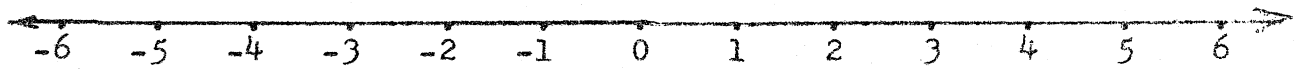
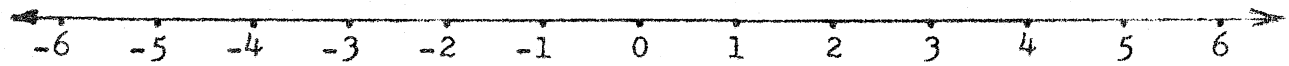
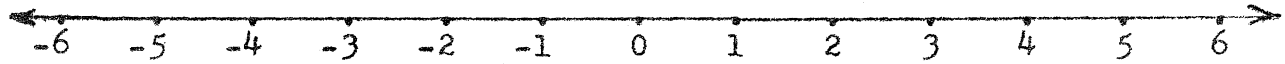
January 10, 1979 WOCOMAL FRESHMAN MEET

ROUND I: GRAPHING ON THE NUMBER LINE

ANSWERS

1. 

2. 

3. 

4.

ON THE NUMBER LINES ABOVE DRAW THE GRAPHS OF THE SOLUTIONS OVER THE SET OF REAL NUMBERS FOR THE FOLLOWING OPEN SENTENCES. USE THIS NOTATION FOR $3 \leq x < 5$ or $x > 6$

.

(1 point) 1. $|2 + x| < 3$

(1 point) 2. $|2x - 5| \geq 3$

(2 points) 3. $\{x: 6x + 11 < 14x + 7 \text{ and } 3x + 7 < 8x - 3\}$

(2 points) 4. $|x - 1| < |x + 1|$

Bromfield, Grafton, Tantasqua, Worcester Academy

January 10, 1979 WOCOMAL FRESHMAN MEET

ROUND II: PERIMETER, AREA & VOLUME

ANSWERS

(1 point) 1. ____ meters

ALL ANSWERS MUST BE SIMPLIFIED

(2 points) 2. _____

(3 points) 3. _____

1. How long is the diagonal of a rectangle whose area is 48 square meters and whose base is 8 meters?

2. A rectangular solid has a square face. The longest edge is twice the length of the side of the square. Find the number of cubic units in the volume of the solid if the volume and total surface area are numerically equal.

3. What is the number of square units in the total area (including the top and bottom) of the smallest cylindrical container that will contain three spheres of radius one inch? Use $\pi = \frac{22}{7}$.

Hudson, Wachusett

January 10, 1979 WOCOMAL FRESHMAN MEET

ROUND III: OPEN

ANSWERS

(1 point) 1._____

SIMPLIFY THE ANSWERS (2 points) 2._____ degrees

(3 points) 3._____

1. Thrice what number is twice that number?

2. If the equation $C = \frac{5}{9}(F - 32)$ represents the relationship between the centigrade (C) and Fahrenheit (F) readings for any temperature, find the temperature at which the two will be equal.

3. In the following multiplication exercise numbers are replaced with letters. The letter O is not used. When you see O it is zero! What number does the product C7DD stand for?

```
  A O B
    C D
  D A D
C 2 4
C 7 D D
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Hudson Catholic, South, Southbridge

January 10, 1979 WOCOMAL FRESHMAN MEET

ROUND IV: OPERATIONS ON NUMERICAL FRACTIONS AND DECIMALS

ANSWERS

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

SIMPLIFY THE FOLLOWING EXPRESSIONS. ALL ANSWERS MUST BE EXACT AND SIMPLIFIED AS FAR AS POSSIBLE.

1. $$\frac{\frac{1}{2} + \frac{2}{3} - \frac{3}{4} + \frac{4}{5}}{-\frac{1}{2} - \frac{2}{3} + \frac{3}{4} - \frac{4}{5}}$$

2. $$\frac{.04}{.06} + \frac{.3}{.09} - \frac{.8}{2.4} \times \frac{.35}{.7} \div \frac{.3}{3.6}$$

3. $$\cfrac{\cfrac{2 + \frac{1}{2}}{3 - \frac{1}{3}}}{\cfrac{4 + \frac{1}{4}}{5 - \frac{1}{5}}}$$

Burncoat, St. John's, Wachusett

January 10, 1979 WOCOMAL FRESHMAN MEET

TEAM ROUND: NUMBER THEORY - PRIMES, DIVISIBILITY, LCM, GCF, SEQUENCES OR SERIES

ALL ANSWERS MUST BE IN SIMPLEST FORM.

QUESTIONS 1 THROUGH 6 COUNT TWO POINTS EACH. ANSWERS

1. Which of the following numbers (a, b, c or d) is divisible by both 4 and 9? a) 89462875312 b) 362877885 c) 984325698432 d) 54136928436 1._____

2. Find the greatest common factor of 429 and 715. 2._____

3. Give the next three terms in the sequence $\{1, 3, 7, 15, \ldots\}$. 3._____

4. Find four prime numbers which are factors of 6072. 4._____

5. Find the sum of the greatest common factor and the least common multiple of 1001 and 111,111. 5._____

6. Find two pairs of primes whose sum is 98. 6._____

._____

QUESTIONS 7 THROUGH 9 COUNT FOUR POINTS EACH.

7. Find the least common multiple of 231 and 4004. 7._____

8. How many counting numbers from 1 to 100, inclusive, are divisible by <u>neither</u> 2 nor 3 ? 8._____

9. Three numbers have a greatest common factor of 4 and a least common multiple of 240. One is 16 and the second is 60. Find all possible values of the third number which are between 16 and 60. 9._____

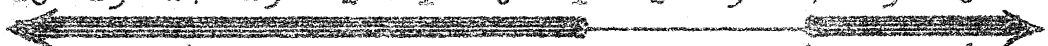
Auburn, Holy Name, Marlboro, St. John's, Shrewsbury, Southbridge, Ware, Worcester Academy

January 10, 1979 WOCOMAL FRESHMAN MEET ANSWERS

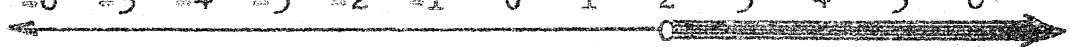
ROUND I

(1 pt.) 1.

(1 pt.) 2.



(2 pts.) 3.



(2 pts.) 4.

ROUND II

(1 pt.) 1. 10 meters

(2 pts.) 2. 250

(3 pts.) 3. 44

ROUND III

(1 pt.) 1. 0

(2 pts.) 2. -40 degrees

(3 pts.) 3. 8755

ROUND IV

(1 pt.) 1. -1

(2 pts.) 2. 2

(3 pts.) 3. $\frac{18}{17}$ or $1\ \frac{1}{17}$

TEAM ROUND

TWO POINTS EACH

1. c

2. 143

3. 31, 63, 127

4. 2, 3, 11, 23

5. 112, 112

6. any two pairs of
   19 and 79
   31 and 67
   37 and 61

FOUR POINTS EACH

7. 12012

8. 33

9. 20, 24, 40, 48