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

(a) (i) Using the above identity, show that

$$\cos 2x = 1 - 2\sin^2 x$$

(ii) Hence show that

$$\frac{13\sin x - 2\cos 2x - 10}{4\sin x - 3} = 4 + \sin x \tag{7}$$

(b) Hence solve, in radians to 3 significant figures, the equation

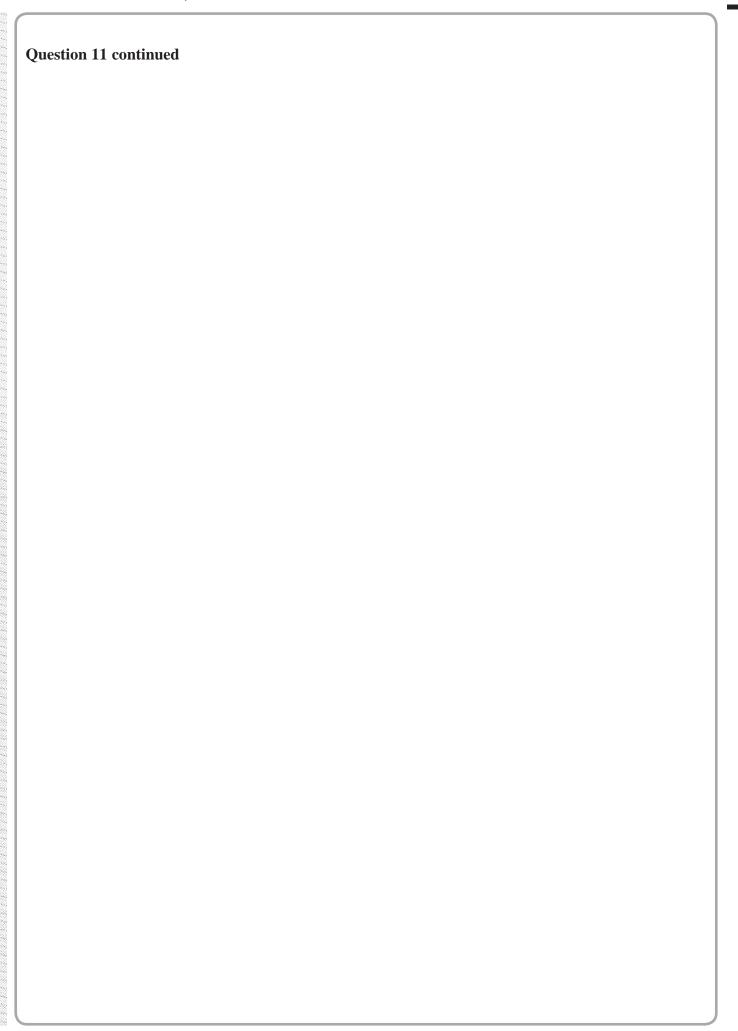
$$10 + 2\cos\left(2\theta + \frac{\pi}{3}\right) - 13\sin\left(\theta + \frac{\pi}{6}\right) = 2\sin\left(\theta + \frac{\pi}{6}\right) + 8$$

for  $\pi \leqslant \theta \leqslant 2\pi$ 

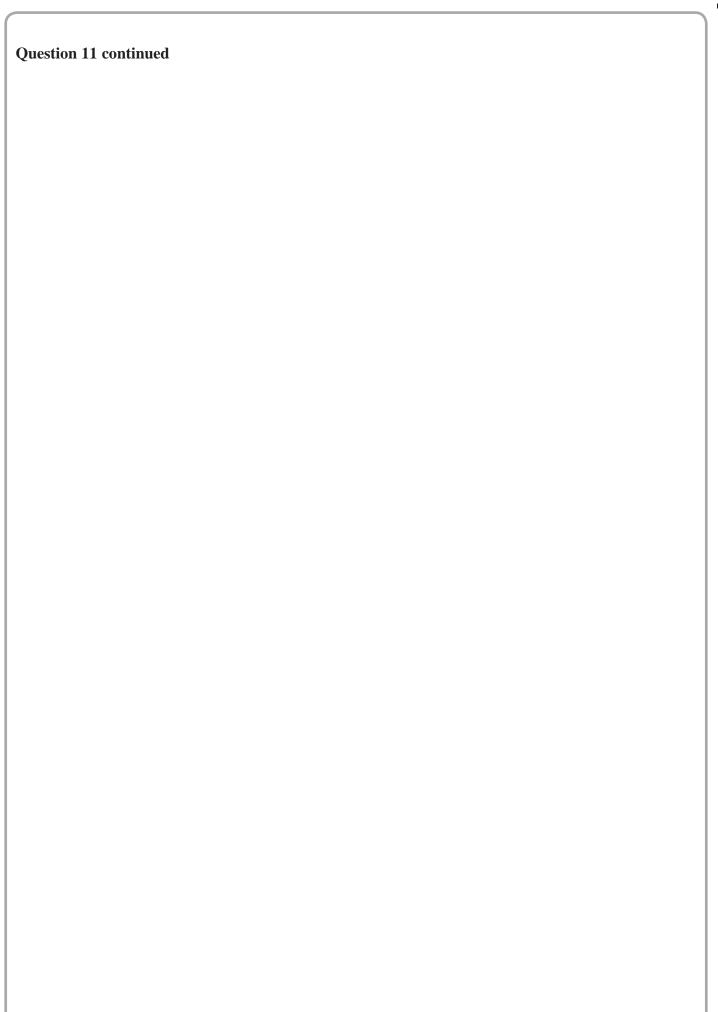
(5)

(c) Find the exact value of

$$\int_{0}^{\frac{\pi}{2}} \left( \frac{13\sin x - 2\cos 2x - 10 + 4x\sin x - 3x}{4\sin x - 3} \right) dx \tag{5}$$



**Question 11 continued** 



## **Question 11 continued**

(Total for Question 11 is 17 marks)

TOTAL FOR PAPER IS 100 MARKS