TEACHERS' DESK.

J. C. GLASHAN, ESQ., EDITOR.

Contributors to the 'Desk' will oblige by observing the following rules:—

1. To send questions for insertion on separate sheets from those containing answers to questions already proposed.
2. To write on one side of the paper.
3. To write their names on every sheet.

CORRECT ANSWERS RECEIVED.

J. C. HARRIS, Tweedside, 93, 95.
W. G. BROWN, Brooklyn, 93, 95.
R. CRUIKSHANK, Hawksville, 93, 95.
DAVID BELL, 95, 96.
J. S. GILFILLAN, Mt. Pleasant, 95, 96.
ALEX'R DICKIE, Lynden, 93, 96.
JOHN E. TOM, Canfield, 95, 98. (Todhunter.)
HENRY GRAY, Sombra, 93, 95, 96.
OSCAR DODGE, Mt. Brydges, 93, 95, 96.
C. A. BARNES, Windsor, 93, 94, 95, 96.
WM. JAMISON, Aberfoyle, 93, 94, 95, 96,
ALBERT DIXON, Springford, 93, 94, 95, 96, 98.
DAVID HICKS, Rose Hall, 90, 93, 94, 95, 96.
JOHN CUSHNIE, Holstein, 89, 90, 91 (?), 93, 94, 95, 96.
H. T. SCUDAMORE, Sutherland's Corners, 91, 92, 93, 95, 96, 98.

ANSWERS TO CORRESPONDENTS.

David Bickell, Freelton.—Your problem is indeterminate, the third condition being implicitly contained in the first two. You give for the answer 58, which would by the problem be apportioned into 16, 30, and 12; but 22 would do, partioned into 4, 6, and 12, as also would 70 partioned into 20, 38, and 12.

ANSWERS.

(90.) We regret that we were unable last month to give the necessary attention to the Teachers' Desk. Several correspondents could not find the -20 inquired about by Mr. Ferguson, and we overlooked this in choosing the height to work from, although it may be easily deduced, that -24 will give for base -20. Worse than this several signs in the solution in (98) were wrong, although, as the correct answer was given, this could easily be detected. It should have been

$$(-x-6)(-x+10)=\tfrac{7}{8}(-x)(-x+4)$$
$$(-x)^2+4(-x)+4=484$$
$$\therefore -x=-24.$$

We restate the problems and give the solutions working from the base.

90. The height of a certain triangle is 4 inches less than the base, if the base be increased 6 inches and the height lessened as much, the area will be diminished by one-eighth. Find the length of the base.

Let $+x$ equal the base measured forward (say to the right) and $+x-4$ equal the height measured upwards (x upwards then 4 downwards);

$$\therefore (+x+6)(+x-10)=\tfrac{7}{8}(+x)(+x-4)$$
$$(+x)^2-4(+x)+4=484$$
$$+x=+24.$$

98. The depth of a certain triangle is 4 inches greater than the base; if the base be decreased 6 inches and the depth increased as much, the area will be diminished by one-eighth. Find the length of the base.

Let $-x=$ the base measured backwards and $-x-4$ equal the depth,

$$\therefore (-x+6)(-x-10)=\tfrac{7}{8}(-x)(-x-4)$$
$$(-x)^2-4(-x)+4=484$$
$$-x=-20.$$

Both of these are included in the quadratic

$$(X+6)(X-10)=\tfrac{7}{8}X(X-4)$$
$$X^2-4X+4=484$$
$$X-2=\pm 22.$$

It will be noticed that positive and negative refer to the relative directions of the measurements.

And here we are tempted to take up a question asked by Mr. Albert Dickson as a rider to problem 95, Where does arithmetic end and algebra begin? But if we enter on this disputed question we fear we should very soon *end* our Desk. The views generally adopted since Dean Peacock's discussion of the subject will be found well set forth in Sandeman's *Pelicotetics* pp. 245-249. Consult also, De Morgan's *Trigonometry and Double Algebra* and the 'List' at the beginning of that work especially Part 2 of 'on the Foundation of Algebra;' Ellis's *Algebra identified with Geometry;* and Chap. I. of Kelland and Tait's *Introduction to Quaternions.*

(91.) LEMMA I. A perpendicular is the shortest line that can be drawn from a point situated without a straight line to that line: of any two oblique lines cutting off unequal distances from the perpendicular, the one which cuts off the greater distance will be the longer. (Prove by Euclid, 17, I. and 19, I.)