11.

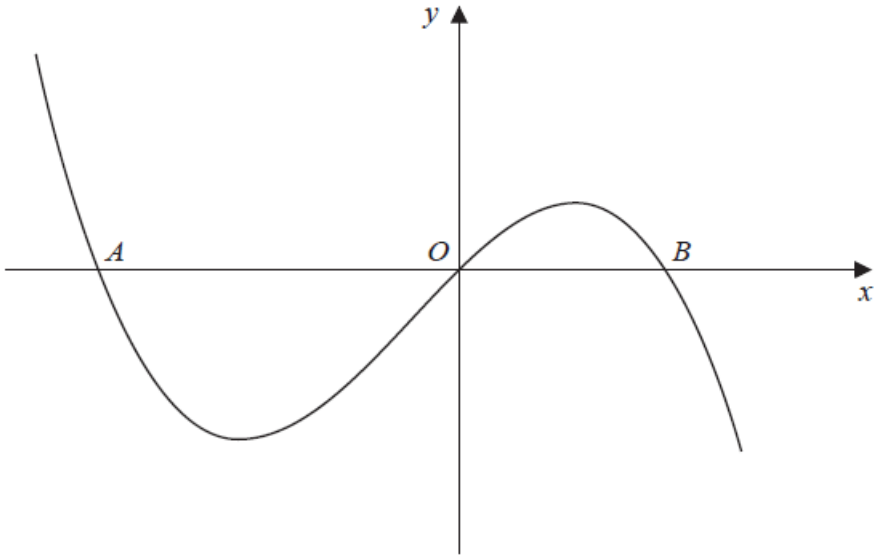

Figure 5

Figure 5 shows a sketch of the curve C with equation $y = f(x)$.

The curve C crosses the x-axis at the origin, O, and at the points A and B as shown in Figure 5.

Given that $f'(x) = k - 4x - 3x^2$, where k is a constant,

(a) show that C has a point of inflection at $x = -\frac{2}{3}$.

(3)

Given also that the distance $AB = 4\sqrt{2}$,

(b) find, showing your working, the integer value of k.

(7)

(Total for Question 11 is 10 marks)