November 4, 1981 WOCOMAL FRESHMAN MEET

ROUND I: ARITHMETIC - ORDER OF OPERATIONS & EVALUATION

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Simplify: $6 \cdot 7 - 2^5 + 4 \div \frac{1}{4} \div 2 + 1 \cdot 0$.

2(a). Let $x = -1$ and evaluate $15x^5 - 23x^3 + 14x^2 - 5x - 8$.

2(b). Let $a = -3$, $b = -6$, $c = 2$.
Evaluate the polynomial $2a^2 + \frac{1}{3}b^2 - 1.5c^2$.

3. If $\textcircled{x} = 3x + 2$, $\triangle x = \frac{x^2 + 2}{3}$, and $x * y = \textcircled{y} - \triangle x$,
evaluate $2 * 3$.

ANSWERS: (1 point) 1. _____

(1 point) 2(a). _____

(1 point) 2(b). _____

(3 points) 3. _____

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ROUND II: LINEAR EQUATIONS

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Solve for x; $\frac{x-4}{4} + \frac{x-5}{5} - \frac{x-2}{2} = 2.$

2. Solve for x; $5x + 7 - [2 + 3(2x - 3) + 1] = 6.$

3. If $a \neq c$, solve for x; $ax - (b - g) = cx - (-3b + 4g).$

4. Solve for $\triangle$ in terms of # and ϕ;

$2\triangle\# + 2\phi = (4\# - 6\triangle\phi)3 - 4(\# - \phi).$

ANSWERS: (1 point) 1. x = _____

(1 point) 2. x = _____

(2 points) 3. x = _____

(2 points) 4. $\triangle$ = _____

Auburn, Hudson Catholic, Marlboro

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ROUND III: OPEN

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Simplify; $\dfrac{\frac{1}{2}}{\frac{6}{\frac{3}{108}}}$

2. A certain telephone ring lasts 5 seconds. The pause between rings lasts 6 seconds. If the phone begins ringing at 5:15 P.M. and the last ring ends exactly at 5:16 P.M., how many rings were there?

3. If $5x + 3y = 73$, find five ordered pairs (x,y) which satisfy the equation such that x and y are positive integers.

ANSWERS: (1 point) 1._____

(2 points) 2._____

(3 points) 3.(,),(,),(,),(,),(,)

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ROUND IV: GEOMETRY - PERIMETER & AREA; VOLUME OF RECTANGULAR SOLIDS

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. The side of a square is 3/5 the side of an equilateral triangle. If the sum of the perimeters of the two figures is 810 meters, what is the side of the triangle?

2. In a rectangular solid with a square base, the area of the base is 4 sq. cm. and the volume of the solid is 20 cu. cm.. Find the total surface area of the solid.

3. The width of one rectangle is 5 cm. shorter than the length of a second rectangle. The length of the first rectangle is 14 cm. and the width of the second rectangle is 9 cm.. The area of the second rectangle is 10 sq. cm. greater than the area of the first. Find the dimensions of the first rectangle.

ANSWERS: (2 points) 1. _____ meters

(2 points) 2. _____ sq. cm.

(2 points) 3. ___ cm. by ___ cm.

Auburn, Marlboro

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TEAM ROUND: NUMBER THEORY, PRIMES, DIVISIBILITY, LCM, GCF, SEQUENCES

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST EXACT FORM

EACH ANSWER COUNTS THREE POINTS

ANSWERS

1. Find the least common multiple of 10, 14, 15, and 21. 1. _____

2. Find the greatest common factor of 162, 270, and 432. 2. _____

3. Give the next three terms of the sequence {1, 4, 13, 40, ...}. 3. _____

4. What is the sum of the two largest prime numbers less than 100? 4. _____

5. The greatest common factor of two numbers is 33. The least common multiple is 726. If one number is 363, what is the other number? 5. _____

6. Find the next two numbers in the sequence {256, 16, 4, ...}. 6. _____

7. Two numbers are called relatively prime if they have no common factors other than one. How many positive integers are less than 100 and relatively prime to 100? 7. _____

8. What is the least common multiple of the seven smallest non-prime numbers that are not divisible by 2? 8. _____

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ROUND I

(1 point) 1. 18

(1 point) 2(a). 19

(1 point) 2(b). 24

(3 points) 3. 9

ROUND II

(1 point) 1. $x = -60$

(1 point) 2. $x = 7$

(2 points) 3. $x = \frac{4b - 5g}{a - c}$ or $\frac{5g - 4b}{c - a}$

(2 points) 4. $\triangle = \frac{4\# + \clubsuit}{\# + 9\clubsuit}$

ROUND III

(1 point) 1. 3

(2 points) 2. 6

(3 points) 3. (2,21),(5,16),(8,11),
(11,6),(14,1)

ROUND IV

(2 points) 1. 150 meters

(2 points) 2. 48 sq. cm.

(2 points) 3. 7 cm. by 14 cm.

TEAM ROUND

3 points each

1. 210

2. 54

3. 121, 364, 1093

4. 186

5. 66

6. 2, $\sqrt{2}$

7. 40

8. 51975