

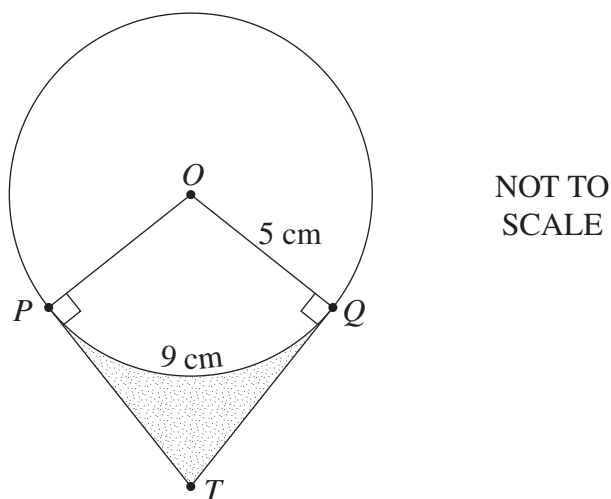
Question 6 (12 marks) Use the Question 6 Writing Booklet.

(a) Let $f(x) = (x + 2)(x^2 + 4)$.

- (i) Show that the graph $y = f(x)$ has no stationary points. 2
- (ii) Find the values of x for which the graph $y = f(x)$ is concave down, and the values for which it is concave up. 2
- (iii) Sketch the graph $y = f(x)$, indicating the values of the x and y intercepts. 2

(b) The diagram shows a circle with centre O and radius 5 cm.

The length of the arc PQ is 9 cm. Lines drawn perpendicular to OP and OQ at P and Q respectively meet at T .



- (i) Find $\angle POQ$ in radians. 1
- (ii) Prove that $\triangle OPT$ is congruent to $\triangle OQT$. 2
- (iii) Find the length of PT . 1
- (iv) Find the area of the shaded region. 2