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Geometry

1. Inscribe a regular polygon of $2^n \cdot 3 \cdot 5$ sides in a circle, the methods of inscribing pentagons and hexagons being assumed to be known.

2. Prove that a pavement may consist only of equilateral triangles, squares, or regular hexagons, but no other regular polygons. $\frac{p}{p'} = \frac{r_n}{r_{n'}}$

3. In every right angled triangle the square on the hypotenuse is equivalent to the sum of the squares on the sides of the right angle.

4. To divide a st. line AB in M so that the rectangle under that line and the smaller segment shall be equivalent to the square on the greater segment AM.

5. Prove that a side of a starshaped regular decagon inscribed in a circle is equal to a side of an inscribed regular decagon augmented by the radius of the circle.

6. Given the major & minor radii of a regular polygon, find those of an isoperimetical regular polygon of twice as many sides

N.B. – In 3 & 4 the propositions in Bk. III are not to be used

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$2 - \frac{4}{n}$ $2 - \frac{4}{2n}$

$2 - \frac{2}{3}$

$\frac{2}{3} + \frac{2}{3}$ $2 - \frac{2}{9}$

$\frac{1}{10} + \frac{1}{6} = \frac{3+5}{30}$ $\frac{8}{30} = \frac{4}{15}$ $\frac{3+5}{30}$ $2^n \cdot 3 \cdot 5$ $\frac{}{15}$

$1\frac{2}{6}$ $\frac{8}{6}$

Questions on Geometry.

1°. Explain how an angle may be generated by a certain rota- of a str. line. Shew that the magnitude of an angle is independent of the lengths of its sides.

Define the bisector of an angle. Explain that an angle has only one bisector.

2°. If two triangles have two sides of the one equal to two sides of the other, each to each, but the angle contained by the sides of the one greater than the angle contained by the two sides equal to them of the other, the third side of that which has the greater angle is greater than the third side of the other.

3°. State an obverse to the last theorem. Assuming it as established, prove directly the converse propositions using for that purpose the 'Rule of Conversion.'

4°. The perpendicular OL from a pt O on a str line AB is the shortest line that can be drawn from that point to the str line. State and prove the converse using for that purpose the 'Rule of Identity.'

5°. When a str line, EF, cuts two parallel, AB, CD, obliquely, the two interior angles on the same side of the secant are supplementary.

6°. State the contrapositive of the last theorem. Thence deduce three corollaries, pointing out which of these was adopted by Euclid as one of his Axioms