PROBLEM XLVII.

Having given the surface $S$ of a regular polygon inscribed in a circle, to find the surface $s$ of a similar circumscribed polygon (See Problem XXXV.).

$$s = \frac{S\,R^2}{r^2}$$

PROBLEM XLVIII.

To express the surface of a circle in terms of the radius $R$.

$$S = \pi R^2$$

PROBLEM XLIX.

Having given the difference $d$ between the circumferences of two circles, and the ratio of the radii, so that $r : R :: m : n$, to find the circumference and the radii.

$$\text{Circ. of the greater} = \frac{m\,d}{m - n}$$

$$\text{Circ. of the lesser} = \frac{m\,n\,d}{m^2 - m\,n}$$

$$\text{Rad. of the greater} = \frac{m\,d}{2\,\pi\,(m - n)}$$

$$\text{Rad, of the lesser} = \frac{m\,n\,d}{2\,\pi\,m^2 - m\,n}$$

PROBLEM L.

Let the base of a triangle be $B\,C = b$, the vertical angle be $A$, and then the sides $A\,B$ and $A\,C$ be respectively $a$ and $c$. To divide this triangle into two equivalent parts by a straight line passing through a given point $D$ on the side $A\,C$. Let the distance $A\,D$ be $= d$. The Problem is solved as soon as another point $H$ on the side $A\,B$, is found, through which the dividing line is to pass. Let the distance $A\,H$ be denoted by $x$; then

$$x = \frac{c\,a}{2\,d} \qquad \text{N. S.}$$

$$= \frac{c \times \frac{1}{2}\,a}{d} \qquad \text{G. S.}$$

PROBLEM LI.

To divide the same triangle into three equivalent parts by two lines passing through the same point $D$. It is evident that