

SHREWSBURY SCHOOL

Mathematics Prize, 1965

1. On a moving stairway, I find that if I walk down 26 steps I require 30 seconds to reach the bottom, but if I make 34 steps I require only 18 seconds. If each step is 8 inches high, what is the height of the stairway?

2. Replace the stars and letters by numbers in the following square root calculation:

$$\begin{array}{r}
 \begin{array}{l} x \\ * * \\ * * * \end{array} \left| \begin{array}{l} * * * y y * \\ * * \\ y * y \\ y x * \\ \hline x * y * \\ x * y * \end{array} \right. \begin{array}{l} x * * \\ * * * \end{array}
 \end{array}$$

3. Find four consecutive numbers that are divisible by 3, 7, 11, 15 respectively.

4. Two variable chords AB and CD, inclined to each other at a constant angle, intersect inside a circle. Prove that arc AC + arc BD is constant and state the corresponding result if the chords meet outside the circle.

ABCD is a cyclic quadrilateral; AB and DC produced meet at X, BC and AD produced meet at Y. Prove that the internal bisectors of angles BXC and CYD meet at right angles.

5. If a hen and a half lay an egg and a half in a day and a half, how many and a half who lay better by half will lay half a score and a half in a week and a half?

6. '... they slung up with great Dexterity one of their largest Hogsheads, then rolled it toward my hand, and beat out the Top; I drank it off at a draught, which I well might do, for it hardly held half a Pint'. If 'a typical Lilliputian was a human Creature not six inches high', how many Lilliputian gallons did the hogshead contain?

7. Make a list of the matches to be played in each of the five rounds of a league competition for six teams.

Make a similar table for the '1st Leagues' competition at Shrewsbury.

8. In the accompanying 'Pythagoras figure' prove that AJ is perpendicular to BC.



