

November 3, 1976

WOCOMAL FRESHMAN MEET

ROUND I: EVALUATION OF ALGEBRAIC EXPRESSIONS

ANSWERS

(1 point) 1. _____

(2 points) 2. _____

(3 points) 3. _____

ALL ANSWERS MUST BE EXACT.

1. Evaluate the expression $3x^2 - 3x - 21$ if $x = -2$.

2. If $x = \frac{1}{2}$, find the value of $\frac{x - \frac{1}{x}}{x - \frac{1}{x^2}}$.

3. If $*$ is a binary operation defined by $a * b = a + b - 2ab$, find the value of $(a * b) * (c * d)$ when $a = 1$, $b = 2$, $c = -1$, $d = -2$.

Marlborough, Shrewsbury, Southbridge

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ROUND II: ORDER OF OPERATIONS

ANSWERS

(1 point) 1. _____

(2 points) 2. _____

(3 points) 3. _____

PERFORM THE FOLLOWING OPERATIONS AND GIVE THE SIMPLEST ANSWER. ALL ANSWERS MUST BE EXACT. 8 x 7 MEANS 8 TIMES 7.

1. $24 + 40 \div 4 - 10 \times 2$

2. $5[5 \times 5 + 5 \div 5 + \frac{5+5}{5}]$

3. $\frac{(\frac{5}{6})^2 + (\frac{2}{3})^2}{8 \times 4 + 4} \div \frac{8 + 3 \times 2}{[(2 + 7) \times 4]^2}$

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ROUND III: OPEN

ANSWERS

(1 point) 1. _____

(2 points) 2. _____

(3 points) 3. meters

1. Find the greatest common factor of 72, 135, and 342.

2. 50% of 12 is 40% less than half of what number?

3. A bull is released from a pen and runs in a straight line through the center of a circular arena. At the moment the bull crosses the center, a fly takes off from its nose and flies in the same direction as the bull but at twice the speed of the bull. When the fly reaches the wall of the arena, it turns and flies toward the bull without changing speed. If the fly reaches the bull at a point 10 meters from the nearest point on the wall, what is the diameter of the arena?

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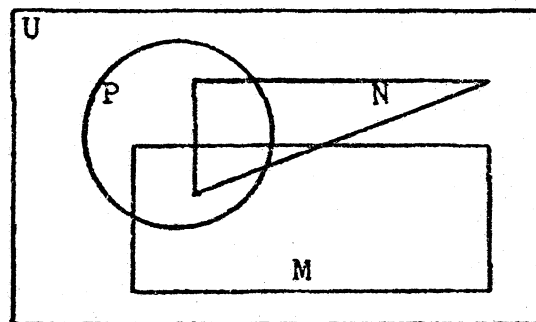
ROUND IV: SET THEORY - UNION, INTERSECTION, COMPLEMENT, VENN DIAGRAMS

A' REPRESENTS THE COMPLEMENT OF THE SET A.

1. In the diagram shade the region representing the following subset of the universal set U.

$$P \cap (M \cup N)'$$

(1 point) 1.



2. Given: U is the universal set

$$U = \{a, b, c, d, e\}$$

$$A = \{a, b, d\}$$

$$B = \{b, d, e\}$$

Find: a) $(A \cap B)'$

(2 points) 2. a) { _____ }

b) $(A \cup B)'$

b) { _____ }

3. 80 students competed in the last round.
3 students got a perfect score.
2 students got only Question I wrong.
4 students got only Question II wrong.
10 students got only Question III wrong.
47 students had Question I right.
29 students had Question II right.
10 students had Question III right.
How many students had a score of zero?

(3 points) 3. _____

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ANSWERS
3 POINTS EACH

TEAM ROUND: PERCENTAGE WORD PROBLEMS

1. John had a collection of 250 stamps. He sold 10% of the collection to his friend. How many stamps did he have left? 1. _____

2. In the primaries in a Massachusetts town 10% of the voters voted for Kennedy, 30% for Carter, 20% for Regan, and the remaining 120 for Ford. How many votes were cast in all? 2. _____

3. What single discount is equivalent to successive discounts of 10% followed by 20% ? 3. _____ %

4. A prepared mixture of sand and cement contains 2 cu. meters of cement and 5 cu. meters of sand. A patching job calls for a mixture which is 25% cement. How much sand must be added to produce the required mixture? 4. _____ cu. meter(s)

5. What number added to 8% of itself is 64.8 ? 5. _____

6. An advance from 10 to 40 is a gain of 300%. What per cent is a decline from 40 to 10? 6. _____ %

7. Last year 2 million young people were enrolled in elementary schools. This year 2.4 million pupils are enrolled. What is the percent increase from last year to this year? 7. _____ %

8. If a sportscoat now sells for \$76.50 after a 10% markdown, and an 8% markup, what was the original cost? 8. \$ _____

Hudson, Hudson Catholic, Marianhill, Marlborough, St. Peters-Marion, Southbridge, Tantasqua, Wachusett

ROUND I

1 point 1. -3

2 points 2. $3/7$

3 points 3. -22

ROUND II

1 point 1. 14

2 points 2. 140

3 points 3. $\frac{41}{14}$ or $2 \frac{13}{14}$ ROUND III

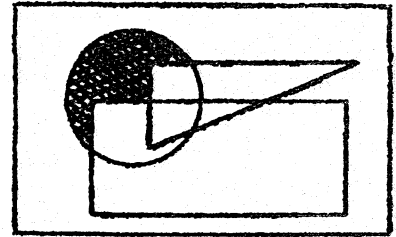
1 point 1. 9

2 points 2. 20

3 points 3. 60 meters

ROUND IV

1 point 1.



1 point 2. a) {a, c, e}

1 point b) {a, b, c, d}

3 points 3. 16

TEAM ROUND3 POINTS FOR EACH QUESTION

1. 225

2. 300

3. 28%

4. 1 cu. meter

5. 60

6. 75%

7. 20%

8. \$78.70