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

$$\sin\theta + 12\cos^2\theta = 6.$$ [6]

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

$$\cos(2x - 35°) = 0{\cdot}891.$$ [3]

(c) Find all values of ϕ in the range $0° \leqslant \phi \leqslant 360°$ satisfying

$$\sin\phi + \cos\phi = 0.$$ [3]

June 2011

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

$$10\sin^2\theta + 7\cos\theta = 5\cos^2\theta + 8.$$ [6]

(b) Find all values of x in the range $0° \leqslant x \leqslant 360°$ satisfying

$$\sin(x - 50°) = -0{\cdot}682.$$ [3]

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

$$\sin\phi + \cos\phi = 3.$$ [1]

Jan 2012

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

$$10\cos^2\theta + 3\cos\theta = 4\sin^2\theta - 2$$ [6]

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

$$\sin(3x - 21°) = -0{\cdot}809.$$ [3]

(c) Find all values of ϕ in the range $0° \leqslant \phi \leqslant 360°$ satisfying

$$\cos\phi - 5\sin\phi = 0.$$ [3]

June 2012

84. *(a)* Find all values of θ between 0° and 360° satisfying

$$7\sin^2\theta - \sin\theta = 3\cos^2\theta.$$ [6]

(b) Find all values of x between 0° and 180° satisfying

$$\tan(3x - 20°) = 1{\cdot}28.$$ [4]

Jan 2013