First Year Maths and Further Maths combined A14
First year trigonometry
25 minutes

Throughout the entire test all working must be shown and solutions based entirely on graphical or numerical methods may not be acceptable.

1.

(a) Find all values of θ in the range $0° \leqslant \theta \leqslant 360°$ satisfying

$$6\sin^2\theta + 1 = 2(\cos^2\theta - \sin\theta).$$ [6]

(b) Find all values of x in the range $0° \leqslant x \leqslant 180°$ satisfying

$$\tan(3x - 57°) = -0{\cdot}81.$$ [4]

(c) Without carrying out any calculations, explain why there are no values of ϕ which satisfy the equation

$$2\sin\phi + 4\cos\phi = -7.$$ [1]

2.

(i) Solve, for $0 \leq \theta < 180°$ the equation

$$\sin 3\theta - \sqrt{3}\cos 3\theta = 0$$

(3)

(ii)

$$4\sin^2 x + \cos x = 4 - k, \qquad 0 \leqslant k \leqslant 3$$

(a) find $\cos x$ in terms of k.

(3)

(b) When $k = 3$, find the values of x in the range $0 \leqslant x < 360°$

(3)

