

13.

**In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.**

The curve C has equation

$$x^2 - 2y^2 - xy - x + 5y + 79 = 0$$

(a) Find an expression for $\frac{dy}{dx}$ in terms of x and y .

(5)

The point $P\left(1 + 6\sqrt{2}, 10 - \frac{3\sqrt{2}}{2}\right)$ lies on C .

(b) Show that the gradient of the normal to C at P is

$$a + b\sqrt{2}$$

where a and b are fully simplified rational numbers to be found.

(3)