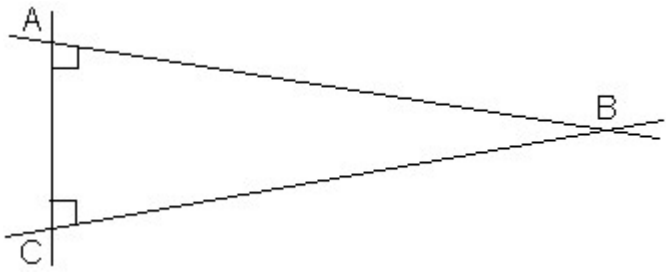
MAGNET IM 6 - SUMMER PROBLEMS
FOR INCOMING 6TH GRADE STUDENTS

Please use a pencil to neatly record your solutions to the following problems. The solutions should be recorded on notebook paper. Each solution must include the procedure (steps) you used to solve the problem. Include tables, diagrams, written explanations, or other aids when appropriate. This assignment is optional and will not be graded. An answer key is provided. Please feel free to discuss the solutions with others. I hope you find the problems to be challenging but enjoyable.

1. Complete the magic square so that it contains all of the numbers from 1 to 25. The sum of each line, each column, and each of the two diagonals should be 65.

1		22		
7		3	11	
13	21		17	5
19	2		23	
25		16		

2. State at least two reasons why 3ABC does not exist as drawn in the following diagram.



3. Complete the equation by filling in the five blanks with the numbers 1, 2, 3, 5, and 6. Each number may be used only once.

(___ + ___ - ___) × ___ ÷ ___ = 4

4. Peter, Ann, Bob, and Chip go to the same school. They are in different math classes taught by Mr. Potts, Ms. Able, Ms. Brave, and Mr. Chump. No student has a math teacher whose last name begins with the same letter as the student's first name. Each student owns a pet, and its name does not begin with the same letter as its owner's first name. The pets are: a pink panther, an anteater, a boa, and a chimp.

    - Ann's best friend has a boa for a pet.
    - Mr. Potts and his student both have chimps for pets.
    - Chip was the only one who got an A on the first math test.
    - Chip and the student who has the anteater have lunch together.
    - Bob is in math class at 2 o'clock, the same time as Peter.
    - Mr. Potts and Ms. Brave did not give any A's on the first test.
    - Ms. Brave only teaches in the morning.

    Who owns the pink panther? Name each student's math teacher and pet.

5. If this text were arranged alphabetically, what would the 13th word be?

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    Her own mother lived the latter years of her life in the
    horrible suspicion that electricity was dripping invisibly
    all over the house.
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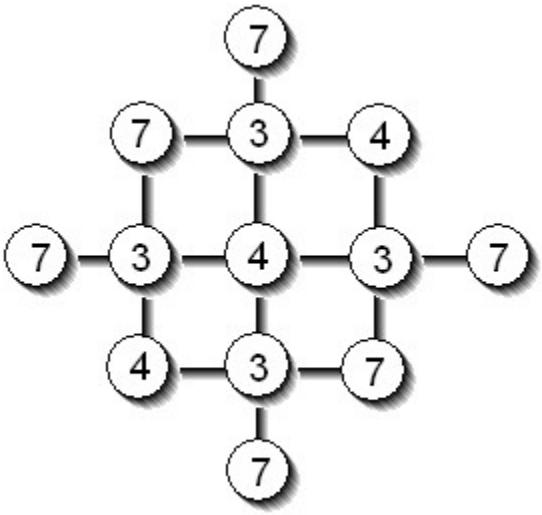
    – James Thurber

6. How many times can you read 734? The sequence is valid only if the numbers are joined by a line.

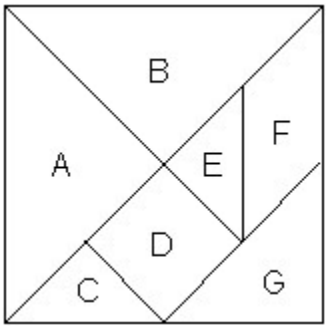


7. Suppose that a printer is using an old-style printing press and needs one piece of type for each digit in the page numbers of a book. A certain book contains pages numbered from 1 to 375.

   a. What is the total number of pieces of type that the printer will need to print these page numbers?
   b. How many 3s will the printer need?
   c. How many 4s will the printer need?
   d. How many 8s will the printer need?

8. If a certain number is divided by 2, 3, 4, or 5, the remainder is 1 in each case. What is the least number that satisfies these conditions?

9. The figure at the right shows a square separated into the seven pieces of an ancient puzzle called the **tangram**. If the area of the entire square is one square unit, what is the area of each of the seven tangram pieces?



10. a. If $a \# b$ is defined as $\frac{a+b}{2}$, what is the value of $\frac{1}{3} \# \left(\frac{1}{5} \# \frac{1}{7}\right)$ written as a simple fraction its lowest terms?

    b. Write the following expression as a simple fraction in lowest terms.

$$\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3}}}}$$

MAGNET MATH 6 – SUMMER PROBLEMS – SOLUTIONS

1.

1	14	22	10	18
7	20	3	11	24
13	21	9	17	5
19	2	15	23	6
25	8	16	4	12

2. As the figure is drawn, ΔABC would contain over 180° in the sum of its angles.
   As the figure is drawn, line AB and line CB are parallel and would never meet.

3. $(6 + 5 - 3) \times 1 \div 2 = 4$

4. Peter's teacher is Mr. Chump and his pet is the anteater. Ann's teacher is Ms. Brave and her pet is the pink panther. Bob's teacher is Mr. Potts and his pet is the chimp. Chip's teacher is Ms. Able and his pet is the boa.

5. Mother

6. 16 ways

7. a. 1017 b. 154 c. 78 d. 67

8. 61

9. A = $\frac{1}{4}$ un^2 B = $\frac{1}{4}$ un^2 C = $\frac{1}{16}$ un^2 D = $\frac{1}{8}$ un^2

   E = $\frac{1}{16}$ un^2 F = $\frac{1}{8}$ un^2 G = $\frac{1}{8}$ un^2

10. a. $\frac{53}{210}$ b. $\frac{7}{11}$