

1. **Nov/2021/Paper_9709/21/No.2**

(a) Sketch, on the same diagram, the graphs of $y = 3x$ and $y = |x - 3|$.

[2]

(b) Find the coordinates of the point where the two graphs intersect.

[3]

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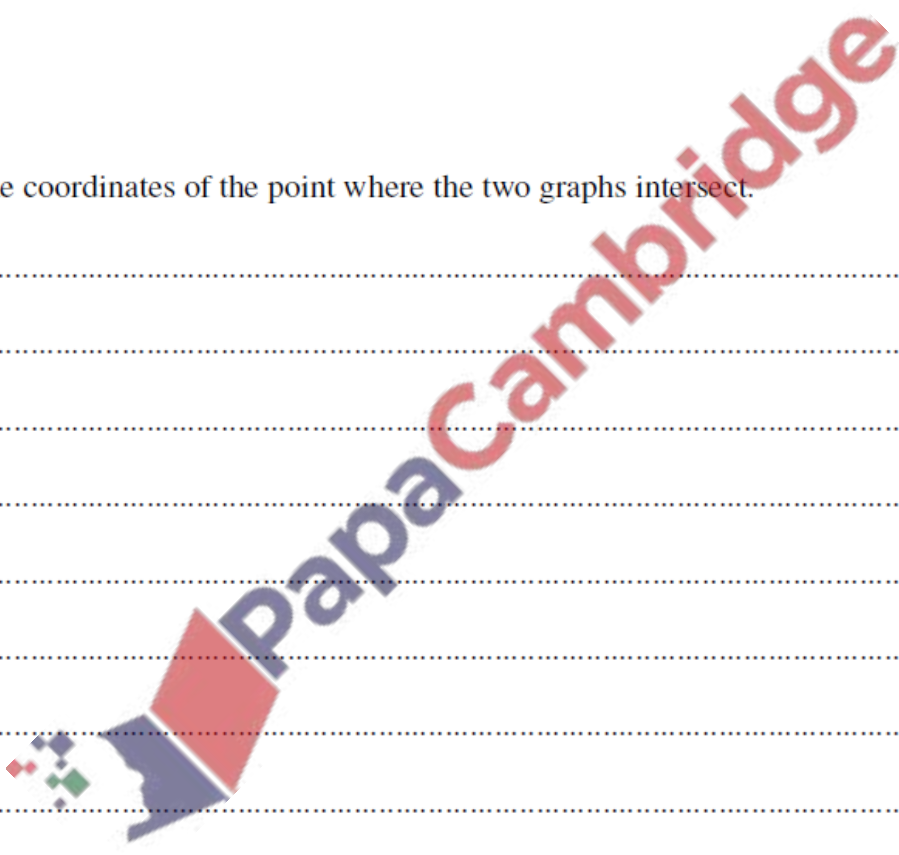
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(c) Deduce the solution of the inequality $3x < |x - 3|$.

[1]

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2. Nov/2021/Paper_9709/21/No.6

The polynomials $f(x)$ and $g(x)$ are defined by

$$f(x) = 4x^3 + ax^2 + 8x + 15 \quad \text{and} \quad g(x) = x^2 + bx + 18,$$

where a and b are constants.

- (a) Given that $(x + 3)$ is a factor of $f(x)$, find the value of a . [2]

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- (b) Given that the remainder is 40 when $g(x)$ is divided by $(x - 2)$, find the value of b . [2]

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(c) When a and b have these values, factorise $f(x) - g(x)$ completely.

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(d) Hence solve the equation $f(\operatorname{cosec} \theta) - g(\operatorname{cosec} \theta) = 0$ for $0 < \theta < 2\pi$.

[3]

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(a) Sketch, on the same diagram, the graphs of $y = x + 3$ and $y = |2x - 1|$.

[2]

(b) Solve the equation $x + 3 = |2x - 1|$.

[3]

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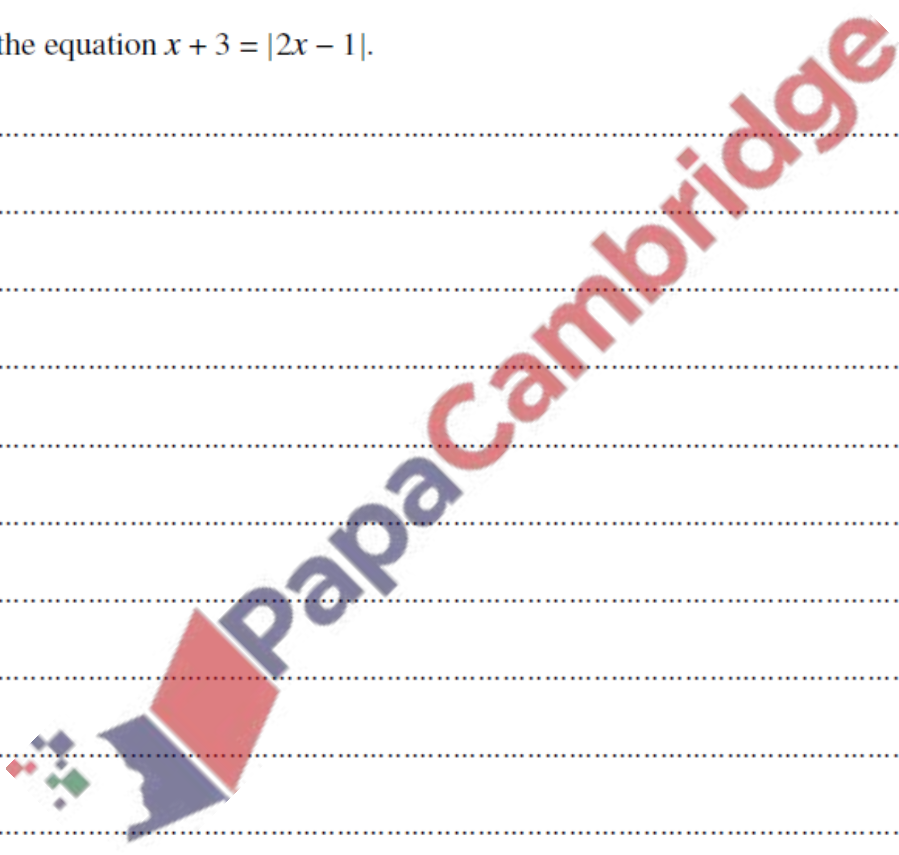
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(c) Find the value of y such that $5^{\frac{1}{2}y} + 3 = |2 \times 5^{\frac{1}{2}y} - 1|$. Give your answer correct to 3 significant figures.

[2]

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