**10.** The curve $C$ has equation

$$y = \frac{3k}{x - 2k} \qquad x \neq 2k$$

where $k$ is a positive constant.

(a) Sketch a graph of $C$.
Show on your sketch the coordinates of the point where $C$ crosses a coordinate axis.

**(3)**

The line $l$ has equation $x + y = 12$

Given that $l$ is a tangent to $C$,

(b) show that

$$k^2 - 15k + 36 = 0$$

**(4)**

The line $l$ meets $C$ at a point $P$.

Given that $P$ lies below the $x$-axis,

(c) find the coordinates of $P$.

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

**(4)**

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**Question 10 continued**

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**(Total for Question 10 is 11 marks)**

**TOTAL FOR PAPER IS 75 MARKS**

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