6. The transformation T from the z-plane, where $z = x + iy$, to the w-plane, where $w = u + iv$, is given by

$$w = \frac{z + 2}{3z + 4} \qquad z \neq -\frac{4}{3}$$

The circle C in the z-plane has equation

$$(x + 1)^2 + (y - 1)^2 = 1$$

Given that T maps C to the circle D in the w-plane, determine the equation of D, giving your answer in the form

$$u^2 + v^2 + au + bv + c = 0$$

where a, b and c are real numbers.

(7)

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Question 6 continued

(Total for Question 6 is 7 marks)