PROBLEM XXXIX.

Having given the side a of a regular pentagon, to find R, r and S (See Problem XXXV.).

$$R = \sqrt{\frac{a^2}{1.3816}}$$

$$r = \sqrt{\frac{a^2}{1.3816} - \frac{a^2}{4}}$$

$$S = \frac{5\,a}{2}\sqrt{\frac{a^2}{1.3816} - \frac{a^2}{4}}$$

PROBLEM XL.

Having given the side a of a regular octagon, to find R, r and S (See Problem XXXV.).

$$R = \sqrt{\frac{a^2}{.5858}}$$

$$r = \sqrt{\frac{a^2}{.5858} - \frac{a^2}{4}}$$

$$S = 4\ a\sqrt{\frac{a^2}{.5858} - \frac{a^2}{4}}$$

PROBLEM XLI.

Having given the side a of a regular decagon, to find R, r and S (See Problem XXXV.).

$$R = \frac{a}{2} + \sqrt{a^2 + \frac{a^2}{4}}$$

$$r = \sqrt{R^2 - \frac{a^2}{4}}$$

$$S = 5\,a\sqrt{R^2 - \frac{a^2}{4}}$$

N.B.—In the last two formulas the value of R, when found, is to be substituted for R.

PROBLEM XLII.

Having given the side a of a regular dodecagon, to find R, r and S (See Problem XXXV.).