DICK SCHAFF SUPERBOWL XLII
2015 Junior High School Bomb Exam – Page 1 of 5

School _____ Team _____

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:

$$2^{2015} + 0^{2015} + 1^{2015} + 5^{2015}$$

Student name: _____ Ans: _____

2. What is the measure of the angle inside a point of a regular pentagram?

Student name: _____ 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?

Student name: _____ Ans: _____

4. Arrange the following four terms in order from least to greatest:

$\frac{8}{9}$ $\frac{9}{8}$ $0.80\overline{9}$ $0.\overline{809}$

Student name: _____ Ans: _____

5. Assuming fair coins, if you toss 5 pennies what is the probability of getting 3 heads and 2 tails?

Student name: _____ Ans: _____

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1. The number 6 has exactly four positive divisors: 1, 2, 3, 6. What is the smallest number with exactly 5 positive divisors?

Student name: _____ Ans: _____

2. I have 8 black socks and 8 white socks loose in a drawer. If someone has blindfolded me so that I cannot see into the drawer, what is the least number of socks I must pull out to ensure that I have a matching pair?

Student name: _____ Ans: _____

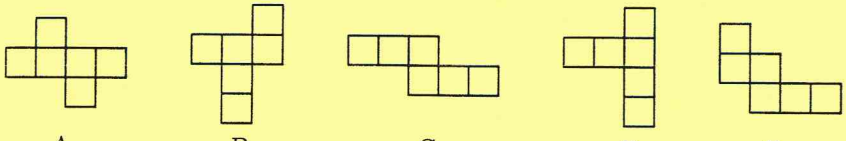
3. What is the reciprocal of $\left(1 \div \frac{2}{3}\right) \div \frac{2}{3} \times \frac{1}{2}$?

Student name: _____ Ans: _____

4. Given that $3^5 + 3^5 + 3^5 = 3^x$ and $5^3 + 5^3 + 5^3 + 5^3 + 5^3 = 5^y$, evaluate x^y.

Student name: _____ Ans: _____

5. Can all of the following 'nets' be folded in such a way as to form a cube? If so, write 'yes' in the blank. If not, write the letter for each net that cannot be folded into a cube in the blank.



Student name: _____ Ans: _____

School _____ Team _____

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1. A bag contains 3 blue marbles, 2 yellow marbles, and 5 green marbles. What is the probability that a blue marbles will be chosen from the bag on each of three consecutive draws without replacement? (Give your answer as a fraction.)

Student name: _____ Ans: _____

2. Factorial, denoted by an exclamation point, operates in the following way: $3! = 3 \times 2 \times 1 = 6$ and $7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$. Find the number of zeros at end of the value of 25!

Student name: _____ Ans: _____

3. If the radius of a circle is doubled in length, by what factor is the area of the circle increased?

Student name: _____ Ans: _____

4. What is the average of $\frac{1}{5}$, $\frac{2}{3}$, and $\frac{1}{7}$?

Student name: _____ Ans: _____

5. Express as a common fraction: $\sqrt{0.\overline{4}}$

Student name: _____ Ans: _____

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1. What is the sum of all the values for which $(6 - 3x)^2 = 16$?

Student name: _____ Ans: _____

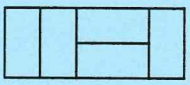
2. If tomorrow's day before yesterday is Friday's day after tomorrow, what day is it today?

Student name: _____ Ans: _____

3. Four different integers are added together in pairs to produce the numbers 0, 1, 3, 7, 9, 10. Find the largest of the four integers that give rise to this set.

Student name: _____ Ans: _____

4. Below is one way of partitioning a 2×5 rectangle with dominoes. (Assume dominoes are 1×2.) In how many ways can this be done?



Student name: _____ Ans: _____

5. Find the product:

$$(a - x)(b - x)(c - x) \cdots (y - x)(z - x)$$

Student name: _____ Ans: _____

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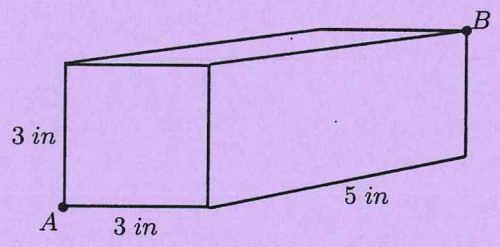
1. Find the length of the diagonal connection point A to point B in the rectangular prism shown below.



Student name: _____ Ans: _____

2. What is the smallest two-digit prime number each of whose digits is also a prime number?

Student name: _____ Ans: _____

3. $0.\overline{8} \times 18 =$

Student name: _____ Ans: _____

4. Find the *smallest* natural number whose factors include 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

Student name: _____ Ans: _____

5. How many 5s are used to number the first 150 pages in a book?

Student name: _____ Ans: _____