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 $0° \leqslant x < 180°$, 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)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 15 marks)