13. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

(a) Show that the equation

$$\sin\theta(7\sin\theta - 4\cos\theta) = 4$$

can be written as

$$3\tan^2\theta - 4\tan\theta - 4 = 0$$

(4)

(b) Hence solve, for $0 < x < 360°$

$$\sin x(7\sin x - 4\cos x) = 4$$

giving your answers to one decimal place.

(4)

(c) Hence find the smallest solution of the equation

$$\sin 4\alpha(7\sin 4\alpha - 4\cos 4\alpha) = 4$$

in the range $720° < \alpha < 1080°$, giving your answer to one decimal place.

(1)