1 The line l has equation $y + 2x - 5 = 0$. Point A lies on l and has coordinates $(1, k)$.

Find the equation of the line that is perpendicular to l and passes through point A, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

.....

(4 marks)

2 The point A lies at the intersection of the lines l_1 and l_2, where the equation of l_1 is $x - y + 1 = 0$ and the equation of l_2 is $2x + y - 8 = 0$.

a) Find the coordinates of point A.

.....

(3 marks)

b) The points B and C have coordinates $(6, -4)$ and $\left(-\frac{4}{3}, -\frac{1}{3}\right)$ respectively, and D is the midpoint of AC. Find the equation of the line through B and D in the form $ax + by + c = 0$, where a, b and c are integers.

Draw a sketch to help you see what's going on here. Remember, to find a midpoint, you just average the x-values and the y-values of the two points.

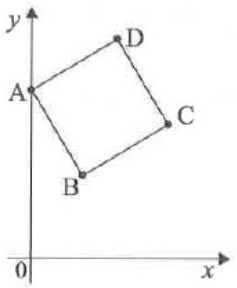
.....

(5 marks)

c) Show that the triangle ABD is a right-angled triangle.

(3 marks)

3 The diagram shows a square ABCD, where point B has coordinates $(3, k)$.
The line through points B and C has equation $-3x + 5y = 16$.



a) Show that the line through points A and B has equation $3y + 5x = 30$.

(4 marks)

b) Find the area of square ABCD.

.....

(3 marks)

c) Show that the line with equation $5x + 3y - 6 = 0$ is parallel to the line through points A and B.

(2 marks)