

(2). The paper duty was 1½d. per lb., and the weight of a certain book 1½ lbs. The paper manufacturer realized 10 per cent. on his sale, and the publisher 20 per cent. on his outlay. What reduction might be made in the price of the book on the abolition of the paper duty, allowing to each tradesman the same rate of profit as before?

The duty on the book would be $(1\frac{1}{2} \times 1\frac{1}{2})d. = 2\frac{1}{2}d.$ But this would be increased by 10 and 20 per cent. Therefore $2\frac{1}{2} \times \frac{11}{10} \times \frac{6}{5} = 2\frac{2}{3}d.$ would be the extra amount.

A TEACHER AND SUBSCRIBER. A man spent \$2.50 more than $\frac{7}{9}$ of his money at one time and \$1.15 less than $\frac{5}{1441}$ of the remainder at another, and now has \$2.609; how much had he at first?

If he had spent the \$1.15 he would have had \$2.609 - \$1.15 = \$1.457. In that case he would have spent $\frac{6}{1441}$ part and would have had $\frac{481}{1441}$ part left.

$$\begin{aligned} \text{Therefore } \frac{481}{1441} \text{ part} &= \$1.457 \\ \text{" the whole} &= 1.457 \times \frac{1441}{481} \\ &= \frac{1443}{330} = \frac{1441}{330} \\ &= \$ \frac{1441}{330} = \text{first remainder} \end{aligned}$$

Again, if at first he had not spent the \$2½ he would have had $\$ \frac{1441}{330} - 2\frac{1}{2} = \$ \frac{2266}{330}$. But if he had

not spent the \$2½ he would have spent $\frac{7}{9}$ part or $\frac{1}{3}$ which would leave $\frac{1}{3}$.

$$\begin{aligned} \text{Therefore } \frac{1}{3} &= \$ \frac{2266}{330} \\ \text{" the whole} &= \$341 \end{aligned}$$

NOTE.—This problem was solved June, 1894.

S. B. A. The bisectors of the three angles of a triangle meet in one point.

Draw BO, CO the bisectors of the angles ABC, ACB meeting in O. Draw OD, OE, OF perpendicular to AB, BC, CA, and join AO. Then we have to show that OA bisects the angle BAC.

Now because the angle OBE = angle OBD, and the angle OEB = the angle ODB and OB is common, therefore OD = OE, and because the angle OCF = the angle OCE and the angle OFC = angle OEC and OC is common, therefore OF = OE, and therefore OF = OD. Then, because OF = OD and AO common, and the angles OFA, ODA are right angles, therefore angle OAD = angle OAF.

(2). The perpendicular to the three sides of a triangle drawn from the middle points of the three sides meet in one point.

Let OD, OE, bisecting AB, BC at right angles meet in O. Join AO, BO, CO, and draw OF to F the middle point of AC. We have then to show that OF is perpendicular to AC.

Now because BE = CE and OE common, and the angle OEB = the angle OEC, therefore OB = OC; and because BD = AD, and OD is common, and the angle ODB = the angle ODA, therefore OB = OA, and therefore OA = OC. Then because OA = OC and OF is common, and FA = FC, therefore the angle OFA = the angle OFC, and therefore OF is perpendicular to AC.

(3). AB and CD are two given straight lines. Through a point E, between them draw a straight line GEH, such that the intercepted line GH shall be bisected in E.

The proposition is impossible when AB and CD are parallel unless the point E be equally distant between them.

Produce BA, DC to meet in F. Draw EM parallel to CD meeting FB in M. In MB make MG = ME, join GE and produce it to meet FD in H. Draw MN parallel GH and join MH. Then because the angle GME = angle MFN, and the angle MGE = the angle FMN, and MG = FM, therefore MN = GE. And because the angle EMH = the angle MHN, and the angle EHM = the angle NMH and MH is common, therefore EH = MN, and therefore EH = GE.

SUBSCRIBER. A man having lent \$10,000 at 5 per cent interest, payable half yearly, wishes to receive his interest in equal portions monthly and in advance, how much ought he to receive every month?

The problem is to find what is the present worth in six equal instalments paid six months, five months, four months, etc., in advance, the various payments to be equivalent to \$250 to be paid 6 months hence.

The interest on \$100 for 1 month = $\$ \frac{5}{24}$.
The required sum = $\$ (1\frac{1}{24} + 1\frac{1}{24} + 1\frac{1}{24} + 1\frac{1}{24} + 1\frac{1}{24} + 1\frac{1}{24}) = \250

$$\text{Therefore sum} = \$ \text{of } \frac{5}{24} = \$250$$

$$\begin{aligned} \text{Therefore sum} &= \$250 \div 6\frac{5}{24} \\ &= \$41\frac{1}{3} \end{aligned}$$

S. B. A., Port EL 48, N. B. Could you give me the address of *Electrical World* or *Electrical Review*?

Our readers interested in the latest development of electrical science would do well to correspond with the editor of the *Electrical World*, 11 Park Row, New York, or the editor of the *Electrical Review*, Alabaster, Gatehouse & Co., 22 Paternoster Row, London, E. C.