



MATHEMATICAL CHALLENGE 2021–2022

Entries must be the unaided efforts of individual pupils.

Solutions must include explanations and answers without explanation will be given no credit.

Do not feel that you must hand in answers to all the questions.

Junior Division: Problems 1

- J1.** In the diagram (not to scale) the rectangle is divided into nine smaller rectangles. The areas of five of the smaller rectangles are given. Determine the area of the rectangle labelled R .

5		2
	4	R
3	2	

- J2.** Forest Rovers, Southside United, Hilltown Thistle and Valley Wanderers were to play each other at football. After some of the matches had been played, a table showing some details of matches played, won, lost, drawn etc looked like this:

	Played	Won	Lost	Drawn	Goals for	Goals against	Points
Forest Rovers	2			1	0		
Southside United							0
Hilltown Thistle	1						
Valley Wanderers			0	0	4	2	6

3 points are given for a win and 1 for a draw. Complete the table and find the score in each match played, explaining how you worked it out.

- J3.** A and B are two towns connected by a single road which crosses a bridge over a wide river. James leaves A at 10.38 am and walks along the road to B at uniform speed, reaching B at 1.50 pm. On the same day Isla leaves B at 9.20 am and walks along the road to A at uniform speed, reaching A at 12 noon. They arrive at their nearest end of the bridge at the same time. James leaves the bridge one minute later than Isla.

At what time did they reach the bridge?

- J4.** At present, the sum of the ages of the parents, P , is five times the sum of the ages of their children, C . Two years ago, the sum of the ages of the husband and wife was eleven times the sum of the ages of the same children. A year from now, it will be four times the sum of the ages of the same children.

Determine the number of children.

- J5.** Two numbers x and y satisfy three of the following equations but do not satisfy the remaining one.

$$x + y = 63$$

$$x - y = 47$$

$$xy = 392$$

$$\frac{x}{y} = 8$$

What is the value of x ?

END OF PROBLEM SET 1