(12) The points A, B, C, D have coordinates $(-5, 14)$, $(1, 2)$, $(5, 4)$, $(3, 8)$ respectively.

(a) (i) Show that AB and CD are parallel.

(ii) Find the equation of AB.

(iii) The line L passes through the point D and is perpendicular to AB. Show that L has equation

$$x - 2y + 13 = 0.$$ [8]

(b) The lines L and AB intersect at the point E.

(i) Find the coordinates of E.

(ii) Calculate the length of EF, where F denotes the mid-point of AB. [6]

Jan 12

(13) The points A, B, C are such that A, B have coordinates $(-4, 7)$, $(2, -1)$ respectively and C is the mid-point of AB. The line L is the perpendicular bisector of AB.

(a) Find the gradient of AB. [2]

(b) Find the coordinates of C. [2]

(c) Show that the equation of L is

$$3x - 4y + 15 = 0.$$ [4]

(d) The point D lies on L and has coordinates $(7, k)$.

(i) Show that $k = 9$.

(ii) Find the length of CA and the length of DA.

(iii) Hence show that the value of $\sin A\hat{D}C$ may be expressed in the form $\frac{1}{\sqrt{a}}$, where a is an integer whose value is to be found. [7]

June 12

(14) The points A and B have coordinates $(2, -3)$ and $(4, 1)$ respectively.
The line L has equation $x + 2y - 11 = 0$.

(a) Find the equation of AB and simplify your answer. [5]

(b) Show that AB and L are perpendicular. [3]

(c) The lines AB and L intersect at the point C. Show that C has coordinates $(5, 3)$. [2]

(d) Find the lengths of AB and AC. Hence find the value of the constant k such that $AB = kAC$, giving your answer in its simplest form. [4]

Jan 13