

November 5, 1997

WOCOMAL FRESHMAN MEET

ROUND I: Evaluation of algebraic expressions and order of operations

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Evaluate this expression for $x = 4$ and $y = -2$.

$$-2x^2 - (-x + 2) + 5y$$

2. Simplify $\left(1 - \frac{1}{3}\right)\left(1 - \frac{1}{4}\right)\left(1 - \frac{1}{5}\right)(\dots)\left(1 - \frac{1}{n}\right)$

3. Consider $a \& b = a - b + ab$
and $a \# b = a + b - ab$

If “&” alone is a commutative operation, evaluate $5 \& (4 \# 3)$.

If “#” alone is a commutative operation, evaluate $(5 \& 4) \# 3$.

If both are commutative or neither is commutative, evaluate $(5 \# 4) \& 3$.

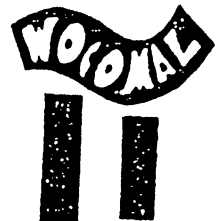
ANSWERS

(1 pt.) 1. _____

(2 pts) 2. _____

(3 pts) 3. _____

Algonquin, Assabet Valley, Southbridge



November 5, 1997

WOCOMAL FRESHMAN MEET

ROUND II: Solving linear equations

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Solve for F : $30 = \frac{5}{9}(F - 32)$

2. If $3 + x = 1$ and $5 - y = 10$, find the value of $3y - 2x$

3. Solve for x . Answer as an exact mixed number.

$$\frac{x}{2} + \frac{2x}{3} + \frac{3x}{4} + \frac{4x}{5} + \frac{5x}{6} = 60\frac{6}{7}$$

ANSWERS

(1 pt.) 1. _____

(2 pts) 2. _____

(3 pts) 3. _____

Hudson, Shrewsbury, Worcester Academy

November 5, 1997

WOCOMAL FRESHMAN MEET

ROUND III: Logic problems

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Suppose that some water lilies double in number each day. If a pond became full of lilies on April 15, on which day was the pond a quarter full?

2. Alice, Nathan, and Marie play in the school band. One plays the drums, one the saxophone, and one the flute. Alice is a senior. Alice and the saxophone player practice together after school. Nathan and the flute player are freshmen. Who plays which instrument? Give names.

3. In this multiplication example

$$\begin{array}{r} ABCDE \\ \times \quad 4 \\ \hline EDCBA \end{array}$$

Find the sum of the five digits A through E.

different
^

ANSWERS

(1 pt.) 1. _____

(2 pts) 2. drums : _____ sax : _____ flute : _____

(3 pts) 3. _____

Assabet Valley, Holy Name, Notre Dame

November 5, 1997

WOCOMAL FRESHMAN MEET

ROUND IV: Number theory

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. What is the sum of all prime numbers between 90 and 100?

2. What is the smallest positive integer that leaves a remainder of 3 when divided by ^{all of} 5, ^{and} 6, ~~or~~ 8?

3. At 12:01AM on Jan. 1, 1997 all three lighthouses along the coastline flash simultaneously. The lighthouse at Rhombus Cove flashes every quarter hour. The one on Square Sound flashes every 25 minutes, while the one at Pyramid Point flashes for the sixth time at 1:01AM. At what time (hour, minute, AM or PM) on what date will all three flash simultaneously for the second time in 1997?

ANSWERS

(1 pt.) 1. _____

(2 pts) 2. _____

(3 pts) 3. time _____ date _____

Assabet Valley, Auburn, Shrewsbury

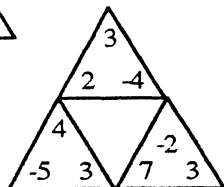
TEAM ROUND: Topics of previous rounds and open

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM AND ON THE SEPARATE TEAM ANSWER SHEET

3 points each

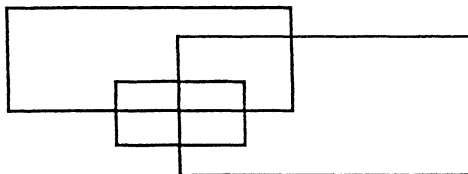
1. If the symbol  means evaluate $a - b + c$,

find the value of



2. Solve $\frac{x}{23} + x = \frac{x}{87} + 2065$
3. Three friends live on the same side of a street at different numbers a , b , and c , none of which are in the 20's. If $abc = 5544$, find $a + b + c$. *Each is > 2 .*
4. Given the numbers 21, 33, 63, 65, and 286, which of these numbers is (are) not divisible into the product of the first twenty-five prime numbers?

5. How many rectangles are shown?



6. If I start with 2 and count by 3's until I reach 449, I will get 2, 5, 8, 11, ..., 449. If 449 is the N th number, what is the value of N ?

7. Line segments are used to make up the digits of the numbers in the display of a digital clock. Which segment is used least often in forming the digits 0 to 9? Show your answer by thickening it (or them).

8. Six squirrels were playing cards around a hexagonal table. Each squirrel had $10d + 20$ fleas and each flea had $4d^2 - 24$ mites. If the Celsius temperature d was 23° , how many mites were on the squirrels at this card game?

November 5, 1997

WOCOMAL FRESHMAN MEET ANSWERS

Round I
evaluating
1 pt 1. -40
2 pts 2. $\frac{2}{n}$
3 pts 3. -39

Round II
linear eq
1 pt 1. 86
2 pts 2. -11
3 pts 3. $17\frac{1}{7}$ This form only

Round III
logic
1 pt 1. April 13
drums: Alice
sax: Nathan
2 pts 2. flute: Marie
3 pts 3. 27

Round IV
theory
1 pt 1. 97
2 pts 2. 123
5:01 AM
3 pts 3. Jan 1

TEAM Round
3 points each

1. -21
2. 2001
3. 86
4. 63
5. 12
6. 150
7.

8. 3,138,000