11 A curve has equation $y = 5\ln(1-\cos 2x)$, where x is in radians.

(a) State the values of x for which $5\ln(1-\cos 2x)$ is not defined. **[2]**

(b) P is the stationary point on the curve that has the smallest positive x-coordinate.

Determine the exact coordinates of P. **[4]**

(c) **(i)** Show that $\dfrac{\mathrm{d}^2y}{\mathrm{d}x^2} + 20\mathrm{e}^{-\frac{1}{5}y} = 0$. **[5]**

(ii) State what can be deduced about all of the stationary points on this curve, giving a reason for your answer. **[1]**