

$$\frac{3}{8} : \frac{3}{4} \times 12 :: \frac{3}{10} \times 720 :: 1 : 15 : 360$$

94. Draw the isosceles triangle ABC right-angled at C, and let P be the weight-point. Join AP and produce it to meet BC in D. Similarly draw BPE and CPF. Through P draw GPH parallel to BC and cutting AB in G, and AC in H.

$$AC=36, PH=HC=15, \therefore 21=AH=HG, \therefore PG=6.$$

Taking moments successively about the three sides as axes,

$$\begin{aligned} AD : DP :: AC : CH :: 36 : 15 :: 30 : 12\frac{1}{2} ; \\ BE : EP :: BC : PH :: 36 : 15 :: 30 : 12\frac{1}{2} ; \\ EF : FP :: CA : PG :: 36 : 6 :: 30 : 5 \end{aligned}$$

Hence the weights at A, B, and C are respectively $22\frac{1}{2}$, $12\frac{1}{2}$, and 5. Or thus.—Draw the isosceles triangle ABC right-angled at C, and let P be the weight-point. Join AP and produce it to meet BC in D. From P and D let fall PH, DK perpendiculars on AC. Let W be the weight at P and w, w' the pressure at C, A, and B respectively.

$$w + w' + w = W$$

$$DC \cdot w = DP \cdot W$$

$$AD \cdot w' = DB \cdot w''$$

But $AC=BC=36, PH=HC=15, DK=KC=18, AD=DB$, and

$$DC : DP :: KC : KH :: 18 : 3 :: 6 : 1$$

Substituting

$$w + w' + w'' = 30$$

$$6w = 20 \therefore w = 5$$

$$w' = w'' \therefore w = 12\frac{1}{2}.$$

PROBLEMS.

(105.) Two drains are dug under a Township By-Law. The first to cost \$1,300 whereof A is to contribute \$110, and the second to cost \$450, whereof B is to contribute \$86. The By-Law provides that one-fifth of the principal and the accrued interest on the unpaid part thereof, shall be levied every year to defray the cost. The Debentures are issued 21st May, payable 1st January at 8 per cent., and for four years the contributors pay according to the estimated cost, when it is discovered that the first drain cost \$1169.84 and the second \$486.14. What amount must be levied on A and B during the fifth year?

(Work only to the nearest cent.)

H. T. SCUDAMORE, Sutherland's Corners.

(106.) Two Lots are assessed to a Drain in the sums of \$76 and \$79. Principal to be paid in five equal Annual Instalments and Interest on unpaid Principal, yearly at 6 per cent. Debentures issued 1st June payable 5th January. Three years rates have been levied, when it is found that the Clerk has inadvertently charged the Lots at \$79 and \$76. What payments must each Lot make during the next two years, so that the mistake may be rectified?

[NOTE.—These are questions actually occurring to me as a Township Auditor.]

DITTO.

(107.) Three masses, of gold, silver, and a compound of gold and silver, weigh respectively, P Q and R ounces in air, and $p q$ and r ounces in water. Shew what is the order of magnitude of the quantities

$$p : P, q : Q, r : R.$$

GEO. SHARMAN, Forest.

(108.) The tube of a Mercurial Barometer is vertical, and of uniform base. On a syringeful of air being introduced into the upper part of the tube mercury falls 1 inch; and it falls eight-tenths of an inch more when another syringeful is introduced, The mercury in the cistern being kept at the same level throughout, find the length of that portion of the tube which was originally a vacuum.

DITTO.

(109.) Find the pressure against the valve, which opens into the Receiver of a condenser, after 15 strokes of the piston, when A equals content of the Receiver, B equals content of the barrel, and P equals the atmospheric pressure.

DITTO.

(110.) Rider to Problem 8, Paper XVI, p. 284, Advanced Arithmetic.

Mr. McMurchy's solution is in effect,—Time = $\{ \text{£}34 \text{ 14s. } 3 \text{ } 3\text{-}7\text{th } d. \div (.04\frac{1}{2} \times \text{£}567 \div 1.04\frac{1}{2}) \}$ years. Is it correct?

E. ROWLAND, Strathroy.

CURIOSITIES.

(6.) Find the forms for two cubes whose sum is a square; also, for two cubes whose difference is a square.

(7), Solve

$$X^x = .207879457 \dots$$

We hope some of our algebraic friends will be able to send us the well-known solution of this equation. Can any of them explain its meaning?

NEW SCHOOL BOOKS.

An Elementary Treatise on the Integral Calculus. By B. Williamson, A. M., London; Longmans & Co. 1875, (Crown 8vo. pp. 267.) This is a companion volume to the author's Elementary Treatise on the Differential Calculus, and like it, is another excellent college text-book and nothing more. Perhaps it was needed; Trinity College, Dublin, and Mr. Williamson appear to have thought so; but it seems to us that we had already several excellent elementary works and that what is needed is a treatise such as Bertrand's. The four volumes by