7.

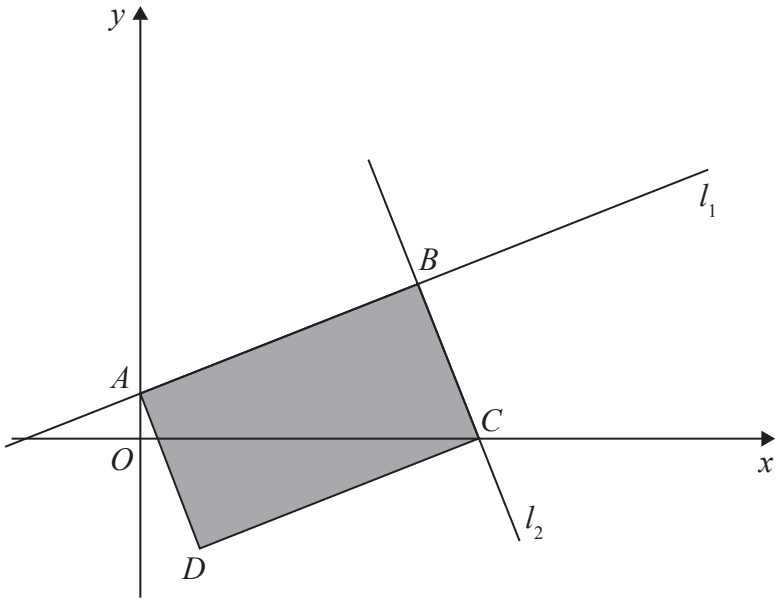

Figure 2

The straight line l_1 shown in Figure 2 has equation $5y = 2x + 10$

The points A and B lie on l_1 such that

- point A lies on the y-axis
- point B has x coordinate 10

(a) Find the distance AB writing your answer as a fully simplified surd.

(3)

The straight line l_2 also shown in Figure 2

- passes through B
- is perpendicular to l_1

(b) Find an equation for l_2 writing your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(4)

Line l_2 crosses the x-axis at the point C.

Point D is such that the points A, B, C and D form the vertices of a rectangle, shown shaded in Figure 2.

(c) Find the area of rectangle $ABCD$.

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 7 continued

Question 7 continued

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 7 continued

(Total for Question 7 is 10 marks)

8. A curve C with equation $y = f(x)$ passes through the point $R(4, 13)$.

Given that

$$f'(x) = 2(x - 3)(3x + 2)$$

(a) use integration to find $f(x)$, giving your answer in simplest form.

(5)

(b) Given that $f(x)$ can be written in the form

$$(x - 3)^2(px + q)$$

find the value of the constant p and the value of the constant q.

(2)

(c) Sketch the graph of $y = f(2x)$, showing the coordinates of any points where the curve touches or crosses the coordinate axes.

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA