

JUNIOR HIGH MATHEMATICAL SUPERBOWL XXXI

May 1, 2004

Eighth Grade Bomb

Page 1

- Directions:
1. Reduce all fractions. Unless indicated otherwise, either improper fractions or mixed numbers may be used.
 2. Include units in answers when appropriate.
 3. Round decimals to the nearest hundredth unless instructed otherwise.
 4. Place answers on the answer blank.

SCHOOL:

TEAM MEMBERS: 1) _____

2) _____

3) _____

4) _____

5) _____

1. A shelf contains 12 algebra books, 16 geometry books, 20 trigonometry books, 7 pre-calculus books and 8 calculus books in a random order. If you are blindfolded, what are the fewest books you could take off the shelf and still be sure that you have at least ten of one type of book?

1) _____

2. Jose, Susan and Kevin can mow a lawn in 3 hours, 5 hours and 7 hours respectively. How many hours will it take them to mow the lawn if they work together?

2) _____

3. Express $(\overline{.15})(\overline{.15})$ as a single reduced fraction.

3) _____

4. The product of two numbers is $\frac{3}{8}$. If one is added to each of the numbers, the product is 15. What is the sum of the original two numbers?

4) _____

5. Solve for x : $8^{x-1} = 4^{x+1}$

5) _____

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1. What is the number of degrees in the acute angle made by the hands of a clock at 7:24?

1) _____

2. What is the sum of all values of x for which $|2x - 10| = 18$?

2) _____

3. When Joe runs a race, each mile he runs after the first takes $\frac{2}{3}$ of a minute longer than the one before. In a ten mile race he ran the first mile in six minutes. How many minutes did it take him to run the entire race?

3) _____

4. Find the remainder when 2^{2004} is divided by 7.

4) _____

5. For x in the range $3 < x < 5$, what is the value of $||x - 5| - |x - 7||$?

5) _____

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What is the largest three digit number with an odd number of distinct positive factors?

1) _____

2. Find the last two digits of x if $x = 1! + 2! + 3! + 4! + \dots + 2004!$

2) _____

3. 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 .

3) _____

4. If $f(x) = 3x - 2$, evaluate $f\left(\left(\frac{-1}{3}\right)\right)$

4) _____

5. Solve for x : $\frac{1}{|x+1|} = \frac{1}{|x|}$

5) _____

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2) _____
4) _____

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3) _____
5) _____

1. Solve for x : $x(x-3) = -2$

2. Find $x+y+z$ if $\left(\left(2^{50}3^{20}\right)^{100}\left(7^{15}3^3\right)^{10}\right)^4 = 2^x3^y7^z$

2) _____

Solve for x : 3 flips = 2 flaps, 3 flaps = 2 flops, so 3 flops = x flips.

3) _____

4. Solve for x : $1(x^2+1)+2(x^2+2)+3(x^2+3)=4(x^2+4)$

4) _____

5. Simplify: $\frac{(x+h)^2 - x^2}{(x+h) - x}$

5) _____

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2) _____ 3) _____

4) _____ 5) _____

1. Solve for x : $.12x + .12\% + \overline{.12}x = 1.2$ Write your answer as a reduced fraction.

1) _____

2. The value of a two-digit number is one and three-fourths times as much as the number whose digits are the reverse of the given number. What is the sum of all possible given numbers?

2) _____

3. When Jerry is half as old as he will be when he is three times as old as he is now, he will be twice as old as he was four years ago. How old is he?

3) _____

4. Arrange the numbers 5^{4444} , 2^{8888} , 7^{3333} , 3^{5555} in order from least to greatest.

4) _____

5. What is the remainder when the product $7654321234567 \times 1234567654321 \times 1223344556677$ is divided by 100?

5) _____