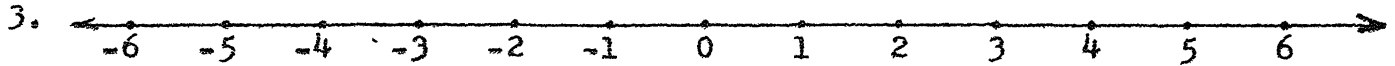
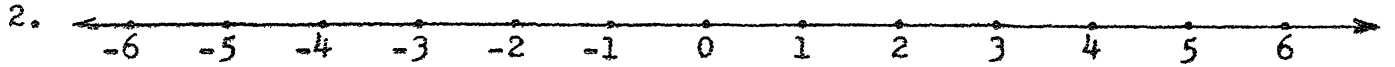
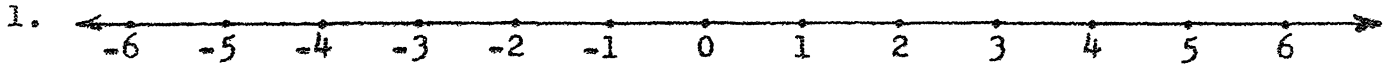


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WOCOMAL FRESHMAN MEET

ROUND I: GRAPHING ON THE NUMBER LINE

ANSWERS



ON THE NUMBER LINES ABOVE DRAW THE GRAPHS OF THE SOLUTIONS OVER THE SET OF REAL NUMBERS FOR THE FOLLOWING OPEN SENTENCES. USE THIS NOTATION FOR  $3 \leq x < 5$  or  $x \geq 6$  

(1 point) 1.  $|x - 2| \leq 3$

(2 points) 2.  $\{x: -2 < 4 - 3x < 2x - 1\}$

(3 points) 3.  $|x - 3| - |x| < 1$

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ROUND II: AREA & VOLUME

ANSWERS

(1 point) 1. \_\_\_\_\_ square feet

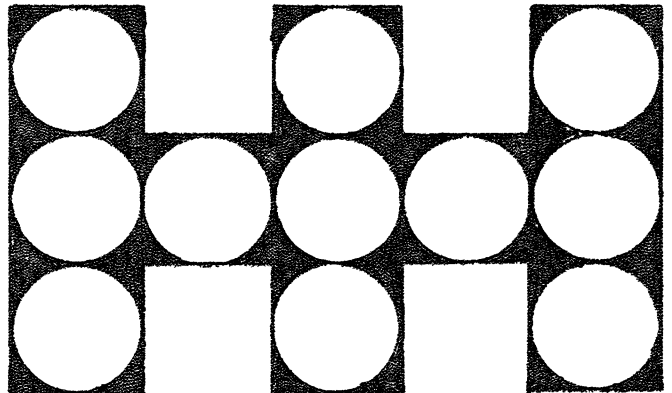
(2 points) 2. \_\_\_\_\_ liters

(3 points) 3. \_\_\_\_\_ square cm.

1. The length of a rectangle is 2 feet more than the width and the perimeter is 44 feet. Find the area of the rectangle.

2. How many liters are there in a container which is a right circular cylinder if the diameter of its bottom is 40 centimeters and the height is 2 meters. A liter is equal to the volume of a 10 centimeter cube. Leave your answer in  $\pi$  form and measured in cubic centimeters.

3. Find the area of the shaded region if the perimeter of the figure is 144 cm. Assume that the circles and line segments just touch. Leave the answer in terms of  $\pi$ .



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ROUND III: OPEN

ANSWERS

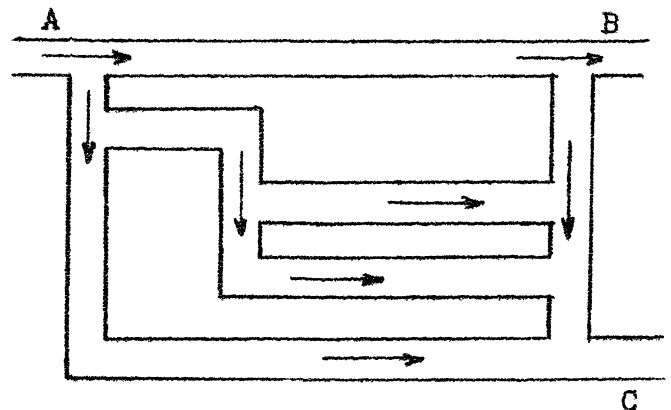
(1 point) 1. \_\_\_\_\_

(2 points) 2. \_\_\_\_\_  $\frac{1}{2}$

(3 points) 3. \_\_\_\_\_

1. If  $x * y = x + y + xy$ , find  $(2 * 3) * 2$ .

2. Professor Katz's educated mice travel only in the directions shown by the arrows. When they come to a corner, they are just as likely to go one way as the other. What percent of the mice that enter at door A leave by door C?



