

A function f is defined by $f(x) = \frac{2x-1}{x+1}$, where $x \in \mathbb{R}$, $x \neq -1$.

The graph of $y = f(x)$ has a vertical asymptote and a horizontal asymptote.

2a. Write down the equation of the vertical asymptote. [1 mark]

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2b. Write down the equation of the horizontal asymptote. [1 mark]

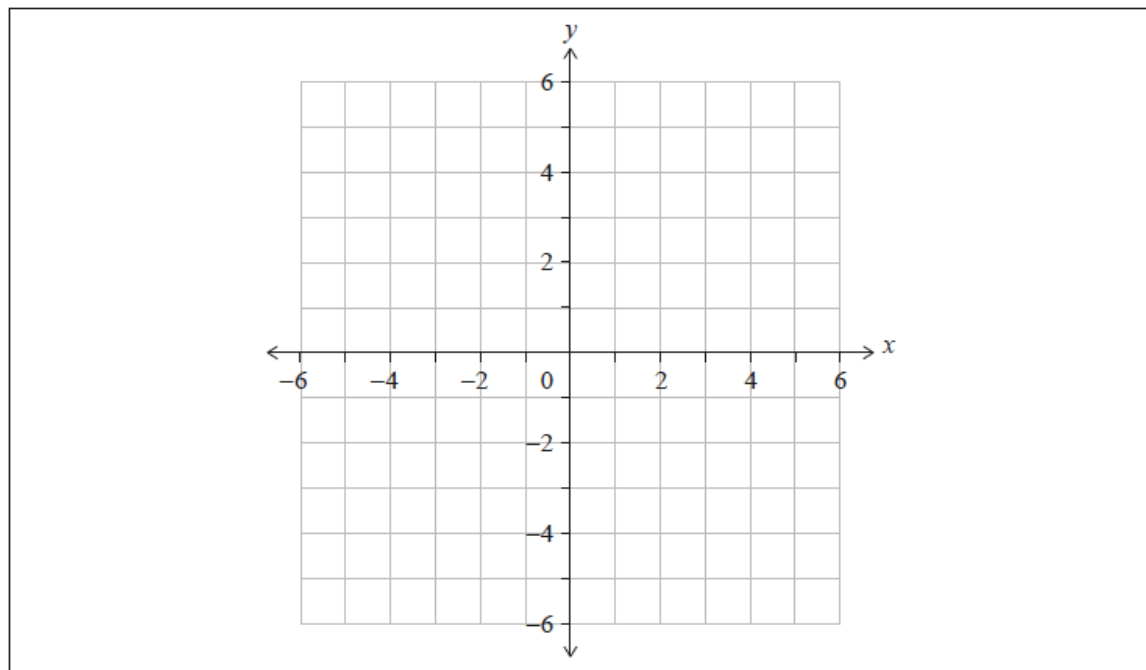
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2c. On the set of axes below, sketch the graph of $y = f(x)$. [3 marks]

On your sketch, clearly indicate the asymptotes and the position of any points of intersection with the axes.



2d. Hence, solve the inequality $0 < \frac{2x-1}{x+1} < 2$.

[1 mark]

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2e. Solve the inequality $0 < \frac{2|x|-1}{|x|+1} < 2$.

[2 marks]

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The faces of a fair six-sided die are numbered 1, 2, 2, 4, 4, 6. Let X be the discrete random variable that models the score obtained when this die is rolled.

4a. Complete the probability distribution table for X .

[2 marks]

x				
$P(X=x)$				

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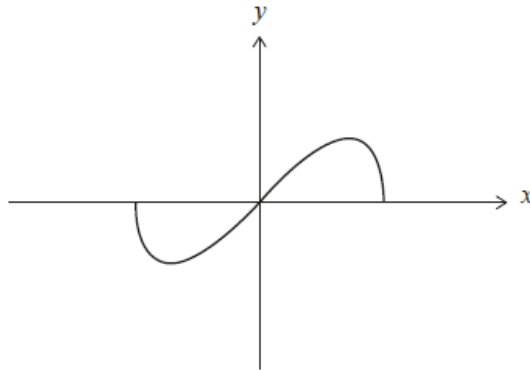
4b. Find the expected value of X .

[2 marks]

A large rectangular box with a solid black border, containing 18 horizontal dotted lines for writing. The lines are evenly spaced and extend across the width of the box.

A function f is defined by $f(x) = x\sqrt{1-x^2}$ where $-1 \leq x \leq 1$.

The graph of $y = f(x)$ is shown below.



5a. Show that f is an odd function.

[2 marks]

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5b. The range of f is $a \leq y \leq b$, where $a, b \in \mathbb{R}$.

[6 marks]

Find the value of a and the value of b .

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