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**6.**

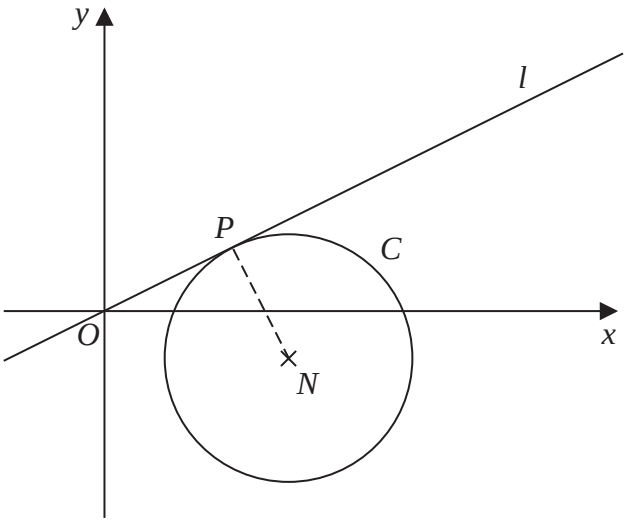



**Figure 1**

Figure 1 shows a sketch of a circle $C$ with centre $N(4, -1)$.

The line $l$ with equation $y = \frac{1}{2}x$ is a tangent to $C$ at the point $P$.

Find

(a) the equation of line $PN$ in the form $y = mx + c$, where $m$ and $c$ are constants,

**(2)**

(b) the equation of $C$.

**(5)**

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**Question 6 continued**

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**Question 6 continued**

**Q6**

**(Total 7 marks)**

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**7.** Given $\log_a b = k$, find, in simplest form in terms of $k$,

(i) $\log_a\left(\frac{\sqrt{a}}{b}\right)$ **(2)**

(ii) $\frac{\log_a a^2 b}{\log_a b^3}$ **(2)**

(iii) $\sum_{n=1}^{50}(k + \log_a b^n)$ **(3)**

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