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274. Note on the Power Inequality

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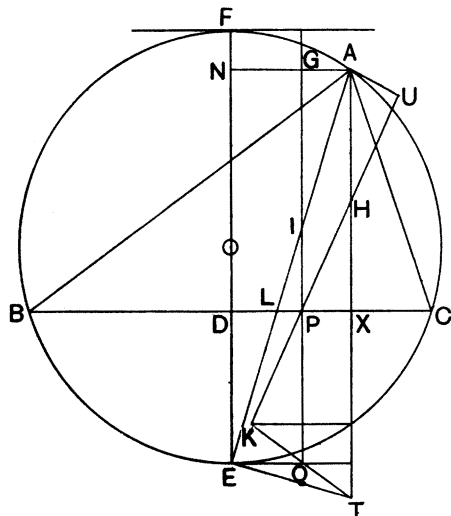


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Thus  $T$  and  $Q$  are points on the radical axis of a point-circle at  $I$  and the circle upon  $AP$  as diameter.

Now  $HT = 2DE = 2PQ$ ; consequently if  $HP$  be produced to  $K$  so that  $HP = PK$  then  $K$  is also a point on the radical axis  $TQ$ .



Drawing  $AU$  perpendicular to  $HPK$ ,  $IK^2 = PK \cdot UK$ .

But

$$IH^2 + IK^2 = 2IP^2 + 2HP^2;$$

therefore

$$\begin{aligned} 2IP^2 - IH^2 &= PK \cdot UK - 2HP^2 \\ &= HP(UH + 2HP) - 2HP^2 \\ &= HP \cdot UH \\ &= AH \cdot HX. \end{aligned}$$

R. F. DAVIS.

273. [K. 1. c.] *Note on Euclid I. 32. Corollary.*

If one vertex of a polygon of  $n$  sides be joined to the others the number of triangles formed is  $n - 2$ .

Each triangle contains angles whose sum is 2 right angles.

$\therefore$  the sum of all the interior angles of the polygon  $= 2(n - 2)$  right angles.

A. A. BOURNÆ.

274. [A. 1. b.] *Note on the Power Inequality.* [Cf. Mr. V. R. Aiyar, p. 322.]

In proving the fundamental inequality that if  $p > q$  and  $x > y$ , then

$$\frac{p}{q} x^{p-q} > \frac{x^p - y^p}{x^q - y^q} > \frac{p}{q} y^{p-q}$$

for the simple case when  $p$  and  $q$  are integers, it is well to notice that the statement can be written

$$\frac{x^{p-q}(x^q - y^q)}{(x-y)q} > \frac{x^p - y^p}{(x-y)p} > \frac{y^{p-q}(x^q - y^q)}{q(x-y)},$$

which is equivalent to the following truism:

In a Geometrical Progression  $x^{p-1} + x^{p-2} + \dots + y^{p-1}$  the average of all the terms is intermediate between the average of the first  $q$  and the average of the last  $q$ .

F. J. W. WHIPPLE.