Mathematical Department.

SAMUEL R. BROWN, EDITOR, BOX 67 D, LONDON.

Teachers and others are invited to forward any problems they may think worthy of a place in these columns, provided always that the solutions accompany the problems.

Send Solutions before 15th inst., to receive attention, and address the Editor as above.

When sending solutions, correspondents will please send each month's problems separately.

The names of those who solve the several problems correctly will be published with the solutions thereof

The solutions of all problems published in this department will be printed in the second number following that in which the problems appear

Solutions.

No. 26,—

By a condition of the question $\frac{1}{3}$ of the cost of the horse + \$25 is the cost of the buggy; to which add \$25 (cost of harness) and we have $\frac{1}{3}$ of the cost of the horse + \$50 = $\frac{2}{3}$, or the cost of the horse. Therefore $\frac{2}{3} - \frac{1}{3}$, or $\frac{1}{3}$ of the cost of horse equals \$50. If $\frac{1}{3} = 50$, then $\frac{2}{3} = \$125$, cost of horse; $\frac{1}{3}$ of 125, + 25, = \$100, cost of buggy, and \$125 + 100 + 25 = \$250, the cost of all.

No. 27,—

If the two flocks were equal, the average price would be \$5. But the \$6 flock contained 20 extra sheep, each costing \$1 above the average. Therefore all the sheep cost \$20 above an average of \$5. He sold them at \$30 profit. That is for \$20 + \$30 above the average. Therefore an advance of \$1½ in average price realizes \$50. ∴ Number of sheep equals $50 \div \frac{1}{2} = 100$. Sum of two flocks = 100, and difference = 20. ∴ Flocks are 40 and 60 in number.

No. 28.—

$$x^3 = \sqrt{x^2-1} + \sqrt{x^4-1}.$$

$$x^3 - \sqrt{x^2-1} = \sqrt{x^4-1}.$$ Squaring we get

$$x^6 - 2x^3\sqrt{x^2-1} + x^2 - 1 = x^4 - 1.$$

$$x^6 - x^4 + x^2 = 2x^3\sqrt{x^2-1} \text{ or } x^4 - x^2 + 1 = 2x\sqrt{x^2-1}$$

$$x^8 - 2x^6 + 3x^4 - 2x^2 + 1 = 4x^4 - 4x^2$$

$$x^8 - 2x^6 - x^4 + 2x^2 + 1 = 0.$$

Extracting the square root we get

$$x^4 - x^2 - 1 = 0.$$

$$x^4 - x^2 = 1, \text{ from which } x^2 = \tfrac{1}{2} + \tfrac{1}{2}\sqrt{5}.$$

$$\therefore x = \pm\sqrt{\tfrac{1}{2} \pm \tfrac{1}{2}\sqrt{5}}.$$

No. 29,—

A cubic inch of water, at the common temperature of 60° Fah., weighs 0.03616 of a pound avoirdupois. Hence the vessel may be sunk as many inches as .03616 lbs. is contained times in 170 lbs. That is depth = 170 ÷ 0.03616 = 4701½ inches = 391 feet, 9½ inches.

No. 30.—We have received no correct solution of this problem yet, and by the request of several teachers, will not give its solution until next month.

CORRECT SOLUTIONS have been received as follows:—

Nos. 21, 22, 23, 24, 25, F. W. M., Port Dover; Geo. F. Payne, Burford; Peter Pounder, Arnprior; A. G. Henderson, Ashburn.

Nos. 22, 25, Thos. McCarthy, Downeyville.
Nos. 21, 22, 23, H. M. Hicks, Trenton.
Nos. 21, 23, 24, A. H., Toronto.
Nos. 21, 22, 23, 25, Chas. Fuller, Madoc.

The above were received too late to appear in the December No.

No. 26, Lizzie Keachie and Jennie Moffat, pupils S. S. 21, N. Dumfries; R. Acton, Ashton; A. F. McLean, McGillivray; Geo. Tyler, London; Geo. A. Robertson, Verschoyle; J. M. Duncan, Forest.

Nos. 26, 27, Allan F. Pringle, Galt; C. L. Crasweller, Spence; R. M. Pascoe, Bowmanville; G. W. Marriott, Jura; Frank Hansel, Smithville; Henry W. Hoover, Selkirk; M. Church, London; Thos. McCarthy, Downeyville; A. Dorsett, Comber; W. S. Mellis, Lucknow; Lizzie S. Walker, Amanda Walker and Angus Graham, pupils of Glencoe school; Geo. Phillips and Ebenezer V. Cody, Verschoyle; John Anderson, Marnock; J. McKenzie, Lorne; No Name, Sunbury; G. B. Boggs, Marsville.

Nos. 28, 29, A. H., Toronto.

Nos. 26, 27, 29, A. S. McGregor, Avonbank; Thristram Chislitt, Walkerton; J. F. Aitken, Watford; Thos. Hammond, Selkirk; Chas. Fuller, Madoc; H. M. Hicks, Trenton; A. Stevenson, Markham; P. G. Kimmerly, Napanee; J. H. S., St. Thomas; Bonus Puer, Beverley; P. George Kavanagh, Jarvis; R. Coates, Lowville; Theophilus Hall, Markdale; Thos. Cameron, Arkona.

Nos. 26, 27, 28, Geo. F. Payne, Burford; Robt. Drinnan, Elmsvale.

Nos. 26, 27, 28, 29, James Millar, Grimsby; John Anderson, Severn Bridge; Wm. Johnston, Watford; Joseph Richardson, Innerkip; Peter Pounder, Arnprior; Thos. Worden, Cromarty; A. G. Henderson, Ashburn; A. B. Blanshard; Dr. Campbell, Principal King-st. school, London; G. W. Priest, Ayr.

Problems.

No. 36,—

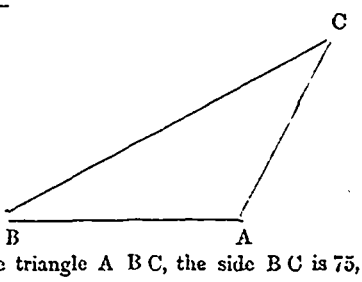
Given $\left\{\begin{array}{l} \dfrac{x + \sqrt{x^2-y^2}}{x - \sqrt{x^2-y^2}} = \dfrac{17}{4} - \dfrac{x - \sqrt{x^2-y^2}}{x + \sqrt{x^2-y^2}}, \\ x(x+y) = 52 - \sqrt{x^2+xy+4} \end{array}\right.$

to find the values of x and y.

No. 37,—

A can do a piece of work in 18 days, B can do it in 30 days, and C in 33 days; the work is to be done in 25 days; each of these three men, A, B, and C, has to do a part of the work, only one working at a time. How long must each work?

No. 38,—



In the triangle A B C, the side B C is 75, th