

The variables  $x$  and  $\theta$  satisfy the differential equation

$$\frac{dx}{d\theta} = \left(\frac{1}{5}x + 1\right)\sin^2 2\theta,$$

and  $x = 5$  when  $\theta = 0$ .

Solve the differential equation and obtain an expression for  $x$  in terms of  $\theta$ .

[7]