

Y8 Academic Mathematics Enrichment

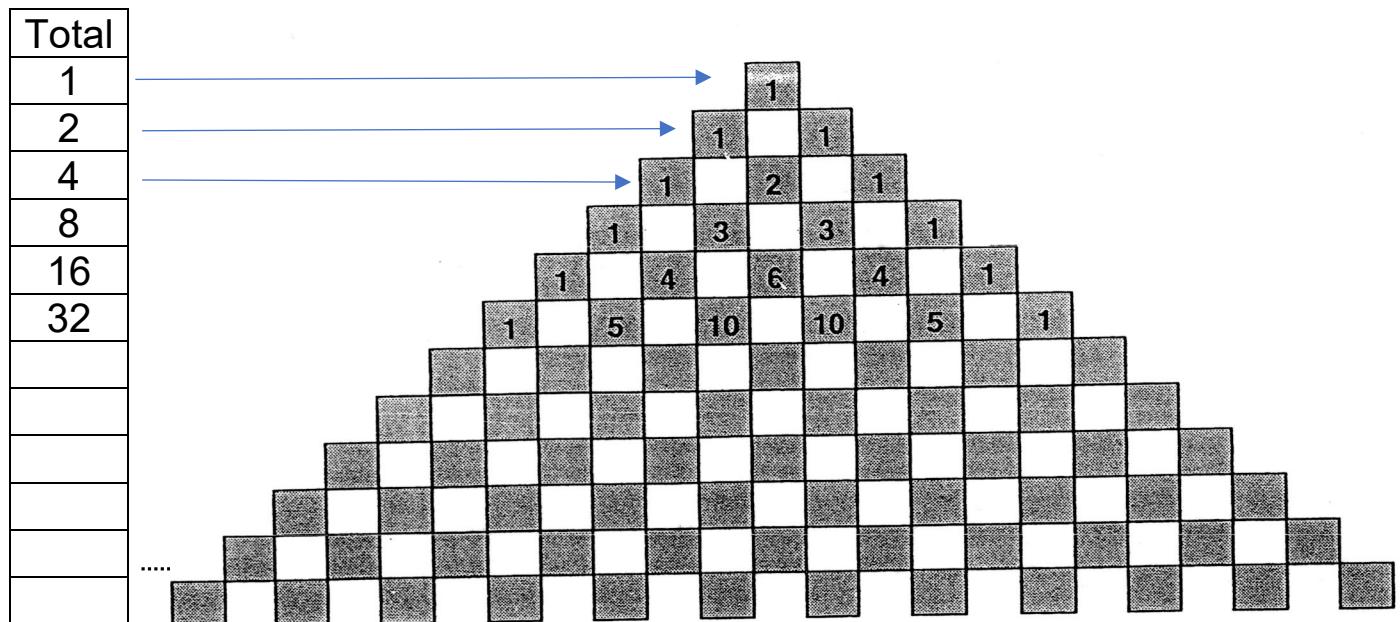
These tasks are created to encourage you to problem solve, think creatively and outside the box. You might explore some new areas of mathematics that you may want to research further on the Internet if you wish to. Some tasks will take longer than others and some tasks are open-ended, so you may not complete them “fully”, which is perfectly okay. You can attempt the tasks in any order you wish and you don’t need to start with Activity 1. See which one you fancy! Please send in any solutions to your Mathematics teacher and ask for help and guidance if you require it. We hope you have fun trying these activities.

Activity 1

Consider a rectangle of length A and width B .

- If its length is increased by 10% and its width by 10%, what is the percentage increase of the perimeter?
- What is the percentage increase of the area?
- What if its length, A , had been increased by 20% and the width by 10%?

Activity 2



- Complete six more rows by filling in the shaded boxes.
- Complete the total column
- Write down any sequences you can spot.
- Can you identify the triangular numbers?
- Search the Internet for tetrahedral numbers, can you spot the link with the triangular numbers?

Activity 3

The Insurance Man Problem



A woman heard knocking at her door. She answered it and saw a man carrying a briefcase. He told her he was selling insurance and asked if she would like to buy a policy. She thought about it then said she would if he could tell her the ages of her three children based on a series of clues.

Clue 1

She told him that the product of the ages of her three children was 36. He had a think then said he would need another clue.

Clue 2

She told him that the sum of the ages of the children was the same as the number of the house next door.

He jumped over the fence, looked at the number of the house next door, jumped back over the fence and said he would need another clue.

Clue 3

She told him that her eldest child played the piano

The insurance man then told her the ages of the children.
What are their ages?

Activity 4 - Puzzles

1. Brothers and sisters

Each child in a family has at least 3 brothers and 2 sisters. What is the smallest number of children the family might have?

2. The Circle

A number of children are standing in a circle. They are evenly spaced and the 6th child is directly opposite the 16th child. How many children are there altogether?

3. The Pole

There is a pole in a lake. One-half of the pole is in the ground, another one-third of it is covered by water, and 9 ft is out of the water. What is the total length of the pole in ft?

4. The River

A man has to get a fox, a chicken, and a sack of corn across a river. He has a rowboat, and it can only carry him and one other thing. If the fox and the chicken are left together, the fox will eat the chicken. If the chicken and the corn are left together, the chicken will eat the corn. How does the man do it?

5. The Portrait

A man on a park bench is looking at a small portrait. You ask him, "Who is that in the picture?"
The man says, "Brothers and sisters, I have none, but that man's father, is my father's son."
Can you tell what person is in the picture?

6. Making 100

Using the numerals 1,7,7,7,7 create the number 100. As well as the five numerals you can use the usual mathematical operations +, -, x, ÷ and brackets ().

7. Cards

On your travels you come to an old man on the side of the road holding three cards from a standard deck face down. Trying to make conversation you ask him what the three cards are. He tells you, "To the left of the queen, are one or two jacks. To the right of the jack, are one or two jacks. To the right of the club, are one or two diamonds. To the left of the diamond, are one or two diamonds." What are the three cards?

Activity 5

- How many fractions lie between $\frac{1}{2}$ and $\frac{3}{4}$ Explain.
- Can we make sense of:

$$\frac{3}{2}, \quad \frac{5}{4}, \quad \frac{7}{3}$$

$$\begin{array}{r} 1 \\ \hline 2+ \quad \quad 1 \\ \hline \end{array}$$

$$1 + \frac{1}{2}$$

Can you work out what the big fraction equals to?