Shrewsbury School.

ARITHMETIC.

1.—The natural numbers are written down in a row—thus 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12......What will be the thousandth digit in this row?

2.—Find the least number which when divided by 35 leaves a remainder 25, when divided by 45 leaves 35, and when divided by 55 leaves 45.

3 — Find, as shortly as possible, the square of 7·14389673 correct to 4 decimal places.

4.—Express $\frac{4}{5}$ of £4 1s. $1\frac{1}{2}$d. as the vulgar fraction of ·315 of 97 35 francs; reckoning a shilling as worth 1·26 francs.

5.—Three men, A.B.C. go into business, A contributing £5000, B £3000, and C £2500 of the capital on the understanding that, after allowing one-eighth of the profits to C as manager, the remainder should be divided amongst them all in proportion to the amount of capital contributed by each   At the end of a year C receives £280 altogether. What are the total profits of the business, and how much do A and B respectively receive?

6.—If in 5 years at compound interest £150 amounts to £200, to what would it amount in 10 years more?

7.—Sugar passes through the hands of three dealers, each of whom makes 10 per cent on his outlay, and is sold by the last of the three at $2\frac{3}{4}$d. a lb.   Find the original price of the sugar per cwt.

8.—If £7 19s. 0d. is the true discount on £272 19s. 0d. for a certain time, what is the true discount on the same sum for double that time, the rate being the same as in the first case.

9.—If money invested in the 3 per cent Consols yields interest at the rate of 3 per cent per annum after paying 5d. in the £ income tax, what is the price of the Consols.

10.—A spherical ball 3 inches in diameter is melted and re-cast into three spherical balls.   The diameters of two of these are $1\frac{1}{2}$ inches and 2 inches respectively.   What is the diameter of the other? (volume of sphere $= \frac{4}{3}\Pi r^3$).

11.—A alone can reap a field in 15 days and B in 12 days.   If A begins alone, and after a certain time B joins him, the field is reaped in $7\frac{1}{2}$ days.   How long were A and B working together?

12.—Three clocks. A, B, C, go at uniform speeds.   At noon on Monday A is 1 minute slow, B is 2 minutes slow, and C is 1 minute fast.   At 8 p.m. Tuesday B is 1 minute fast and C is 3 minutes slow. At 8 a.m. Wednesday A is $2\frac{3}{5}$ minutes ahead of B.   When do A and C both indicate the same time?

13.—Fill in the missing figures, indicated by dots, in the following division sum :—

$$7 \quad . \quad . \;) \; 5 \; 1 \quad . \quad . \quad 1 \; (\quad . \quad 2$$
$$\frac{. \quad . \quad 1 \quad .}{1 \quad . \quad 1 \quad .}$$
$$\frac{. \quad . \quad . \quad .}{1 \quad . \quad 9}$$

State the reasoning by which the missing figures may, *with certainty*, be obtained.

14.—Two men walk with uniform speed along a railway in the same direction.   A train travelling uniformly overtakes one of them, who walks at 4 miles per hour, and the whole train, which is 132 yards long, passes him in $7\frac{1}{2}$ seconds; $6\frac{3}{4}$ seconds after it began to pass the above mentioned man, the train begins to pass the other, and occupies $7\frac{1}{8}$ seconds in doing so.   How long will it take one man to overtake the other, reckoning from the time when the train began to pass the first man?