54. Note on Section VI. of Professor Tanner's Article on "A Class of Algebraic Functions"

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Source: *The Mathematical Gazette*, Vol. 1, No. 14 (Jun., 1898), p. 184

Published by: Mathematical Association

Stable URL: <http://www.jstor.org/stable/3604682>

Accessed: 20-11-2015 23:34 UTC

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the ratio $AF:AE$, which will be negative if F and E are on opposite sides of A .

To get the positions of P and Q at this time, draw FG parallel to BE or CD to meet AB in G , and complete the parallelogram $CFGH$.

Since $GA:BA=FA:EA$, it is clear that P gets to G at the time in question; and since GH is equal in magnitude and direction to FC , H must be the position of Q at that time. If AE produced passes through C , then P and Q strike one another.

A modified construction would enable us to find when P and Q were at a *given distance* from one another, or when their join was in a *given direction*. Instead of dropping the perpendicular C we should, in the former case, describe a circle with the given distance as radius and C as centre, cutting AE in F ; and in the latter case draw a line from C in the given direction, so as to cut AE in F .

We may note that these results, except as to the *positions* of P and Q , would hold equally if P and Q were falling freely under gravity, with the given initial conditions; and the positions of P and Q could be got by the additional construction of lines vertically downward from G and H equal to the distance a stone would fall during the time in question.

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MATHEMATICAL NOTES.

54. *Note on Section VI. of Professor Tanner's article on "A Class of Algebraic Functions" (p. 153).*

If W be a diaphoric function of $x, y, \dots, z$, and $\equiv U \times V$, then U and V must be diaphoric. For, let each argument be increased by δ , and let the new values of U and V contain respectively, as *highest powers* of δ , $U_r\delta^r$ and $V_s\delta^s$. Then, δ being an independent letter, $U_rV_s\delta^{r+s}$ must appear in the product. But the product is free from δ . Therefore $r=0, s=0$. R. W. GENESE.

55. *Euclid* IV. 12, 13, 14.

Let F, G, H, K, L be the angular points of an inscribed regular pentagon. At these points draw the tangents AB, BC, CD, DE, EA , and produce EA, CB to meet in P , and AB, DC to meet in Q .

Now (*Euclid* III. 26, 29) $LG=FH$, and $\angle s PLG, PGL, QFH, QHF$ are equal to the exterior angle of a regular pentagon and therefore equal one another (*Euclid* III. 32). Hence the

$\triangle s PLG, QFH$ are congruent,(a)

and $FQ=GP$.

But

$BF=BQ$.

Hence

$BQ=BP$(b)