

- [3]

[illegible]

- 1 (a) Express $x^2 - 8x + 11$ in the form $(x + p)^2 + q$ where p and q are constants. [2]

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- (b) Hence find the exact solutions of the equation $x^2 - 8x + 11 = 1$. [2]

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5 (a) Express $2x^2 - 8x + 14$ in the form $2[(x - a)^2 + b]$.

[2]

[illegible]

- 3 (a) Express $4x^2 - 24x + p$ in the form $a(x + b)^2 + c$, where a and b are integers and c is to be given in terms of the constant p . [2]

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- (b) Hence or otherwise find the set of values of p for which the equation $4x^2 - 24x + p = 0$ has no real roots. [1]

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- 1 (a) Express $16x^2 - 24x + 10$ in the form $(4x + a)^2 + b$. [2]

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- (b) It is given that the equation $16x^2 - 24x + 10 = k$, where k is a constant, has exactly one root.

Find the value of this root. [2]

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- 9 Functions f and g are both defined for $x \in \mathbb{R}$ and are given by

$$f(x) = x^2 - 4x + 9,$$

$$g(x) = 2x^2 + 4x + 12.$$

- (a) Express $f(x)$ in the form $(x - a)^2 + b$. [1]

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- (b) Express $g(x)$ in the form $2[(x + c)^2 + d]$. [2]

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- 3** (a) Express $5y^2 - 30y + 50$ in the form $5(y + a)^2 + b$, where a and b are constants. [2]

[illegible]

- 3 (a)** Find the set of values of k for which the equation $8x^2 + kx + 2 = 0$ has no real roots. [2]

[illegible]

6 The equation of a curve is $y = 4x^2 + 20x + 6$.

- (a) Express the equation in the form $y = a(x + b)^2 + c$, where a , b and c are constants. [3]

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- (b) Hence solve the equation $4x^2 + 20x + 6 = 45$. [3]

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- (c) Sketch the graph of $y = 4x^2 + 20x + 6$ showing the coordinates of the stationary point. You are not required to indicate where the curve crosses the x - and y -axes. [3]

- [4]

This image shows a blank sheet of white paper designed for handwriting practice. It features multiple sets of horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.com" is oriented diagonally from the bottom left towards the top right, spanning across the entire page. The watermark is semi-transparent, allowing the ruled lines to remain visible beneath it. There are no other markings, text, or illustrations on the page.

- 1 (a)** Express $3y^2 - 12y - 15$ in the form $3(y+a)^2 + b$, where a and b are constants. [2]

[illegible]

