

9 Using  $\cos(A + B) = \cos A \cos B - \sin A \sin B$

(a) show that  $\cos^2 \theta = \frac{1}{2}(\cos 2\theta + 1)$  (2)

$$f(\theta) = 8 \cos^4 \theta + 4 \cos^2 \theta - 5$$

(b) show that  $f(\theta) = \cos 4\theta + 6 \cos 2\theta$  (4)

Hence

(c) solve, for  $0^\circ \leq x < 180^\circ$ , the equation

$$8 \cos^4 x + 4 \cos^2 x - 6 \cos 2x = 4.5$$
 (4)

(d) find

(i)  $\int f(\theta) \, d\theta$

(ii) the exact value of  $\int_0^{\frac{\pi}{3}} f(\theta) \, d\theta$  (5)

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**Question 9 continued**

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**(Total for Question 9 is 15 marks)**

