ROUND I: ALGEBRAIC WORD PROBLEMS   ANSWERS

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

1. The degree measure of one angle of a triangle is three times
    the degree measure of another and the third angle measures 32°.
    What is the measure of the largest angle of the triangle?

2. Find two consecutive integers such that the square of the
    larger divided by the square of the smaller gives a quotient
    of 1 and a remainder of 15.

3. Aurelius put all his nickels, dimes and quarters which he had
    saved from his sales into a coin bank. He had 18 coins in all
    and twice as many quarters as dimes. If he had a total of
    $3.15, how many nickels did he have?

Hudson, St. John's, Wachusett

ROUND II: STATISTICS   ANSWERS

                                    (1 point) 1._____
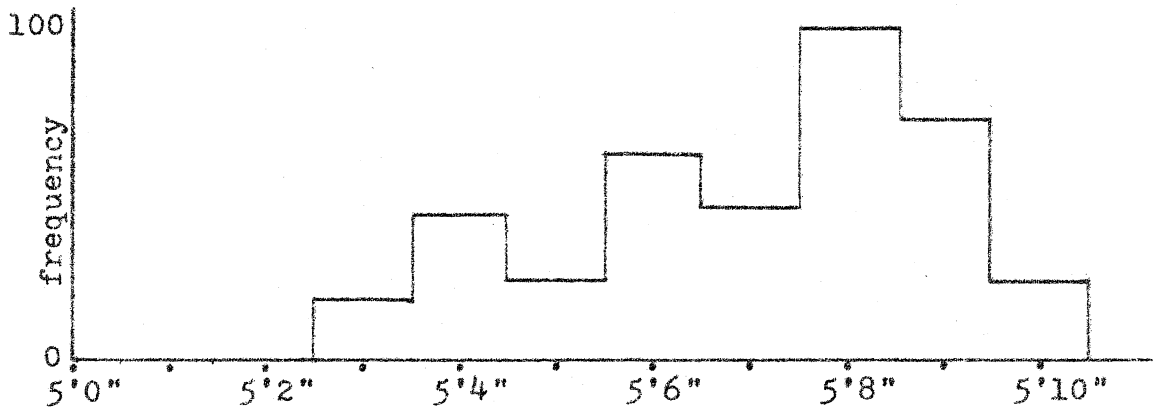
                                    (2 points) 2._____

                                    (3 points) 3._____

1.   What is the mode of this distribution?

2.   Find a if the mean of the folowing set of data is 62;
     58, 75, a, 66, 63, 49.

3.   Find the sum of the mean, median and mode for this set of scores;
     88, 68, 83, 47, 93, 77, 75, 80, 37, 84, 93.

Bromfield, Grafton, Southbridge

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

1. If $\frac{A}{B} = \frac{C}{D}$ list all of the following, a, b, or c, which are true:

(a) DA = BC   (b) $\frac{B}{D} = \frac{A}{C}$ (c) $\frac{D}{C} = \frac{B}{A}$

2. If N written in base 2 is 11000, what is the integer one less than N, written in base 2.

3. Find the square root of 640 to the nearest tenth.

Burncoat, Southbridge, Wachusett

ROUND IV: OPERATIONS ON POLYNOMIALS   <u>ANSWERS</u>

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

1. What is the degree of the polynomial $P(x) \cdot Q(x) + R(x) \cdot S(x)$ where
    $P(x) = 13x^2 - 6x + 4$
    $Q(x) = 2x^3 - 3x^2 + 1$
    $R(x) = 5x^4 - 2x$
    $S(x) = -3x^2 - 16$

2. If the perimeter of a triangle is $8x^2 - 7x + 1$, one side is $2x^2 - x + 5$, and another side is $x^2 - 8x - 9$, find the third side.

3. Find the remainder (an integer) if $2x^2 - 3x + 4$ is multiplied by $x - 2$ and then divided by $2x - 3$.

Burncoat, Worcester Academy

TEAM ROUND: FACTORING

EACH QUESTION COUNTS THREE POINTS.

IN EACH QUESTION, FACTOR COMPLETELY AND SIMPLIFY EACH FACTOR WHENEVER POSSIBLE, UNLESS INSTRUCTED OTHERWISE.

1. $(a + b)^2 + 3(a + b) + 2$ 1._____

2. $3x^3y - 18x^2y + 27xy$ 2._____

3. $ab - ac + db - dc$ 3._____

4. $c^2 - 6c + 9 - t^2$ 4._____

5. $x^4 - 25x^2 + 144$ 5._____

6. $x^3 + x^2 - x - 1$ 6._____

7. Find all positive integer values of   7._____
    k for which $x^2 + kx - 24$ is factorable
    over the integers.

8. Find the sum a + b + c by finding   8._____
    integer values for a, b and c such
    that ax + b is a factor of both
    $6x^2 + 11x + c$ and $4x^2 + 4x + 1$.

Bromfield, St. John's, South, Southbridge, Wachusett, ware, Worcester Academy

ROUND I

(1 point) 1. 211°

(2 points) 2.   7 and 8

(3 points) 3.   3

ROUND II

(1 point) 1.   5'8"

(2 points) 2.   61

(3 points) 3.   248

ROUND III

(1 point) 1.   a, b, c   or   all

(2 points) 2.   10111   or 10111_2

(3 points) 3.   25.3

ROUND IV

(1 point) 1.   6

(2 points) 2. $5x^2 + 2x + 5$

(3 points) 3.   −2

TEAM ROUND

(3 points each)

1. $(a + b + 2)(a + b + 1)$

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

3. $(a + d)(b - c)$

4. $(c - 3 + t)(c - 3 - t)$

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

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

7.   2, 5, 10, 23

8.   7