3. How many ordered pair solutions of the system

$$\begin{cases} x > 0 \\ y \geq 0 \\ 5x + 3y < 15 \end{cases}$$

have only integer coordinates?

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ROUND IV: OPERATIONS ON NUMERICAL  
FRACTIONS AND DECIMALS

ANSWERS

(1 point) 1. \_\_\_\_\_

(2 points) 2. \_\_\_\_\_

(3 points) 3. \_\_\_\_\_

1. Simplify  $\frac{\frac{2}{3} + \frac{5}{6}}{\frac{3}{5} - \frac{1}{2}}$ .

2. What is the sum of the numerator and denominator (in reduced form) of the fractional equivalent of the repeating decimal  $0.\overline{21}$ .

3. The numerator of a fraction is 3. If the numerator is increased by 9 and the denominator is increased by 11, the resulting fraction is equal to  $\frac{1}{2}$ . What was the original denominator?

Holy Name, Southbridge, Wachusett

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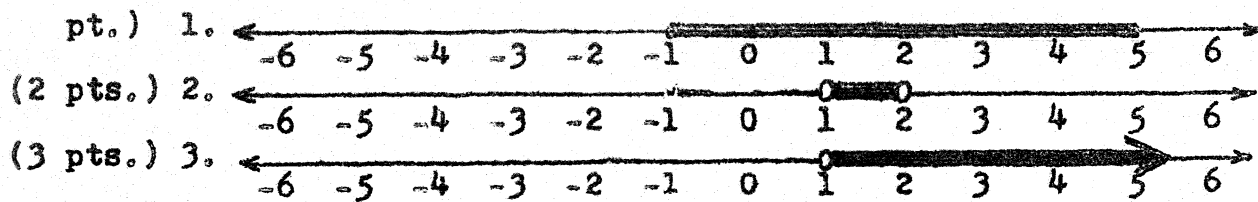
TEAM ROUND: NUMBER THEORY - PRIMES, DIVISIBILITY,  
LCM, GCF, SEQUENCES & SERIES

ANSWERS  
TWO POINTS EACH

1. How many times is 2 a factor of 512 ? 1. \_\_\_\_\_
2. Find the product of the least common multiple and the greatest common factor of 210 and 85. 2. \_\_\_\_\_
3. If set  $A = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots\}$  and set  $B = \{2, 1, \frac{2}{3}, \frac{1}{2}, \frac{2}{5}, \dots\}$ , find the 100<sup>th</sup> term in the set formed by adding corresponding terms of sets A and B. 3. \_\_\_\_\_
4. Find the least common multiple of 14, 10, 21, 15. 4. \_\_\_\_\_
5. Find three prime numbers whose product is 1353. 5. \_\_\_\_\_
6. How many digits are used to number the pages of a book from 1 through 128 ? 6. \_\_\_\_\_
7. Divide the least common multiple of 12, 16, 20 by the greatest common factor of 126 and 240. 7. \_\_\_\_\_
8. Indicate by letters a, b, c, and d which of the following are integers: (a)  $424710 \div 8$   
(b)  $424710 \div 9$   
(c)  $424710 \div 10$   
(d)  $424710 \div 11$  8. \_\_\_\_\_
9. Take the prime number that is greater than 47 but less than 59, and subtract the greatest common factor of 42 and 56, then multiply by the negative reciprocal of  $-\frac{3}{2}$ . State your answer. 9. \_\_\_\_\_
10. What is the greatest common factor of 187 and 119. 10. \_\_\_\_\_
11. Establish the next two numbers in the sequence 1, 5, 14, 30, 55, 91, \_\_\_\_, \_\_\_\_. 11. \_\_\_\_\_
12. Determine the next two numbers in the sequence 1, 4, 9, 61, 52, 63, \_\_\_\_, \_\_\_\_. 12. \_\_\_\_\_

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ROUND I



ROUND II

- (1 pt.) 1. 120 Sq. Ft.  
 (2 pts.) 2.  $80\pi$  liters  
 (3 pts.) 3. or  $396 - 99\pi$  sq. cm.  
 $99(4 - \pi)$  sq. cm.

TEAM ROUND  
TWO POINTS EACH

1. 9  
 2. 17850  
 3.  $\frac{3}{100}$  or 0.03  
 4. 210  
 5. 3, 11, 41  
 6. 276  
 7. 40  
 8. b, c, d  
 9. 26  
 10. 17  
 11. 140, 204  
 12. 94, 46

ROUND III

- (1 pt.) 1. 35  
 (2 pts.) 2. 75 %  
 (3 pts.) 3. 6

ROUND IV

- (1 pt.) 1. 15  
 (2 pts.) 2. 40  
 (3 pts.) 3. 13