

# Shrewsbury School.

## ARITHMETIC PRIZE.

March, 1919.

1. From the Times of Feb. 25th :—

The total figures of the Miners' Ballot as announced in the House of Commons by the Leader of the Labour Party are :—

For a strike	...	...	...	611998.
Against	...	...	...	104997.

Majority for ... 507001

This return includes the following :—

	For	Against.
Scotland	... 76383	14014.
Yorkshire	... 98752	9118.

Find, correct to 1 decimal place, what percentage of all the voters came from Scotland, also what percentage of the Yorkshiremen who voted were in favour of a strike.

Find also what is the greatest number of men in favour of the strike who might have transferred their votes and still maintained the necessary two-thirds majority.

2. A boy did a multiplication sum and then most of it was rubbed out. All that was left is shown below, the dots indicating gaps caused by the missing figures. Fill in all these gaps.

$$\begin{array}{r}
 1 \ . \ 8 \ . \ . \\
 \underline{\hspace{1.5cm}} \\
 \ . \ . \ . \ . \ . \\
 \ . \ . \ . \ 1 \ 3 \\
 3 \ 8 \ . \ . \ 7 \\
 \underline{\hspace{1.5cm}} \\
 \ . \ . \ . \ . \ . \ 2 \ . \\
 \underline{\hspace{1.5cm}}
 \end{array}$$

3. A sum of money is put out at Compound Interest. The first year's Interest was £65 2s. 1d. and the fourth year's Interest £73 4s. 8d. Find the sum and the rate per cent.

4. In a certain election there were both men and women qualified to vote, the number of women being 10% less than the number of men. Of the men 47% voted for Mr. Chipp, 43% for Mr. Chop, and the remainder did not vote. Of the women 36% voted for Mr. Chip, 41% for Chop, and the remainder did not vote. The successful candidate had a majority of 75. How many votes did each candidate get?

5. Shew how to invest £1000 partly in 2 per cents. at 48 and partly in 3 per cents. at 54, so as to get 5% on the whole.

6. A piece of copper wire is in the form of a circle with 18" radius. Without being cut it is bent into the form of a semi-circle. Find the area now enclosed. ( $\pi = \frac{22}{7}$ )

7. Two taps discharge into a leaky cistern. One alone can fill it in 12 minutes, and the other in 15, while if turned on together they would fill it in 6 minutes. How long would they take to fill it if both are turned half on?

8. A train starts full of passengers. At the first station it drops one-third of these and takes in 96 more, at the next station it drops one-half of the new total and takes in 12 more, on reaching the third station 248 passengers get out and the train is now empty. How many started?

9. A 3-quart vessel contains 2 quarts of wine, and a 2-quart vessel is full of water. Pour from the smaller into the larger till full, mix and pour back to fill the smaller. What is now the proportion of wine in the smaller, and what would it be if the operation were repeated?

10. If a cube whose edge is 3 inches be placed with one angular point on a table, find to three decimal places the greatest height at which the opposite point may be above the table.

11. The driving wheels of a motor car by means of a differential gear can move independently. Suppose a car, starting from Shrewsbury, were to go the round Wellington, Market Drayton, Shawbury and back to Shrewsbury, finishing up in exactly the position it started, prove that one back wheel would have made 4 revolutions more than the other, assuming no slipping, and that the car always moves in straight lines or arcs of circles. Given wheel-base = 6ft., diameter of wheels = 3ft.

12. A certain number of teams enter for a knock-out competition. All "byes" are worked off in the first round. Prove that the total number of matches played must be one less than the total number of teams entered.