

5. The flooring of a room 14 ft. 3 in. long by 13 ft. 4 in. wide is laid with $\frac{1}{2}$ in. planks each 8 in. wide and 10 ft. long. How many will be used, and what will be the weight of the whole, if 1 cub. in. of the wood weighs half an ounce?

6. A grocer buys 2 cwt. of tea, and sells the first hundredweight at 5 % profit, and the second, which cost £1 more, at 12 % profit: the difference in the retail price being 4d. a pound, find the cost price of each hundredweight.

7. Find the true present worth of £132 3s. due $2\frac{1}{4}$ years hence at $4\frac{1}{2}$ % simple interest.

8. In what time would a cistern be filled by three pipes, whose diameters are $\frac{1}{2}$ in., $\frac{3}{4}$ in., and 1 in., all open at once, if the largest alone would fill it in 40 minutes, the rates of flow being proportional to the squares of the diameters?

9. Two clocks strike together on Friday evening, and on Saturday evening one is ten minutes to eleven when the other strikes eleven: how much must the slower be put on that they may strike nine together on Sunday morning?

10. How much three-per-cent. stock must be sold out at $96\frac{1}{4}$ to buy an estate producing an income of £377 6s. 6d. at 25 years' purchase?

11. Find the value of 3 tons 11 cwt. 3 qr. 27 lb. at £1 19s. 8d. a hundredweight.

12. A offers for an estate £37,800 cash, and B offers £45,400 to be paid at the end of four years. Which is now the better offer, and by how much, allowing 5 % interest?

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

1. Obtain by practice the value of 14 miles 5 furlongs 97 yards 2 feet at £2 15s. a furlong.

2. If 3 hundredweight 3 quarters 21 pounds $12\frac{1}{2}$ ounces cost £13 6s. 3d., what is the cost of one hundredweight?

3. Find the G.C.M. of 216000 and 727488; and the L.C.M. of 7, 11, 21, 63, 91, 99, 117, 143.

4. What will it cost to paper a room 24 ft. 8 in. long, 18 ft. 4 in. wide, and 10 ft. 6 in. high, with paper 27 in. wide at 6d. a yard?

5. Simplify $\frac{24}{2\frac{1}{2} \text{ of } \frac{1}{4} \text{ of } 3} \div \frac{2\frac{3}{4} \text{ of } 1\frac{1}{2}}{4\frac{1}{8} \text{ of } \frac{3}{8}}$

6. Find the value of 0.90563 of £1; and divide 186.4302 by 31.02, 18643.02 by 0.3102, and 0.1864302 by 3.102.

7. What will be the cost of $\frac{\frac{2}{3} - 0.025}{\frac{11}{40} + 2.0625}$ of 1.03 of 88 pounds of silver at 2s. 4d. an ounce?

8. A quantity of stuff is bought at nineteen guineas a hundredweight: if 5 per cent. of it is lost by leakage, and the remainder is sold at 4s. 6d. a pound, find the rate of profit per cent.

9. If £3,200 amounts in three years to £3,560 at simple interest, what would be the amount at compound interest in the same time and at the same rate per cent.?

10. The income derived by a legatee from money invested in his behalf in the $2\frac{3}{4}$ -per-cent. at $103\frac{1}{2}$ is £85 6s. 8d.: what was the amount of the legacy?

11. The water in a mill lead has a uniform width of 1 ft. 3 in. and a depth of $3\frac{1}{2}$ in.: if it flows at the rate of 1.5 miles an hour, how many gallons will it discharge in 24 hours, estimating a gallon to contain 277.2 cub. in.?

12. A farmer at a sale bought heifers at £3 7s. 6d. a head, twice as many pigs as heifers, at 14s. 6d. a head, and 5 times as many sheep as pigs, at 6s. a head: if he paid £70 8s. 6d. for the whole, how many of each did he buy?

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

1. How can you tell by inspection whether any given number is divisible by 8, and whether it is divisible by 9? Hence show that 176437872 is divisible by 72.

2. Find the value of 968 articles at £199 17s. $9\frac{3}{4}$ d. each.

3. Simplify—

$$(a.) \frac{2+\frac{1}{2}}{2-\frac{1}{2}} + 3 + \frac{1+\frac{1}{2}}{1-\frac{1}{2}} + \frac{2-\frac{1}{2}}{2+\frac{1}{2}} - \frac{1-\frac{1}{2}}{1+\frac{1}{2}}$$

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

4. State and prove the rule for turning a mixed circulator into a vulgar fraction; and find the value of—

$$\frac{1\frac{1}{2} \text{ of } 19 \text{ of } 0.0342 \times 1.442}{0.75 \times 57.76}$$

5. If the interest payable on a debt of £4,000,000 were reduced from 4 % to $3\frac{1}{2}$ %, what sum would be saved annually? If, in consequence, the price of stock fell from 101 to $95\frac{3}{8}$, by how much would the whole property of the fundholders be diminished?

6. In a football match two players, A and B, on opposite sides, are standing 12 yards from each other in a line parallel to the goal line, and a distance of 60 yards from it. A, being opposite the goal, gets the ball, and tries to run straight in; and B, starting at the same time, runs in a straight line so as to catch him 25 yards from the goal line. Compare their respective speeds.

7. An article is sold so as to gain 5 %. If it had been bought for 5 % less, and sold for one shilling less, the gain would have been 10 %. Find the cost price.