1 Point A has coordinates (4, 7) and point B has coordinates (2, 1).

(i) Find the equation of the line through A and B. **[3]**

(ii) Point C has coordinates (–1, 2). Show that angle ABC = 90° and calculate the area of triangle ABC. **[5]**

(iii) Find the coordinates of D, the midpoint of AC.

Explain also how you can tell, without having to work it out, that A, B and C are all the same distance from D. **[3]**

2 A line has gradient 3 and passes through the point (1, –5). The point $(5, k)$ is on this line. Find the value of k. **[2]**

3 Find the equation of the line which is parallel to $y = 5x - 4$ and which passes through the point (2, 13). Give your answer in the form $y = ax + b$. **[3]**

4 Find the coordinates of the point of intersection of the lines $x + 2y = 5$ and $y = 5x - 1$. **[3]**

5 Fig. 9 shows a trapezium ABCD, with the lengths in centimetres of three of its sides.

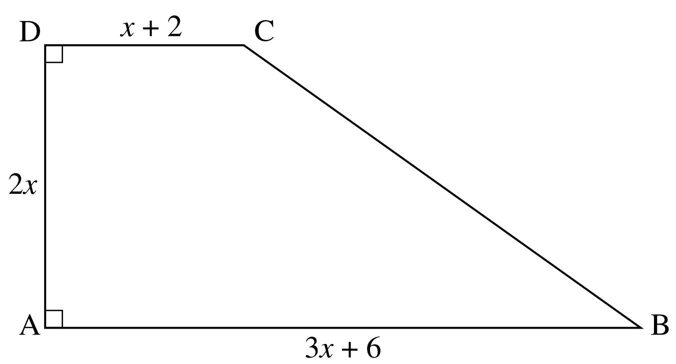

Fig. 9

This trapezium has area 140 cm^2.

(i) Show that $x^2 + 2x - 35 = 0$. **[2]**

(ii) Hence find the length of side AB of the trapezium. **[3]**

6 The points A $(-1, 6)$, B $(1, 0)$ and C $(13, 4)$ are joined by straight lines.

(i) Prove that the lines AB and BC are perpendicular. **[3]**

(ii) Find the area of triangle ABC. **[3]**

(iii) A circle passes through the points A, B and C. Justify the statement that AC is a diameter of this circle. Find the equation of this circle. **[6]**

(iv) Find the coordinates of the point on this circle that is furthest from B. **[1]**

7

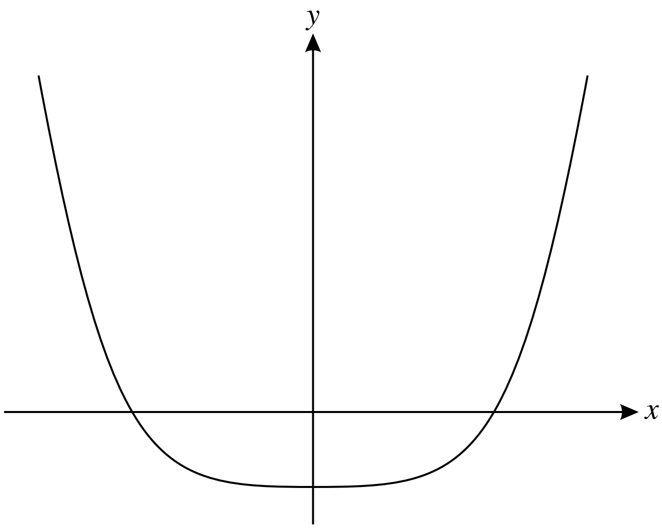

Fig. 13

Fig. 13 shows the curve $y = x^4 - 2$.

(i) Find the exact coordinates of the points of intersection of this curve with the axes. **[3]**

(ii) Find the exact coordinates of the points of intersection of the curve $y = x^4 - 2$ with the curve $y = x^2$. **[5]**

(iii) Show that the curves $y = x^4 - 2$ and $y = kx^2$ intersect for all values of k. **[2]**

8 Find the equation of the line which is parallel to $y = 3x + 1$ and which passes through the point with coordinates $(4, 5)$. **[3]**