

SHREWSBURY SCHOOL.

ARITHMETIC PRIZE.

March, 1930.

(N.B.—All working must be shewn.)

1. On what day of the week will Christmas Day fall in 2030 ?
(The first day of this year was a Wednesday).

2. Part of the clue for the word HECTARE in a Times Cross-word Puzzle was "There are about $2\frac{1}{2}$ acres in this." What is the percentage error in this estimate ? (An "are" is 1 sq. decametre, and 1 metre = 39.37 inches).

3. Prove that the product of any five consecutive numbers is divisible by 120.

4. A man bought two kinds of tea at $1/9$ and $2/4$ per lb. paying altogether £4 0s. 6d. If he had been charged $1/11$ per lb. for the whole amount it would have cost him the same as before. How much of each did he buy ?

5. Two solid lead spheres of radii 2" and 4" are melted down and recast as a solid right circular cylinder of height 6". Show that the surface exposed is unaltered.

6. Water flows from two taps into a cistern which leaks. One tap alone can fill it in 30 minutes and the other in 18. If turned on together they would fill it in 10 minutes. How long would they take to fill it if they were both turned half on ?

7. A starts at 2 o'clock and walks twice round a circular path of one mile with uniform speed. B starts from the same point as A at $6\frac{1}{2}$ mins. past 2 and walks twice round the path with uniform speed different from that of A and in the opposite direction. They pass each other when B has completed 500 yards of his first mile and again when A has completed 500 yards of his second mile. Find where they will again pass, and when each will finish his walk.

8. A man lends a sum of money at a certain rate of interest, and another sum less than the former by £50 at a rate of interest one per cent. higher, and receives £42 10s. for the first year on the two loans. He then agrees to lower the rate of interest in the second case by $\frac{1}{2}$ per cent., and receives £40 5s. interest during the next year. Find the amounts of the loans and the rates of interest during the first year.

9. Find the income derived from investing £1936 in a $3\frac{1}{2}$ per cent. stock at 88.

If the price of this stock rises to 92, how much of it must be sold in order that, when the proceeds are invested in a 5 per cent. stock at 120, the total income may be increased by £5 10s. ?