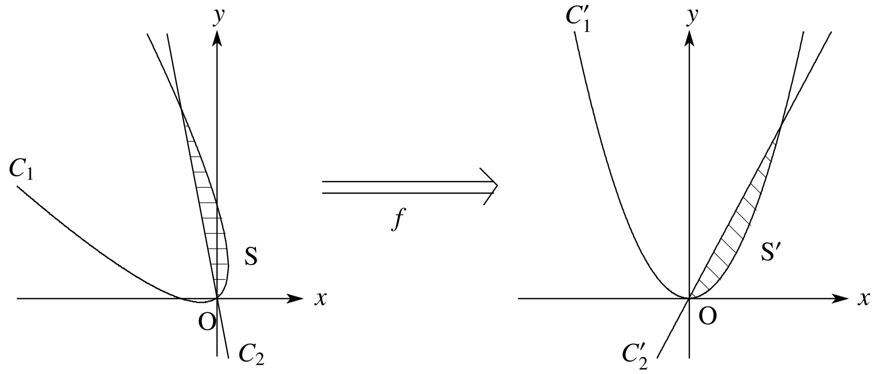
21



We define $f:\ z \longmapsto \dfrac{1}{2+i}z$, and images of α , β produced by f as α', β' respactively, then.

$$\begin{cases} \alpha' &= t + t^2 i \\ \beta' &= \dfrac{(s+si)(3+4i)}{2+i} = s + 3si \end{cases} \qquad \cdots ①$$

Therefore, if we set loci of α' and β' for C_1' and C_2' respectively, then the relations between real value : x and imaginary value: y are,

$$\begin{cases} C_1'\ ; & y = x^2 \\ C_2'\ ; & y = 3x \end{cases} \qquad \cdots ②$$

Thus, if we define S' as the area enclosed by C_1' and C_2' ,then

$$S' = \int_3^0 (3x - x^2)dx = -\int_3^0 x(x-3)dx = \frac{9}{2} \qquad \cdots ③$$

Here, set the angle θ as a figure below. Because f is a combination of the rotation of $(-\theta)$ and the enlargement by the factor of $\dfrac{1}{\sqrt{5}}$ using the O(0) as the center of rotation and enlargement, then,

$$S' = \left(\frac{1}{\sqrt{5}}\right)^2 S$$

Therefore the area required is

$$S = 5 \times S' = \frac{45}{2} \qquad \cdots ans.$$