November 1, 1978 WOCOMAL FRESHMAN MEET

ROUND I: EVALUATION, ORDER OF OPERATIONS

ANSWERS

(1 point) 1. _____

(2 points) 2.(a) _____

(b) _____

(3 points) 3. _____

1. Let $x = -3$, $z = -2$, $s = 4$ and evaluate the polynomial $\frac{1}{4}z^2 + \frac{1}{2}s^2 - x^2$.

2.(a) Define $*$, an operation for positive real numbers, as $a * b = \frac{ab}{a + b}$. Evaluate the expression $4 * (4 * 4)$.

(b) Simplify $3 + 2 \cdot \frac{1}{3} \cdot \frac{6}{5} \div \frac{1}{10} + 28 \div \frac{1}{4}$.

3. Let $a * b = ab - b$ and $c \natural d = c + d - \frac{c}{d}$.
If $a = 2$, $b = 3$, $c = 4$, $d = \frac{1}{2}$, find $(a * b) \natural (c * d)$.

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ROUND II: LINEAR EQUATIONS ANSWERS

(1 point) 1. x = _____

(2 points) 2. _____

(3 points) 3. x = _____

1. If $a \neq c$, solve for x: $ax + b = cx + d$.

2. Identify by letter, a, b, c, d or e, all equations which are identities.

a) $4x - 3(x - 4) + 2 = 5(x - 2) + 6x$

b) $4x - 3(x - 4) - 2 = -5(x - 2) + 6x$

c) $4x - 3(x - 4) - 2 = 5(x - 2) - 6x$

d) $4x - 3(x + 4) + 2 = 5(x - 2) - 6x$

e) $-4x + 3(x - 4) + 2 = 5(x - 2) - 6x$

3. Solve for x: $\frac{54}{x} + 7\frac{1}{2} = \frac{75}{2x} - 3\frac{1}{2}$

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ROUND III: OPEN

ANSWERS

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

1. What number is that whose double exceeds its half by 45 ?

2. By how much does 2^{3^2} exceed $(2^3)^2$?

3. If 2137^{711} is multiplied out, what will be the units digit in the final product?

Hudson, St. John's

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ROUND IV: NUMERICAL SPEED

SIMPLIFY EACH EXPRESSION COMPLETELY.
ANSWERS MUST BE EXACT.
EACH QUESTION COUNTS ONE POINT.

ANSWERS

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

1. $\dfrac{[42 - 3(6 + 3 \cdot 2)][39]}{26}$

2. $(152 + 278 - 305) \cdot (46 + 239 + 54 + 61)$

3. $\dfrac{\frac{2}{3}}{\frac{\frac{1}{9}}{6}}$

4. $4001 \cdot 3999$

5. $(1.1)^5$

6. $\dfrac{\frac{\frac{1}{3} + \frac{1}{4}}{\frac{1}{2} + \frac{1}{6}}}{8}$

Bromfield, Holy Name, Shrewsbury, Southbridge, Tantasqua, Worcester Academy

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TEAM ROUND: PERCENTAGE WORD PROBLEMS ANSWERS

1. An experimenter planted 105 seeds, of which 84 sprouted. What percent of the seeds failed to sprout? 1. _____ %

2. A man has $12,000 to invest. He decides to invest part of the money at 6% and the rest at 7%. How much of the $12,000 must he invest at 7% to get more than $750 in interest each year? 2. _____

3. When the base of a triangle is increased 10% and the altitude to this base is decreased 10%, find the change in area as a percent. Is this an increase of decrease? 3. _____

4. A baseball team has won 30 of its first 42 games. If they win 75% of their remaining games how many more must be played for a final winning percentage of 72% ? 4. _____

5. If 45% of the school are boys and the girls number 858, how many boys are enrolled? 5. _____

6. After working for several months at $220 a week Mr. Brown was given an increase of 20%. Later, during a slack period, his salary was cut 20%. Mr. Brown's final salary was what percent of his original salary? 6. _____ %

7. If the length and width of a rectangle were increased by 200% each, the area is increased by what percent? 7. _____ %

8. Jane invested a certain sum of money on which she received 6% annually. At the end of the year, the interest was credited to her account, thus making her balance $583. What sum did she invest originally? 8. $ _____

9. If meat loses 20% of its weight in cooking, how much meat must be cooked to produce 20 kg. of hamburgers? 9. _____ kg.

10. On a sale a suit sold for $110.50. This was 85% of usual price. What was the usual price? 10. $ _____

11. 54% of some number is the same as 24% of half the number added to 7. What is the number? 11. _____

12. Ed and Jim took a test in math on which Ed scored 90% snd Jim scored 70%. Each question was answered correctly by at least one of the boys and 12 of the problems were answered correctly by both boys. How many problems were on the test? 12. _____

Bromfield, Grafton, Holy Name, Hudson Catholic, Marlboro, Shrewsbury, South, Tantasqua, Wachusett, Ware, Worcester Academy

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ROUND I

1.(1 pt.) 0

2(a)(1 pt.) $\frac{4}{3}$ or $1\frac{1}{3}$ or $1.\overline{3}$

(b)(1 pt.) 123

3.(3 pts.) $\frac{5}{2}$ or $2\frac{1}{2}$ or 2.5

ROUND II

1.(1 pt.) $x = \frac{d - b}{a - c}$ or $\frac{b - d}{c - a}$ etc.

2.(2 pts.) b, e

3.(3 pts.) $x = -\frac{3}{2}$ or -1.5

ROUND III

1.(1 pt.) 30

2.(2 pts.) 448

3.(3 pts.) 3

ROUND IV
(1 point each)

1. 9
2. 50,000
3. 1
4. 15,999,999
5. 1.61051
6. $\frac{7}{64}$ or 0.109375

TEAM ROUND
(2 points each)

1. 20%
2. more than $3000
3. decrease 1%
4. 8
5. 702
6. 96%
7. 800%
8. $550
9. 25 kg.
10. $130
11. $\frac{50}{3}$ or $16\frac{2}{3}$ or $16.\overline{6}$ or 4
12. 20