February 27, 1985 WOCOMAL FRESHMAN MEET

ROUND I: ALGEBRAIC WORD PROBLEMS

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST EXACT FORM

1. An airline took in $1730 on a certain flight. It sold 5 more tourist class tickets at $40 than first class tickets at $50. How many tourist class tickets were sold?

2. Billy Budd must get to Buffalo for a job interview. It is a distance of 365 miles and he must do it in 7 hours. For the first 4.5 hours his average speed is 50 miles per hour. How fast must his average be on the rest of the trip to make Buffalo in time?

3. Jay wishes to obtain 90 gallons of a 30% acid solution. He mixes 30 gallons of a 10% solution, 20 gallons of a 75% solution and 10 gallons of a 90% solution. What percent should the remaining 30 gallons be?

ANSWERS: (1 point) 1._____

(2 points) 2._____ miles per hour

(3 points) 3._____ %

Quaboag, St. John's, Worcester Academy

February 27, 1985 WOCOMAL FRESHMAN MEET

ROUND II: PERIMETER & AREA, VOLUME OF RECTANGULAR FIGURES

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. The area of a triangle is 30 square inches. The base is 8 inches. What is the altitude of the triangle?

2. A semi-circle atop a rectangle ABCD has $\overline{CD}$ as a diameter. AB = 2AD. What is the area of the rectangle if the area of the semi-circle is 50π ?

3. Mr. Smith glues together 42 cubes with 1 centimeter edges to form a solid rectangular-faced brick. If the perimeter of the base is 18 centimeters, what is the height of the brick?

ANSWERS: (1 point) 1.____ inches

(2 points) 2._____

(3 points) 3.____ centimeters

Assabet Valley, Hudson, Notre Dame

February 27, 1985 WOCOMAL FRESHMAN MEET

ROUND III: OPEN

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. One fifth of the square root of a number is 2. Find the number.

2. If $rst = 2$ and $r = t$, what is the value of s in terms of t ?

3. Twelve grams of calcium chloride can absorb 5 cubic centimeters of water. How much calcium chloride is needed to absorb 138 cubic centimeters of water?

4. At the rate of 18 miles per hour, approximate (to the nearest hundredth) the number of miles that a university eight-oar crew can row in 14 minutes 5 seconds.

ANSWERS: (1 point) 1._____

(1 point) 2. $s =$ _____

(2 points) 3._____ grams

(2 points) 4._____ miles

Shepherd Hill, Shrewsbury, Tantasqua

February 27, 1985 WOCOMAL FRESHMAN MEET

ROUND IV: OPERATIONS ON POLYNOMIALS

ALL ANSWERS MUST BE EXPRESSED IN SIMPLEST FORM

1. Simplify: $p^2 - 3p - 4 - 2(p^2 - 7p + 1)$

2. From the sum of $4xy + 2y^2$ and $6x^2 - xy$ subtract $7x^2 - 3xy + y^2$

3. One factor of $x^3 - 10x^2 + x + 120$ is $x - 5$. Find <u>all</u> other prime factors.

4. Simplify: $3(x + 2)(x - 5)^2 + 4(x + 2)^2(x - 1) + 3(x + 2)(x + 1)$
Remove all parentheses.

ANSWERS: (1 point) 1._____

(1 point) 2._____

(2 points) 3._____

(2 points) 4._____

Auburn, Bartlett, Bromfield, Notre Dame

February 27, 1985 WOCOMAL FRESHMAN MEET

TEAM ROUND: FACTORING

EACH QUESTION IS WORTH THREE POINTS

FACTOR COMPLETELY AND SIMPLIFY EACH FACTOR WHEN POSSIBLE

1. $x^{5c} - 9x^{3c}$, c is an integer 1._____

2. $12x^2 - 46x + 42$ 2._____

3. $12B - 8C - 3BX + 2XC$ 3._____

4. $3x^5 - 17x^3 + 20x$ 4._____

5. $x^2y^2 - y^2 + 4x^2y - 4y + 4x^2 - 4$ 5._____

6. $x(x + 1)(x - 2) - 3x - 3$ 6._____

7. $x^5 - x^4 - x + 1$ 7._____

8. $x^2 - 9y^2 + 12yz - 4z^2$ 8._____

Assabet Valley, Auburn, Bartlett, Bromfield,
Quaboag, St. John's, Shrewsbury, Tantasqua

February 27, 1985 WOCOMAL FRESHMAN MEET ANSWERS

ROUND I

(1 point) 1. 22

(2 points) 2. 56 miles per hour

(3 points) 3. 0%

ROUND II

(1 point) 1. 7.5 or $7\frac{1}{2}$ inches

(2 points) 2. 200

(3 points) 3. 3 centimeters

ROUND III

(1 point) 1. 100

(1 point) 2. $s = 2/t^2$

(2 points) 3. 331.2 grams

(2 points) 4. 4.22 or 4.23 miles

ROUND IVI

(1 point) 1. $-p^2 + 11p - 6$

(1 point) 2. $-x^2 + 6xy + y^2$

(2 points) 3. $(x - 8)$ and $(x + 3)$

(2 points) 4. $7x^3 - 9x^2 + 24x + 140$

TEAM ROUND
(3 points each)

1. $x^{3c}(x^c + 3)(x^c - 3)$

2. $2(3x - 7)(2x - 3)$

3. $(4 - X)(3B - 2C)$

4. $x(x + 2)(x - 2)(3x^2 - 5)$

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

6. $(x + 1)(x + 1)(x - 3)$

7. $(x - 1)(x - 1)(x + 1)(x^2 + 1)$

8. $(x + 3y - 2z)(x - 3y + 2z)$