

ARITHMETIC.

(Two hours and a-half allowed for this paper.)

Candidates are not permitted to answer more than *one* question in each section. The *solution* must be given at such length as to be intelligible to the Examiner, otherwise the answer will be considered of no value.

Section 1.

(a) How many multiples of four hundred and seventy-nine lie between fourteen hundred, and one million five hundred and thirty-nine thousand and twenty-seven?

(b) What is the effect upon the remainder, if the divisor be increased by a small quantity without altering the quotient?

(c) What is the average weight in lbs. of nine hams arranged in a row, if the ham at one end of the row weighs $1\frac{1}{2}$ qrs. and the weight of each of the others in succession is greater by 36 oz. than the weight of the ham next preceding it in the row?

(d) How many houses can be built on a frontage of $\frac{3}{4}$ of a mile, each house having a frontage of 36 feet 8 inches, allowing for 11 streets, each having a width of 40 feet?

(These form one question.)

Section 2.

1. An emigrant ship allows 64 cubic ft. of luggage for each person, and requires 10d. for each cubic foot in excess of this allowance: a man pays £7 13s. 4d. excess for his own, his wife's, and his daughter's luggage; how many cubic feet of luggage does the man take, if the wife and daughter each take half as much again as he did?

2. A span of 16 oxen can draw a load of $4\frac{1}{2}$ tons for a distance of 7 miles per day; a man carrying 112 lbs. can travel 21 miles per day: how much more will be carried by 120 men a distance of 147 miles (the men going and returning at a uniform rate) than by two spans of oxen?

3. A railway reduces its fares for first class passengers from 3d. to 2d. per mile, and for second class passengers from 2d. to $1\frac{1}{2}$ d. per mile; before the change of fares 10,000 persons travel second class daily between two towns, and 1,600 first class: after the

change of fares, 10 per cent. of the second class passengers begin to travel first class, but the total number of second class passengers is increased by 50 per cent. Find the total gain per train mile.

Section 3.

1. Prove the rule for division of vulgar fractions. Find the value of—

$$\frac{2\frac{1}{2} + 3\frac{1}{2} + 7\frac{1}{2}}{3\frac{1}{2} - 2\frac{1}{2}} \times 2\frac{1}{2} \div (4\frac{1}{2} \text{ of } 8).$$

2. Find by successive divisions the G. C. M. of 652,674 and 1,475,600. How would you prove to your class without actual division that your G. C. M. will divide any of the divisors you have used?

3. Find the value of $7\frac{1}{2}\%$ of 5 guineas + $4\frac{1}{2}\%$ of £3 - $27\frac{1}{2}\%$ of 5s., and bring the result to the fraction of 1s. 3d.

Section 4.

1. Convert to decimal fractions $5\frac{1}{4}$, $7\frac{1}{2}$, $8\frac{1}{4}$, $1\frac{3}{4}$.

The length of a metre is 1.09363 yards: convert $150\frac{1}{2}$ English miles into kilometres.

2. Prove the rule for multiplication of decimals. Find the value of .1590 of 11 cwt. 0 qrs. 5 lbs. 8 oz.

3. Two sums of money are in the ratio of .52 : .16, and their difference is £12 16s. 2d.: find the sums.

Section 5.

1. If 49 men working for 64 days of $7\frac{1}{2}$ hours can excavate a pit with vertical sides whose edges form a square (each edge being 14 yards long), how many hours a day must 128 men work for 29 days to excavate a pit of the same depth, but longer and broader by two yards each way?

2. A company possessing £500,000 capital carries forward, at the beginning of the year, £1,082 10s.; at the end of the year a dividend of 5 per cent. is paid, and £1,178 18s. 8d. is carried forward; find the gross receipts, the cost of working being to the net receipts in the ratio of 53 : 47.

3. If a quantity of silver bought at 4s. $8\frac{1}{2}$ d. per oz., has lost in value £19 6s. $8\frac{3}{4}$ d.