

SOLUTIONS.

(Arithmetic—Second Class, September and October.)

1.—Disct. 20=per cent. of face, or $22\frac{1}{2}$ per cent. of proceeds; $\therefore$ proceeds = $\frac{20}{22\frac{1}{2}} = \frac{8}{9}$ of face, and discount = $\frac{1}{9}$ of face = $11\frac{1}{9}$ per cent. $\therefore$ time = $\frac{11\frac{1}{9}}{20} = \frac{5}{9}$ yr. $\therefore$ 200 dys.—
Ans.

2.—P. W. of \$1 due in 4, 9, 12, 20 mon. = \$.98361, \$.96385, \$.95238 and \$.92308 respectively; therefore sum = \$3.82292 = P. W. of \$4; $\therefore$ \$3.82292 : \$750 : \$4 : \$784.74—
Ans.

3.—Interest of \$1 for 63 days = \$.021 $\therefore$
discount = $\frac{21}{1021}$, $\therefore$ loss = $\frac{441}{1021000}$. $\therefore$
ace = \$4 80 $\div$ $\frac{441}{1021000}$ = \$11112.93.—
Ans.

4.—P. W. of \$200 for 1, 2, 3, 4, 5 mos. at 9 per cent. = \$198.511; \$197.044; \$185.599; \$194.175; \$192.771; $\therefore$ sum = \$978.10.
Ans.

5.—\$1 Face of check cost 55c.; I received \$1 $\div$.60 = \$1 $\frac{2}{3}$ bonds; 7 per cent. of \$1 $\frac{2}{3}$ = 11 $\frac{2}{3}$ c. = income on 55c. = 21 $\frac{7}{3}$ per ct.

6.—Since comp. amt. of \$1 = \$1 + rate raised to power indicated by number of payments $\therefore$ \$19487.171 $\div$ \$13310 = comp. amount of \$1 for 4 years = 1.4641 $\therefore$ $\sqrt[4]{1.4641}$ = amt. for 1 year = 1.1 $\therefore$ rate 10 per cent. Again \$13310 = P $\times$ (1.1)⁴ $\therefore$ P = \$10000. Ans.

7.—2 $\frac{1}{2}$ per cent. of \$1500 = \$37 50 $\therefore$ amt. received = \$1462.50; $\therefore$ \$1462.50 $\div$ 1.15 = \$1271 739, cost and interest for 3 months $\therefore$ cost = P. W. of \$1271.739 for 3 months at cent. = \$1252.94 Ans.

8.—69 per ct. = $\frac{3}{4}$ of 92 per cent. $\therefore$ rec. $\frac{3}{4}$ as much stock @ 92 as @ 69; 7 per cent. of $\frac{3}{4}$ = 5 $\frac{1}{4}$ per cent. on whole; $\therefore$ gain $\frac{1}{4}$ per cent. per annum on \$5200, = \$13. $\therefore$ \$13 $\div$.06 = \$216 $\frac{2}{3}$ cash gain. Ans.

9.—\$49 = 4900 cents $\therefore$ $\sqrt{4900} = 70$.—
Ans.

10.—Sales, without credit or debts = 119 $\frac{1}{2}$ per cent. of cost = P. W. of sales at 6 months. $\therefore$ 119 $\frac{1}{2}$ per cent. $\times$ 1.03 = 123.085 per cent. of cost, without debts; $\therefore$ 123.085 $\div$.95 = 129.56 per cent. of cost to cover all conditions, $\therefore$ 29.56 + per cent. marked price.—Ans.

SOLUTIONS TO PROBLEMS FROM CORRESPONDENTS.

Under this heading we shall give concise solutions to questions sent in by subscribers.

ABC is an equilat. triangle. D is taken in AB so that AD is $\frac{1}{3}$ AB; E in BC so that BE is $\frac{1}{3}$ BC and F similarly in CA. AE, BF, CD are joined, CD, AE meeting in G; AE, BF in H; BF, CD in K. It is required to show that GHK is an equilat. triangle, and to ascertain what relation it bears to the whole tri. ABC.

Because EB, BA are eq DA, AC ea. to ea. and ang. CBA eq. ang. DAC $\therefore$ the base EA

eq. DC and ang. BEA eq. ADC and BAE eq. ACD. In like manner the triangle CFB can be shown to be eq. in all respects to either of these. Then in the triangles ADG, AEB bec. ang. ADG eq. AEB and DAG is com. $\therefore$ AGD eq. ABE. eq. $\frac{2}{3}$ rt, ang. Hence KGH is $\frac{2}{3}$ rt. ang. and similarly for ang. at K, H hence GHK is an equilateral triangle.

Again, it is evident that the triangles CFK, ADG, BEH, are similar and eq. as are