strange," Miss Blue remarks to the others. "We are named Pink, Green and Blue, and our dresses are pink, green and blue, but none of us is wearing the dress that matches her name." "That is a coincidence," replied the woman in green. Determine the color of Miss Green's dress.

Ans: _____

4. The areas of the sides of a rectangular box are 24 cm^2, 32 cm^2, and 48 cm^2. What is the volume of the box?

Ans: _____

5. Solve for x: $3^{x-2} = \left(\frac{1}{9}\right)^{2x}$

Ans: _____

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1. I have 10 black and 10 brown socks loose in a drawer. In the dark, what is the least number of socks I must pull out to ensure that I have a matching pair?

Ans: _____

2. $3, 7, 11, 15, 19, \ldots$ is an example of an arithmetic sequence because there is a common difference between each term. Determine the 50^{th} term for the following arithmetic sequence:

$13, \_\_\_, \_\_\_, \_\_\_, 36, \ldots$

Ans: _____

3. If each dimension of a rectangular solid is tripled, the the volume of the solid is increased by what factor?

Ans: _____

4. What is the average of $\frac{1}{5}$, $\frac{2}{3}$, and $\frac{1}{2}$?

Ans: _____

5. Write as a reduced fraction: $0.123333333333\ldots$

Ans: _____

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1. What is the sum of all the values for which $|6 - 3x| = 12$?

Ans: _____

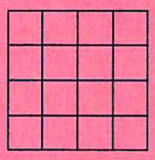
2. A small frog fell into a well twelve feet deep. If the frog climbs up four feet every day but slips down three feet every night when it sleeps, how many days will it take the frog to climb out of the well?

Ans: _____

3. Four integers are added together in pairs to produce the numbers 0, 2, 3, 8, 9, 11. Find the smallest of the four integers that give rise to this set.

Ans: _____

4. How many squares of any size are in the figure below?



Ans: _____

5. What is the sum of the digits of the value of $2^{2013} \cdot 5^{2014}$?

Ans: _____

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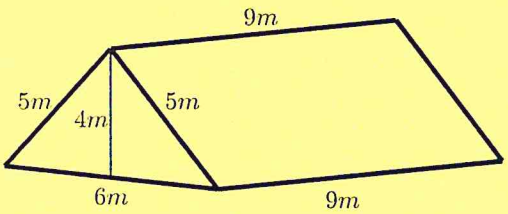
1. Find the total surface area of the triangular prism shown below. The two triangular bases are parallel to each other and have the same dimensions. The other sides are rectangular.



Ans: _____

2. Prime numbers of the form $2^p - 1$ (where p is prime) are called *Mersenne primes*. How many Mersenne primes are there below 50?

Ans: _____

3. $0.\overline{2} \times 9 =$

Ans: _____

4. What is the remainder when the product below is divided by 100?

$$123456789 \times 987654321 \times 8976558977$$

Ans: _____

5. How many 1s are used to number the first 200 pages in a book?

Ans: _____