

Shrewsbury School.

ARITHMETIC PRIZE, 1925.

1. In reckoning my Income Tax there are deducted from my whole income (i) Earned Income Allowance, which is $\frac{1}{10}$ of my income, (ii) Personal Allowance £135, (iii) Allowance for Life Insurance. After these deductions I pay at the rate of $4/6$ in the £ on the remainder. The next year the rate becomes $4/-$ in the £, and the Earned Income Allowance becomes $\frac{1}{6}$ of my income, while other things remain the same. This reduces my tax from £67 3s. 3d. to £52 10s. 0d. What is my income, and my allowance for Life Insurance ?

2. A boy had to take a parcel to the middle house in a certain row. He assumed that there were 333 houses in the row and that they were numbered 1, 2, 3, etc. He found No. 1, and followed the row till he reached what, calculating from the number plate on its door, he took to be the middle house. The houses, however, were numbered 1, 3, 5, 7, etc., and there were 339 houses in the row. How many doors further had the boy to go ?

3. A, B, C start on a journey, having £9, £7 - 10, £5 - 10 respectively with them. At the end it is found that A has left 10/-, B £5, C £1 - 15. For expenses common to B and C only, B has paid £1 - 10; for private expenses A has paid £1, B 10/-, C £1; all other payments have been made to defray expenses in common. How should they divide the money that remains over ?

4. A certain income can be obtained by an investment in the $3\frac{1}{4}$ per cents at $93\frac{3}{8}$. The same income can also be obtained by investing £1595 less in the $4\frac{1}{4}$ per cents at $105\frac{3}{8}$, no brokerage being charged on either transaction. What is the income ?

5. A gallon of spirit valued at 24/- weighs $\frac{1}{4}$ less than a gallon of water. Water is now added to the spirit till a gallon of the mixture weighs $\frac{1}{15}$ more than a gallon of the spirit. What is the value of this mixture per gallon ?

6. On one day as many hundreds of oranges could be bought for half a sovereign as dozens could be bought for a shilling on the previous day. A woman bought 75 on each day and paid altogether for them $5/6$. How many oranges could be bought for sixpence on the first day ?

7. Two fog signals are placed on a railway at distances of 1 mile and $1\frac{1}{2}$ miles from a station. If the second report is heard at the station 1 min. after the first, in how long a time after that will the train pass, and at what rate is the train moving, sound being assumed to travel at the rate of 1125 ft. per second ?

8. A wine merchant buys two casks of whiskey, which differ in size and in the quality of their contents. He intends to sell the whiskey by the gallon, so as to make a profit of 20% on each cask, in which case the price of the better whiskey would have been $1/6$ per gallon more than that of the other; but by mistake the prices are interchanged, with the result that he receives £1 - 11 - 6 less than he expected and only makes a profit of 16% on the transaction. If the two casks together contain 50 gallons, what was the cost of the whiskey in each cask ?