DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

3 A circle with centre C has the equation $x^2 + y^2 - 10x - 4y + 24 = 0$.

(a) Show that the line $y = 2x - 3$ is a tangent to this circle. [3]

(b) Given that this tangent touches the circle at the point P, find the coordinates of P. [2]

(c) Find the equation of the circle which has its centre at P and passes through the origin. [3]

4 **(a)** Find $\int_0^{\pi} \sin\theta \, \mathrm{d}\theta$. [2]

(b) Given that $0 < \alpha < \frac{\pi}{2}$, show that $\frac{\sec\alpha}{\cot\alpha + \tan\alpha}$ can be written as $\sin\alpha$. [3]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN