**7.** (a) On Diagram 1, sketch a graph of the curve $C$ with equation

$$y = \frac{6}{x} \qquad x \neq 0$$

**(2)**

The curve $C$ is transformed onto the curve with equation $y = \dfrac{6}{x-2} \qquad x \neq 2$

(b) Fully describe this transformation.

**(2)**

The curve with equation

$$y = \frac{6}{x-2} \qquad x \neq 2$$

and the line with equation

$$y = kx + 7 \qquad \text{where } k \text{ is a constant}$$

intersect at exactly two points, $P$ and $Q$.

Given that the $x$ coordinate of point $P$ is $-4$

(c) find the value of $k$,

**(2)**

(d) find, using algebra, the coordinates of point $Q$.

(*Solutions relying entirely on calculator technology are not acceptable*.)

**(4)**

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**Question 7 continued**

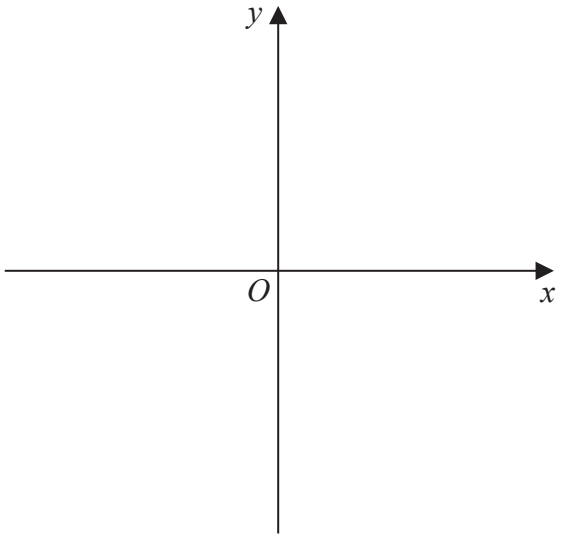



**Diagram 1**

**Turn over for a copy of Diagram 1 if you need to redraw your graph.**

**Question 7 continued**

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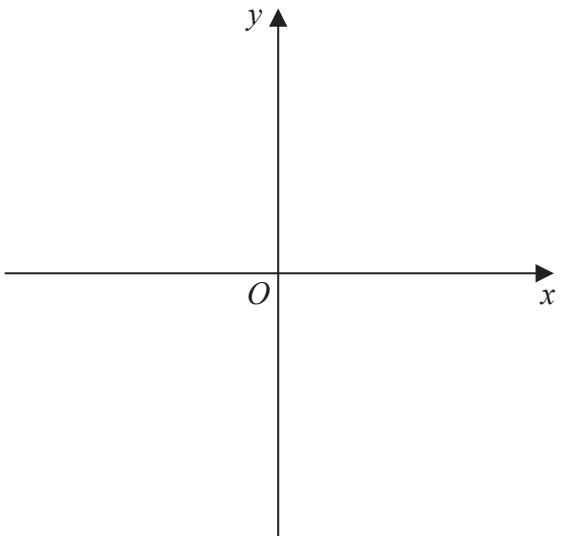
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**Question 7 continued**

**Only use this copy of Diagram 1 if you need to redraw your graph.**




**Copy of Diagram 1**

**(Total for Question 7 is 10 marks)**

**8.**

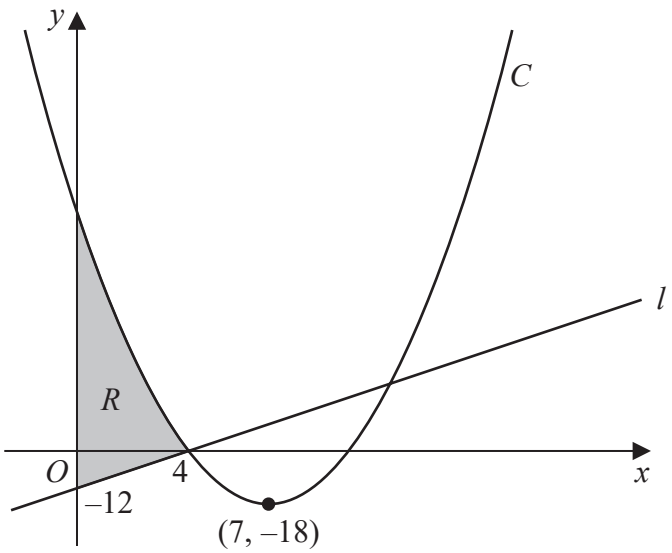



**Figure 2**

Figure 2 shows a sketch of the straight line $l$ and the curve $C$.

Given that $l$ cuts the $y$-axis at $-12$ and cuts the $x$-axis at 4, as shown in Figure 2,

(a) find an equation for $l$, writing your answer in the form $y = mx + c$, where $m$ and $c$ are constants to be found.

**(2)**

Given that $C$

- has equation $y = \mathrm{f}(x)$ where $\mathrm{f}(x)$ is a quadratic expression
- has a minimum point at $(7, -18)$
- cuts the $x$-axis at 4 and at $k$, where $k$ is a constant

(b) deduce the value of $k$,

**(1)**

(c) find $\mathrm{f}(x)$.

**(3)**

The region $R$ is shown shaded in Figure 2.

(d) Use inequalities to define $R$.

**(2)**

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