

Rising Grade 8 Math (Integrated Math I)

OPTIONAL Summer Enrichment Packet

You may choose to do as many or as few of these problems as you like. The goal of this packet is to provide an opportunity for you to reinforce and expand your mathematical reasoning. You are highly encouraged to work with others, including friends and family members.

If you have questions, I will be checking my work email about once a week from June 17th – August 16th. My email address is ghiltebrand@barrie.org.

Beginning August 19th, you should begin reaching out to the new math teacher, Ann Smith. Her email will be available on the school website.

1. The following problems are based on this sequence of equations:

$$\begin{array}{r} - \\ 1 = 1 = 1^3 \\ 3 + 5 = 8 = 2^3 \\ 7 + 9 + 11 = 27 = 3^3 \\ 13 + 15 + 17 + 19 = 64 = 4^3 \end{array}$$

- a. Write down the next three rows to continue the sequence.
- b. Consider the sequence 1, 3, 7, 13, ... of the first terms in the sums of part (a). Write the first ten terms in this sequence.
- c. Write out the tenth row in the pattern established in part (a).

2. In a college mathematics class all the students are also taking anthropology, history, or psychology and some of the students are taking two or even all three of these courses.

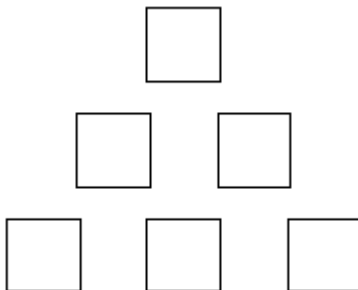
If (i) forty students are taking anthropology, (ii) eleven students are taking history, (iii) twelve students are taking psychology, (iv) three students are taking all three courses, (v) six students are taking anthropology and history, and (vi) six students are taking psychology and anthropology, then

a. How many students are taking only anthropology?

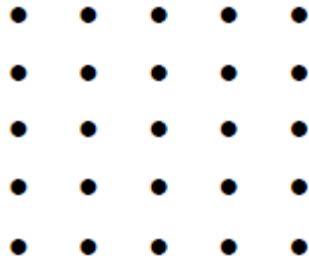
b. How many students are taking anthropology or history?

c. How many students are taking history and anthropology, but not psychology?

3. Use the fractions $\frac{2}{3}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{5}{6}$, $\frac{1}{2}$ and the whole number 1 to fill in the spaces below so that each side of the triangle will have the same sum. Use each number only once.



4. Consider the following array of dots.

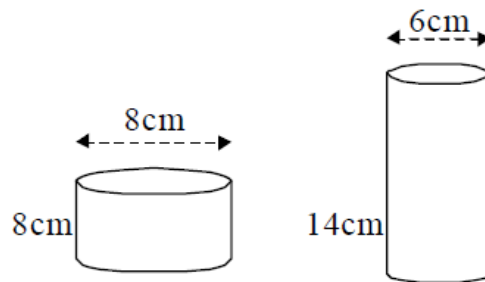


- a. How many squares can you form by connecting these dots?
- b. How many contain the center dot of the array in their interior?
- c. Write an explanation of how you found your answers and describe any patterns you found.

5. A homeowner has a 9 x 12 yard rectangular pool. She wants to build a concrete walkway around the pool. Complete the following table to show the area of the pool.

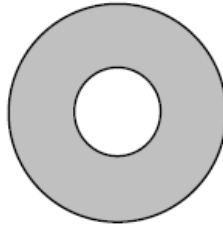
Width of Walkway	Area of Walkway
0.5 yard	
1.0 yard	
1.5 yard	
2.0 yard	
N yard	

6. Some merchandisers take advantage of optical illusions just as some pollsters, advertisers and others do.



- Which of the cans depicted here seems to have the greater volume?
- Actually compute the volumes of the cans.
- Which shape of can do you see more often in the grocery store? Why do you suppose this is so?

7. An annulus is the region bounded by two concentric circles.



- a. If the radius of the small circle is 1 and the radius of the larger circle is 2, what is the area of the annulus? Explain how you solved the problem.
- b. A dartboard has four annular rings surrounding a bull's eye. The circles have radii 1, 2, 3, 4, and 5. Suppose a dart is equally likely to hit any point on the board. Is the dart more likely to hit the outermost ring or inside the region consisting of the bull's eye and the two innermost rings? Show how you determined your answer.

