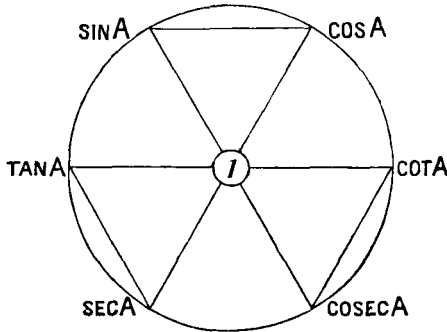


## Trigonometrical Mnemonic.

By JOHN ALISON, M.A.



If the functions be written as in the above figure, then

1. Of any three functions written consecutively on a circular arc or on a diameter, the mean is the product of the extremes. Thus  $\sin A = \tan A \cos A$ ,  $1 = \sin A \operatorname{cosec} A$ , and so on.
2. In each triangle the square of the function written at the vertex turned downwards is equal to the sum of the squares of the functions written at the other two vertices. Thus  $1^2 = \sin^2 A + \cos^2 A$ , and so on.

## Notes on Integration by parts and by successive reduction.

By GEORGE A. GIBSON, M.A.

My object in the following notes is to call attention to some points in integration by successive reduction which may be of use in directing the choice of the particular form for the reduced integral in any given case. The remarks apply chiefly to the binomial differential  $x^m(a + bx^n)^p dx$  which has been discussed from a different point of view by Dr Muir in vol. iii., p. 100 of the Proceedings.

Let  $f(x)$  be a function of  $x$  which may be written as the product of two functions  $u, v$  of  $x$ . Let  $u' = \frac{du}{dx}$ ,  $u_1 = \int u dx$ ,  $v_1 = \int v dx$  &c. Then the integral of  $f(x) \cdot dx$  may be expressed in either of the forms