ROUND I: ALGEBRAIC WORD PROBLEMS

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST EXACT FORM

1. The second angle of a triangle measures three times the first angle. The third angle measures $80^{\circ}$ more than the first angle. Find the measure of the largest angle.

2. How many ounces of water must be evaporated from 16 ounces of a 25% salt solution to obtain a 40% solution?

3. A, B, C are points in this order on a road. On Monday a motorist covers the distance AB at a speed of 36 miles per hour and BC at 24 miles per hour, taking 2 hours and 50 minutes for the entire trip. On Tuesday he covers the entire distance at 30 miles per hour, taking 2 hours and 48 minutes. Find the distance BC.

ANSWERS:  (1 point)  1._____

          (2 points) 2._____ ounces

          (3 points) 3._____ miles

Bartlett, Bromfield, Hudson

ROUND II: SET THEORY

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST FORM

1.  If  A = $\{0, 1, 5, 6, 7, 9\}$
        B = $\{2, 3, 6, 7, 8, 9\}$
        C = $\{4, 5, 6, 8\}$
    find  $(A \cap B) \cup (A \cap C)$.

2.  $A \cap B$ has 8 subsets. $A \cup B$ has 32 subsets. If sets A and B are in a one-to-one correspondence, how many subsets of set B are there?

.  88 students competed in the last WOCOMAL round.
   4  students got a perfect score.
   3  students got only question 1 wrong.
   6  students got only question 2 wrong.
   14 students got only question 3 wrong.
   52 students got question 1 right.
   37 students got question 2 right.
   15 students got question 3 right.
   How many students got a score of zero?

ANSWERS:   (1 point) 1._____

           (2 points) 2._____

           (3 points) 3._____

Shrewsbury, Worcester Academy

ROUND III: OPEN

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST EXACT FORM

1. The sum of a number, its half, its third and its fourth equals 100. What is the number?

2. If 12 Hinkles = 5 Dinkles and 3 Dinkles = 4 Sprinkles, then how many Sprinkles are there in 4 Hinkles?

3. The same test is given to three math classes. The first, a class of twenty, averages 80. The second, a class of thirty, averages 70. What average must the third class, consisting of twenty-five students, get so that the over-all average of all the students is 75?

ANSWERS:  (1 point) 1._____

          (2 points) 2._____

          (3 points) 3._____

Assabet Valley, Hudson, Notre Dame

ROUND IV: OPERATIONS ON POLYNOMIALS

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST FORM

1. From the sum of $6x^2 - 5x - 7$ and $8 - 7x^2$ subtract the difference of $6 - 8x - x^2$ minus $7x - 11$.

2. The scores of several tests totaled $x^3 + 7x^2 + 4x - 12$. The average score was $x^2 + 8x + 12$. How many tests were there?

3. Simplify: $2a^2 - 3(a + 1)(a - 2) - 7[-(a - 1)]^2$.

ANSWERS:  (1 point) 1._____

          (2 points) 2._____

          (3 points) 3._____

Saint John's, Shepherd Hill, Tantasqua

TEAM ROUND: FACTORING

EACH QUESTION IS WORTH THREE POINTS

FACTOR COMPLETELY AND SIMPLIFY EACH FACTOR WHEN POSSIBLE

1. $60y^2 - 140y + 40$          1._____

2. $m^2 - 1 - n^2 + 2n$          2._____

3. $3x^3y^2 - 6x^2y^2 + 6xy^2$          3._____

4. $3x(18x^2 - 2) - 18x^2 + 2$          4._____

5. $7a^3 + 49a^2 + 84a$          5._____

6. $x^2 - 4y^2 + x + 2y$          6._____

7. $b^4 - 13b^2 + 36$          7._____

8. $x^2y + x^2 - 9y - 9$          8._____

Auburn, Bartlett, Bromfield, Leicester,
Notre Dame, Quaboag, Shrewsbury, Southbridge

## ROUND I

(1 point)  1.    100 or $100^\circ$

(2 points)  2.    6 ounces

(3 points)  3.    36 miles

## ROUND II

(1 point)  1.    $\{5, 6, 7, 9\}$

(2 points)  2.    16

(3 points)  3.    15

## ROUND III

(1 point)  1.    48

(2 points)  2.    $\frac{20}{9}$ or $2\frac{2}{9}$ or $2.2$

(3 points)  3.    77

## ROUND IM

(1 point)  1.    $10x - 16$

(2 points)  2.    $x - 1$

(3 points)  3.    $-8a^2 + 17a - 1$

## TEAM ROUND
### (3 points each)

1.    $20(3y - 1)(y - 2)$

2.    $(m + n - 1)(m - n + 1)$

3.    $3xy^2(x^2 - 2x + 2)$

4.    $2(3x + 1)(3x - 1)(3x - 1)$
      or $2(3x + 1)(3x - 1)^2$

5.    $7a(a + 4)(a + 3)$

6.    $(x + 2y)(x - 2y + 1)$

7.    $(b + 2)(b - 2)(b + 3)(b - 3)$

8.    $(y + 1)(x + 3)(x - 3)$