

shipping company at £3 10s. per share, each share representing a nominal capital of £8. The rest of the money he puts into the Government Savings-bank, and receives interest at 4 per cent. If the shipping company declare a dividend of 4 per cent. on its nominal capital, what is the man's total income from his investments, and what rate per cent. does he get for the money put into each of the companies?

11. The velocity of a planet in its orbit varies inversely as its distance from the sun. The greatest distance of Mars from the sun is to its least distance as 16·658 to 13·816. Its greatest velocity is 703,230 miles per day. Find its least velocity.

12. Two men, A and B, walk to meet one another, starting at the same time. The distance between their starting-points is 25 miles 897 yards, and A goes 9 yards for every 8 that B walks. Find how much each will have walked when they meet.

Arithmetic.—For Class E, and for Junior Civil Service. Time allowed: 3 hours.

1. How can you determine by inspection whether a fraction, in its lowest terms, will have for equivalent a recurring or a terminating decimal fraction?

Reduce 2cwt. 45lb. to the decimal fraction of a ton.

2. Reduce $3\frac{7}{8}$ lb. av. to troy weight.

Find the sum of 3·261, 6·3, and ·0432.

3. What relation does true discount bear to true present worth?

What is the true present worth of £845 15s., due 3 years hence, at $5\frac{1}{2}$ per cent. simple interest?

4. If goods worth £1,473 be insured at the rate of £1 16s. per cent., on what amount must insurance be paid so that, in the event of loss, the value of the goods and of the premium may be recovered?

5. A room is 23ft. 8in. long, 15ft. 7 $\frac{1}{2}$ in. wide, and 11ft. 3in. high. After deducting $\frac{1}{4}$ of the area for the space occupied by the door and windows, what will be the cost of painting the walls at 10 $\frac{1}{2}$ d. per square yard?

6. A grocer buys 16lb. of tea at 2s. 2d., 20lb. at 2s. 5d., and 28lb. at 2s. 9d. At what price per pound must he sell the tea, when mixed, so as to get a profit of 10 per cent.?

7. The number of passengers in a train was 175. The first-, second-, and third-class passengers were in the proportion of 3, 5, and 17. The miles travelled by each class averaged 48, 32, and 15, and the fares were 3 $\frac{1}{2}$ d., 2 $\frac{1}{2}$ d., and 1 $\frac{1}{2}$ d. per mile. What was the whole amount of the fares?

8. A man invests a certain sum of money in the $3\frac{1}{2}$ -per-cents at 96; his friend invests an equal sum in the 4-per-cents; and they get the same amount of interest. At what price are the 4-per-cents?

9. What is the value in English money of a bill for 5,000 marks when the course of exchange is 20·38 marks?

What was the course of exchange in London when a sight draft on New York for 900 dollars sold for £181 17s. 6d.?

10. If one man can mow a quarter of an acre of grass in $1\frac{1}{2}$ hours, and another can do it in 1 hour 12 minutes, what, when working together, could they mow in an hour?

11. A man rows 6 miles in 2 hours 15 minutes against a stream, the rate of which is 3 miles an hour. How long will he be rowing 13 miles with the stream?

12. Divide 496 into 4 parts so that 3 times the first, 5 times the second, 7 times the third, and 9 times the fourth may be equal.

Arithmetic.—For Senior Civil Service. Time allowed: 3 hours.

1. Multiply 7356421 by 28814412, using only three lines of multiplication. Do the same thing, taking 289452 as the multiplier. Verify the last result by the ordinary method.

2. Find the Greatest Common Measure of 23024545 and 5852845. Find also their Least Common Multiple.

3. State the rule for the multiplication of decimals. Obtain, accurately, to seven places of decimals, the product of 0·69314718 and 0·43429448. Also, to the same degree of accuracy, find the product of the second number and 2·30258509.

4. Given that the diameter of the earth is 7,926 miles, and that a kilometre is a length such that 10,000 kilometres make a quarter of the circumference of the earth, find, to four places of decimals, the number of kilometres in five miles. (Assume that the circumference of a circle is $\frac{22}{7}$ of the diameter.)

5. What is meant by the term "rate per cent."? A company has a paid-up capital of £430,600. At the end of the financial year there is a profit of £33,326. What is the largest rate per cent. that can be declared as a dividend so as to leave at least £4,000 to be carried forward to a reserve fund? Assuming a rate of 5 per cent. declared, how much will go to the reserve fund?

6. Simplify—

$$\left(\frac{1}{2} + \frac{\frac{1}{8} + \frac{1}{8}}{\frac{1}{8} - \frac{1}{8}}\right) \times 142857 \times \frac{3 + \frac{1}{5 + \frac{1}{7}}}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2 + \frac{1}{14}}}}}$$

7. Find, by Practice, the cost of 34 yards 2ft. of carpet at 6s. 3d. per yard.