

6. A circle  $C$  has equation

$$x^2 + y^2 + 8x - 6y - 7 = 0$$

(a) Find

(i) the coordinates of the centre of  $C$

(ii) the exact radius of  $C$

(3)

The straight line  $l$  with equation  $y = 2x + k$ , where  $k$  is a constant, is a tangent to  $C$

Given that the  $y$  intercept of  $l$  is below the  $x$ -axis,

(b) find the value of  $k$

(4)