March 4, 1981 WOCOMAL FRESHMAN MEET

ROUND I: ALGEBRAIC WORD PROBLEMS

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Sam receives some nickels and dimes whose total value is $3.00. If he receives 50 coins in all, how many are nickels?

2. If the first of three consecutive even numbers is divided by 4, the second by 6 and the third by 8, the sum of the quotients equals 29. Find the numbers.

3. In 1965 John was 5 years more than 3 times as old as Bob. In 1980 Bob was 4 years more than $\frac{1}{2}$ as old as John. How old was Bob in 1965?

ANSWERS: (1 point) 1._____

(2 points) 2._____

(3 points) 3._____

Bromfield, Hudson, Quaboag

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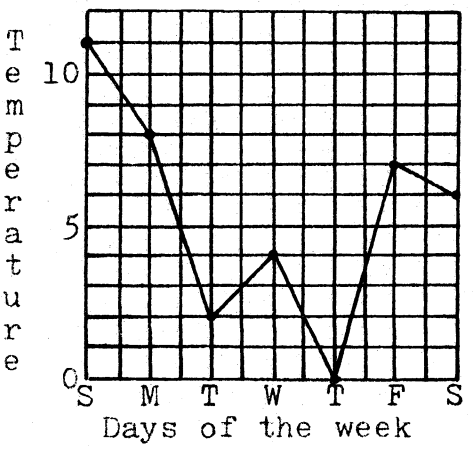
ROUND II: STATISTICS

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. Last week the average daily Celsius temperatures were plotted and this line-segment graph was created. Find the average daily average temperature for last week.



2. Find the average of the median and mode of the following test scores; 63, 65, 72, 83, 72, 65, 72, 68, and 62.

3. Of 500 students whose mean height is 67.8 inches, 150 are girls. If the mean height of the girls is 62.2 inches, what is the mean height of the boys?

ANSWERS: (1 point) 1._____

(2 points) 2._____

(3 points) 3._____

Shrewsbury, Southbridge, Worcester Academy

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ROUND III: OPEN

ALL ANSWERS MUST BE IN SIMPLEST EXACT FORM

1. A teacher used the symbol (4,85) to mean that the student in seat 4 received a mark of 85. Suppose the marks for part of the class were reported as foll ows: (5,80), (6,48), (7,83), (8,64), (9,72), (10,90). In a universal set containing all natural numbers find the solution set for the following open sentence; "The student in seat x got a mark that was 8 times x."

2. Find the sum of the prime factors of 14586.

3. If the length and width of a rectangle are respectively 20100 and 1102, both represented in base 3, find the area of this rectangle represented in base 5.

ANSWERS: (1 point) 1. {_____

(2 points) 2. _____

(3 points) 3. _____

Auburn, Hudson Catholic, Marlboro

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ROUND IV: OPERATIONS ON POLYNOMIALS

ALL ANSWERS MUST BE IN SIMPLEST FORM

1. If $2(5x - 2x^2 + 1)$ is subtracted from a polynomial, P, the result is $x^2 + 5$. Find the polynomial, P.

2. Find the product $(3x - y)(y + 3x)(2z + 1)$.

3. If $x^3 + 4x^2 - 8 = (x - 3)(ax^2 + bx + c) + r$, find the sum $a + b + c + r$.

ANSWERS: (1 point) 1. _____

(2 points) 2. _____

(3 points) 3. _____

Shepherd Hill, Tantasqua, Worcester Academy

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TEAM ROUND: FACTORING

EACH QUESTION COUNTS THREE POINTS

FACTOR COMPLETELY AND SIMPLIFY EACH FACTOR WHEN POSSIBLE

1. $20x^4 - 65x^2y^2 + 45y^4$ 1. _____

2. $a^{2n}b^{6n} - 25$ 2. _____

3. $2R^3 - 54T^3$ 3. _____

4. $x^2 + 4xy + 4y^2 - 16$ 4. _____

5. $6x^2 + x - 15$ 5. _____

6. $x^2(x^2 - 9) - 16(x^2 - 9)$ 6. _____

7. $x^3 + 4x^2 + 5x + 2$ 7. _____

8. $c^3 - c^2 + c - 1$ 8. _____

Auburn, Hudson, Marlboro, Quaboag,
St. John's, Shepherd Hill, Southbridge, Tantasqua

March 4, 1981 WOCOMAL FRESHMAN MEET ANSWERS

ROUND I

(1 point) 1. 40

(2 points) 2. 52, 54, 56

(3 points) 3. 2

ROUND II

(1 point) 1. $5\frac{3}{7}^{\circ}$

(2 points) 2. 70

(3 points) 3. 70.2

ROUND III

(1 point) 1. $\{6, 8, 9\}$

(2 points) 2. 46

(3 points) 3. $201443_{(5)}$ or 201443

ROUND IV

(1 point) 1. $-3x^2 + 10x + 7$

points) 2. $18x^2z - 2y^2z + 9x^2 - y^2$

(3 points) 3. 84

TEAM ROUND

3 points each

1. $5(2x+3y)(2x-3y)(x+y)(x-y)$

2. $(a^n b^{3n} + 5)(a^n b^{3n} - 5)$

3. $2(R - 3T)(R^2 + 3RT + 9T^2)$

4. $(x + 2y + 4)(x + 2y - 4)$

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

6. $(x - 4)(x + 4)(x - 3)(x + 3)$

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

8. $(c^2 + 1)(c - 1)$