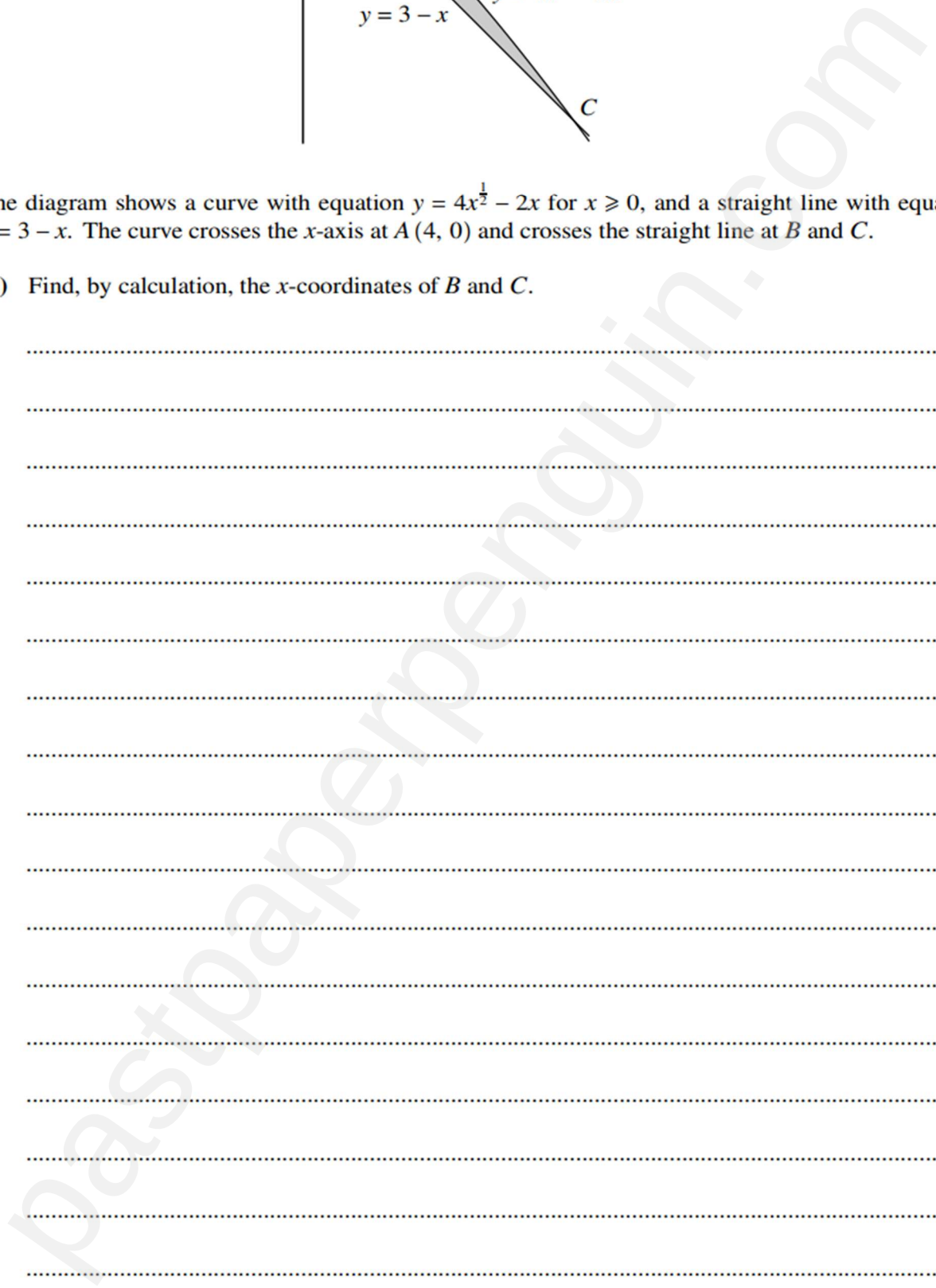
- (b)** Hence find the exact solutions of the equation $3x^4 - 12x^2 - 15 = 0$. [3]

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- 4** Solve the equation $8x^6 + 215x^3 - 27 = 0$.

[3]

[illegible]



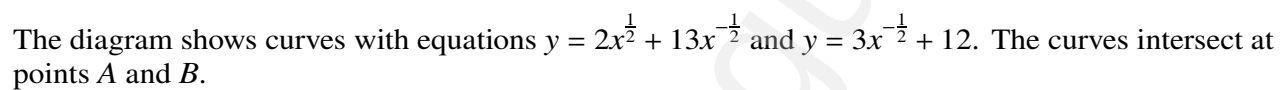
The diagram shows a curve with equation $y = 4x^{\frac{1}{2}} - 2x$ for $x \geq 0$, and a straight line with equation $y = 3 - x$. The curve crosses the x -axis at $A(4, 0)$ and crosses the straight line at B and C .

Find, by calculation, the x -coordinates of B and C .

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- Find, by calculation, the x -coordinates of B and C .

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Find, by calculation, the x -coordinates of B and C .



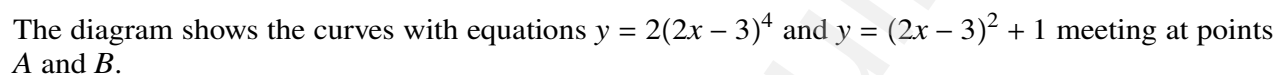
- [4]

[illegible]

2 By using a suitable substitution, solve the equation

$$(2x-3)^2 - \frac{4}{(2x-3)^2} - 3 = 0. \quad [4]$$

[illegible]



- [illegible]

- Find the set of possible values of c . [4]