1996



(ii) Find the equation of the other tangent to *K* which is parallel to *T*.

**SOLUTION** 

3 (a) (i) Circle C with centre (0, 0), radius r.  $x^2 + y^2 = 36$  $x^2 + y^2 = r^2$  $\Rightarrow r = \sqrt{36} = 6$ 3 (a) (ii) IS A POINT ON A CIRCLE, INSIDE A CIRCLE OR OUTSIDE A CIRCLE? Substitute the point into the circle. On the circle: Both sides are equal. Inside the circle: The left hand side is less than the right hand side. **Outside the circle**: The left hand side is greater than the right hand side.  $(2, 3): x^2 + y^2 = 36$  $\Rightarrow$  (2)<sup>2</sup> + (3)<sup>2</sup> = 4 + 9

 $= 13 < 36 \Rightarrow (2, 3)$  is inside the circle.



## 3 (b) (ii)

The radius is the distance from the centre  $(\frac{5}{2}, 2)$  to either of the end points of the diameter, say (1, 0)





## 3 (c) (ii)



To find the point of contact of the parallel tangent, find the image of (3, 4) by a central symmetry through the centre (0, 0).





$$(3, 4) \rightarrow (0, 0) \rightarrow (-3, -4)$$

Equation of parallel tangent:  $(x_1, y_1) = (-3, -4), m = -\frac{3}{4}$ 

$$y - y_1 = m(x - x_1)$$
  

$$\Rightarrow (y - (-4)) = -\frac{3}{4}(x - (-3))$$
  

$$\Rightarrow 4(y + 4) = -3(x + 3)$$
  

$$\Rightarrow 4y + 16 = -3x - 9$$
  

$$\therefore 3x + 4y + 25 = 0$$