ROUND I: EVALUATION, ORDER OF OPERATIONS   <u>ANSWERS</u>

(1 point) 1._____

(2 points) 2.(a)_____

ALL ANSWERS MUST BE EXACT

(b)_____

3._____

1. Evaluate the following expression if x = 3 and y = 2:

$$[(y + x)x - y(x + y)] \div 5 \cdot 3$$

2.(a) If $\boxed{n}$ means $3n - 4$ and $\bigcirc{n}$ means $n^2 + 5$

find $\boxed{\bigcirc{\boxed{3}}}$

(b) If $A * B = A^3 \cdot \dfrac{B}{4}$, find $2 * (1 * \frac{1}{2})$.

3. Let x = 2, y = 1, and evaluate the expression

$$\left[\frac{(xy)^2}{x + y} + \frac{x^3 - y^2}{4y} - \frac{x^2 - 1}{y^3} \right]^2$$

Burncoat Jr., Southbridge, Wachusett

ROUND II: LINEAR EQUATIONS   ANSWERS

                                    (1 point) 1._____

                                    (2 points) 2._____

                                    (3 points) 3.(a)_____

                                                  (b)_____

                                                  (c)_____

1. Solve the equation $5(x - 2) - 2(x + 4) = 3$.

2. Suppose $ax = bx + c$, where $c \neq 0$. Write a condition involving a and b that need be true if there exists a real solution for x.

3. Solve each equation for x:

    (a) $3x - (2 - 4x) = 7x - 2$

    (b) $3x - (-2 - 4x) = -7x - 2$

    (c) $3x - (-2 - 4x) = 7x - 2$

Burncoat Jr., South, Worcester Academy

(1 point) 1._____

(2 points) 2._____

(3 points) 3._____

1. If 1 equals fi, $\frac{1}{20}$ equals fo, and $\frac{1}{21}$ equals fum. How many fos will equal 420 fums.

2. Take the integer whose square is equal to its double, and add its multiplicative identity, then multiply by the number of subsets in the set $\{a, b, c, d\}$.
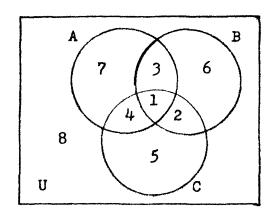
3. Find the largest prime factor of 30030.

Burncoat Jr., Holy Name, Wachusett

(1 point) 1.$\underline{\{\qquad\qquad}$

(2 points) 2.$\underline{\{\qquad\qquad}$

(3 points) 3.$\underline{\qquad\qquad}$

IN THE FOLLOWING QUESTIONS $\overline{A}$ REPRESENTS THE COMPLEMENT OF THE SET A

1. If $A = \{1, 2, 3\}$ and $A \cap B = A \cup B$, write the set B.

2. List the set of numbers of all regions determined by
$A \cap [(\overline{B} \cap C) \cup (B \cap \overline{C})]$
in the Venn diagram.

3. There are 38 hockey players from the Bruins, Flyers, and Sabres on a chartered flight. 10 skaters have played solely for the Sabres, 7 solely for the Bruins, and 9 solely for the Flyers. 7 skaters have played for both the Flyers and Sabres, 6 for both the Bruins and Flyers and 9 for both the Sabres and Bruins. How many skaters have played for all three teams?

Hudson Catholic, Worcester Academy

TEAM ROUND: PERCENTAGE WORD PROBLEMS   ANSWERS

1. This and that and half of this and that is what   1. _____ %
   percent of this and that?

2. The price of one share of Ripoffall Co. stock rose   2. _____ %
   from $55.20 to $57.96. By what percent of the first
   price did the price of the stock increase?

3. At DuBois High School there are 4000 students. One day   3. _____
   11% of the boys were absent and 8% of the girls were
   absent. The total number of students absent that day
   was 386. How many of the students are girls?

4. Section A: 5 increases to 85   4. _____ %
   Section B: 70 decreases to 38
   The increase in A is what percent of the decrease in B?

5. An auto dealer discounts the price of his cars by 20%   5. _____
   and then marks up this discounted price by 20%. But
   if he were smart he could replace this two-step process   _____ %
   with a one-step process.   Would it be a discount
   or markup? What would be the percentage change?

6. A rectangle has length 20 and width 15. If you in-   6. _____ %
   crease the lengths of the sides by 40%, the new area is
   what percent of the old area?

7. The extra equipment on a new car costs $330. If this   7. $ _____
   represents 11% of the price of the car, what is the
   price of the car?

8. One part of 63 is 125% of the other. What is the   8. _____
   larger part?

9. Mr. Mathew Matics invested a sum of money at 5%. He   9. $ _____
   also invested a second sum, $2500 more than the first
   sum, at 8%. His total annual income from these invest-
   ments was $2800. How much was invested at the 8% rate?

10. 18 is what percent of .05   10. _____ %

11. If a sport coat now sells for $76.50 after a 10%   11. $ _____
    markdown followed by an 8% markup, what was the
    original cost?

12. To the nearest tenth, the radius of a circle is what   12. _____ %
    percent of its circumference? Use 3.14 for π.

ROUND I

1.   3

2.(a)   86

  (b) $\frac{1}{4}$ or 0.25

3. $\frac{1}{144}$ or 0.00694
     or 0.006944...

ROUND II

1.   7

2. $a - b \neq 0$ or $a \neq b$

3.(a)   R or {all real numbers}

  (b) $-\frac{2}{7}$ or $\left\{-\frac{2}{7}\right\}$

  (c) $\emptyset$ or { } or no solution

ROUND III

1.   400

2.   48

3.   13

ROUND IV

1.   {1, 2, 3}

2.   {3, 4}

3.   5

TEAM ROUND

1.   150%

2.   5%

3.   1800

4.   250%

5.   discount 4%

6.   196%

7. $3000

8.   35

9. $22,500

10.   36,000%

11. $78.70

12.   15.9%