

EQUATION OF PAYMENT.

145

$$\begin{aligned} \$ (300 \times 9 + 240 \times 6) : \$ (300 \times 9) :: \$ 115 : A's \text{ sh.}, \\ \$ (300 \times 9 + 240 \times 6) : \$ (240 \times 6) :: \$ 115 : B's \text{ sh.}, \\ \text{whence, } A's \text{ sh.} = \$ 75, \text{ and } B's = \$ 40. \end{aligned}$$

Reason. \$300 for 9 mo. = 9 times \$300 for 1 mo., and \$240 for 6 mo. = 6 times \$240 for 1 mo.; the example then becomes one of Simple Fellowship.

EQUATION OF PAYMENTS.

140. When a person owes another several sums of money, due at different times, the Rule by which we determine the just time when the whole debt may be discharged at one payment, is called the EQUATION OF PAYMENTS.

Note. It is assumed in this Rule that the sum of the interests of the several debts for their respective times equals the interest of the sum of the debts for the equated time.

RULE. Multiply each debt into the time which will elapse before it becomes due, and then divide the sum of the products by the sum of the debts; the quotient will be the equated time required.

Ex. 1. *A* owes *B* \$100, whereof \$40 is to be paid in 3 mo., and \$60 in 5 mo.; find the equated time.

By the Rule,

$$\text{equated time in mo.} = \frac{40 \times 3 + 60 \times 5}{40 + 60} = \frac{420}{100} = 4\frac{1}{5}.$$

Ex. 2. *A* owed *B* \$10, to be paid at the end of 9 mo.; he pays however \$2 at the end of 3 mo., and \$3 at the end of 8 mo.; when ought the remainder to be paid?

In this case, $2 \times 3 + 3 \times 8 + 5 \times \text{no. of mo. reqd.} = 10 \times 9$, or $6 + 24 + 5 \times \text{no. of mo. reqd.} = 90$;
or, $30 + 5 \times \text{no. of mo. reqd.} = 90$, or $5 \times \text{no. of mo. reqd.} = 90 - 30$, or 60, $\therefore \text{no. of mo. reqd.} = 12$.

Ex. LXXVI.

(1) Divide (1) 1008 into 3 parts, which shall be to each other as the numbers 2, 3, 4, respectively. (2) \$260 into 3 parts, which shall be to each other as 5, 11, and 16. (3) 145 ac. 3 ro. 33 po. between two persons in the ratio of 5 : 6. (4) £110 between 4 persons, whose shares shall be as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{5}$.

(5) (1) *A*, *B*, and *C* contribute to a fund \$320, \$560, \$720, respectively. How are they to divide a profit of \$680? (2) *A*, who has £422. 10s., owes *B*, £175; *C*, £210; and *D*, £265; what sum ought *C* to receive?