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11. (a) On Diagram 1 sketch the graphs of

(i) $y = x(3 - x)$

(ii) $y = x(x - 2)(5 - x)$

showing clearly the coordinates of the points where the curves cross the coordinate axes.

(4)

(b) Show that the x coordinates of the points of intersection of

$$y = x(3 - x) \text{ and } y = x(x - 2)(5 - x)$$

are given by the solutions to the equation $x(x^2 - 8x + 13) = 0$

(3)

The point P lies on both curves. Given that P lies in the first quadrant,

(c) find, using algebra and showing your working, the exact coordinates of P.

(5)

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Question 11 continued

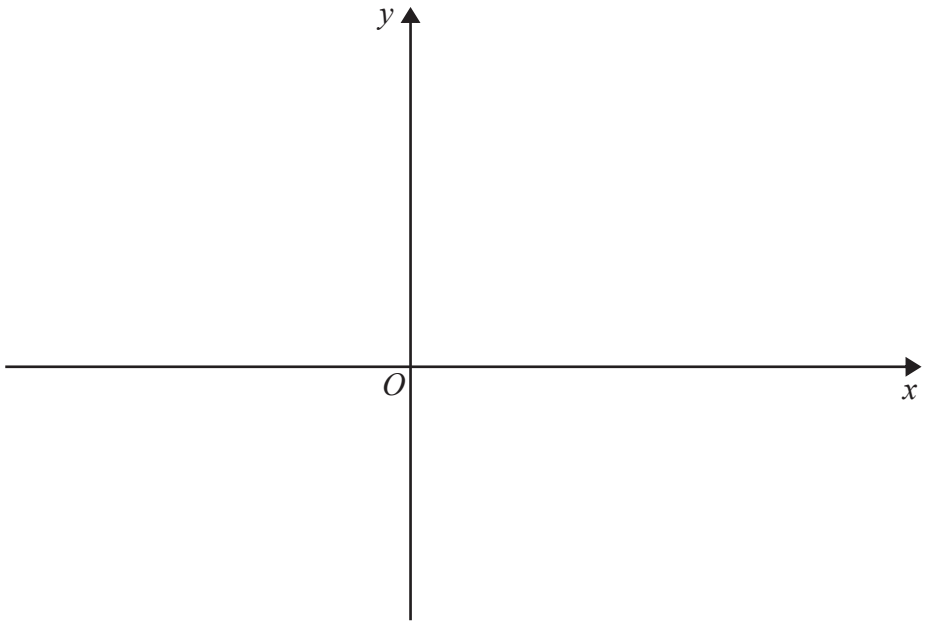

Diagram 1

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Question 11 continued

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Question 11 continued

Q11

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12. The curve with equation $y = f(x), x > 0,$ passes through the point $P(4, -2)$.

Given that

$$\frac{dy}{dx} = 3x\sqrt{x} - 10x^{-\frac{1}{2}}$$

(a) find the equation of the tangent to the curve at P, writing your answer in the form $y = mx + c$, where m and c are integers to be found.

(4)

(b) Find $f(x)$.

(5)

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