

Extreme Problem 6

The Transformation T from the z - plane to the w - plane is given by

$$w = \frac{1}{z-2}, \quad z \neq 2,$$

where $z = x + iy$ and $w = u + iv$

Show that under T the straight line with equation $2x + y = 5$ in the z - plane is transformed into a

circle in the w - plane centred at $\left(1, -\frac{1}{2}\right)$ and radius of $\frac{\sqrt{5}}{2}$ units.