Shrewsbury School.

June, 1891.

Arithmetic Prize.

1. Simplify $\dfrac{1\frac{5}{11} \text{ of } (4\frac{3}{7} + 1\frac{2}{3} - 6\frac{5}{8} - 2\frac{2}{9} + 3\frac{7}{12})}{6\frac{3}{5} \text{ of } (1\frac{10}{11})^2 - 1\frac{1}{5}}$.

2. The circumferences of the large and small wheels of a bicycle are 14ft. 2in. and 3ft. $9\frac{1}{3}$in.; what is the least distance in which each will have turned an exact number of times? and in what distance will one have made 99 revolutions more than the other?

3. (i.) Divide 5·681 by ·0019, and multiply the quotient by $\frac{3}{23}$ of ·0001569.

(ii.) Reduce $\dfrac{\cdot 1\dot{8}}{289}$ of 7 tons 13cwt. to the decimal of $\frac{2}{3}$ of a cwt.

4. In the centre of a square court is a square of grass, and the rest is covered with gravel; if the area of the gravel be $2\cdot48\dot{4}$ times the area of the grass, compare the length of a side of the court and a side of the grass.

5. The difference between the interest and discount on a certain sum for 9 months at $3\frac{1}{3}$ per cent. is 5s. 3d.; find the sum.

6. Divide 21 tons 3 cwt. 3 qrs. 22·6 lbs. into two parts which are to one another as $35\cdot3\dot{1}\dot{8}$ min. to 2 hrs. $\cdot08\dot{1}$ min.

7. Find the price of the 3 per cents. when an increase of income of £5 6s. 3d. is made by transferring to them £4375 from the $3\frac{1}{4}$ per cent. stock at $95\frac{7}{8}$.

8. A man receives £8754 13s. 4d. for the sale of goods, upon which he receives a commission of 5 per cent.; what amount does he clear if his expenses are $15\frac{1}{2}$ per cent. of his commission?

9. Find the value of $\dfrac{\sqrt{\cdot 2} + \sqrt{\cdot 1}}{\sqrt{\cdot 2} - \sqrt{\cdot 1}}$ to three decimal places.

10. A man leaves his property to be divided among his children as follows: the eldest to have £1000 and $\frac{1}{10}$ of the sum remaining; the next, £2000 and $\frac{1}{10}$ of the sum then remaining; the next £3000 and $\frac{1}{10}$ of the sum then remaining; and so on. If all have the same legacy, find the whole property and the number of children.

11. A cube contains 421·875 cub. in.; find (i.) the length of its diagonal to three decimal places; and (ii.) the surface of the inscribed sphere, the surface of a sphere being four times the area of a circle with the same radius.

12. A person wishing to determine the length of some iron railings, and knowing the velocity of sound in iron to be (roughly) 15 times that of sound in air (1120 ft. per sec.), places his ear at one end, and notices an interval of ·4 sec. between the two sounds received, one through the air, the other through the railings, from a blow at the other end; what was the length?