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JC MATHEMATICS (H2) STUDY TIPS

**GRAPHICAL APPROACH IN
SOLVING INEQUALITIES WITH
THE USE OF SUBSTITUTION**

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JC_H2Maths_024



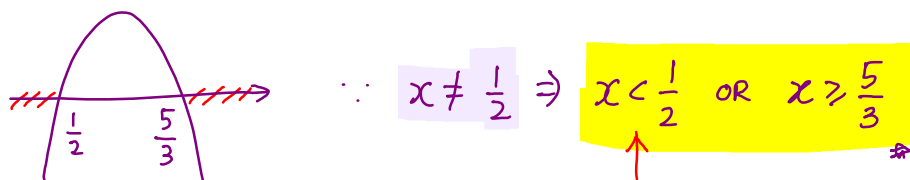
Quick Practice

- (a) Solve the inequality $\frac{x+3}{2x-1} \leq 2$. , $x \neq \frac{1}{2}$

$$\frac{x+3}{2x-1} - 2 \leq 0$$

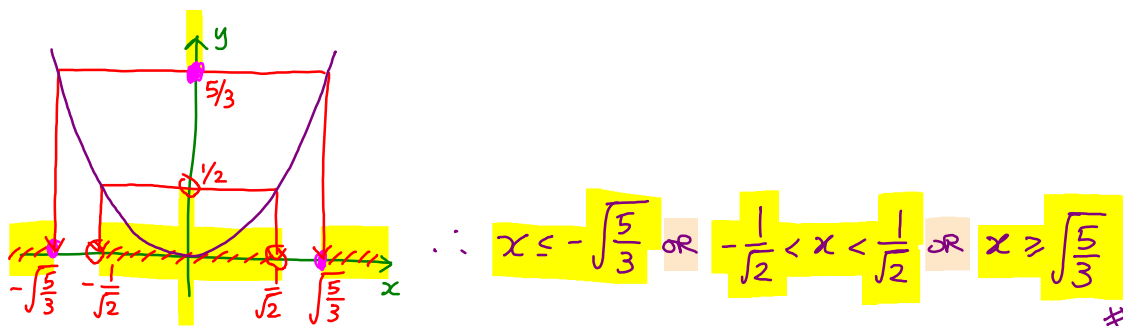
$$\frac{x+3-4x+2}{2x-1} \leq 0$$

$$(2x-1)(5-3x) \leq 0$$

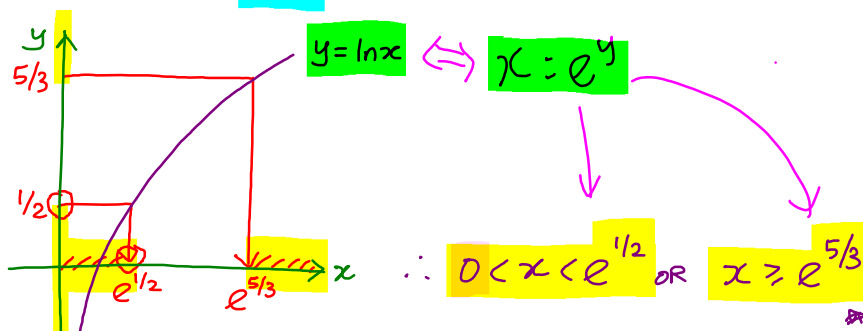


- (b) Using the result from (a), solve the following inequalities.

(i) $\frac{x^2+3}{2x^2-1} \leq 2 \quad \therefore x^2 < \frac{1}{2} \text{ OR } x^2 \geq \frac{5}{3}$



(ii) $\frac{\ln x + 3}{\ln x - 1} \leq 2 \Rightarrow \frac{\ln x + 3}{2 \ln x - 1} \leq 2 \Rightarrow \ln x < \frac{1}{2} \text{ OR } \ln x \geq \frac{5}{3}$





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Explanation

In this specific scenario, substituting the logarithmic component allows you to quickly determine the solution boundaries based on the first part.

However, a major danger when returning to the original variable is overlooking the intrinsic domain restrictions of specific mathematical functions. Since a natural logarithm is defined only for strictly positive inputs, the final interval must be bounded from below. Referencing a visual graph highlights this critical threshold because the curve never crosses the vertical axis, visually confirming that the allowed values must terminate at zero. Without checking the graph, it is incredibly easy to miss this hidden boundary and incorrectly assume the valid range extends infinitely into negative numbers.

Consequently, graphical verification serves as a vital safeguard against losing essential domain constraints during the back-substitution process.

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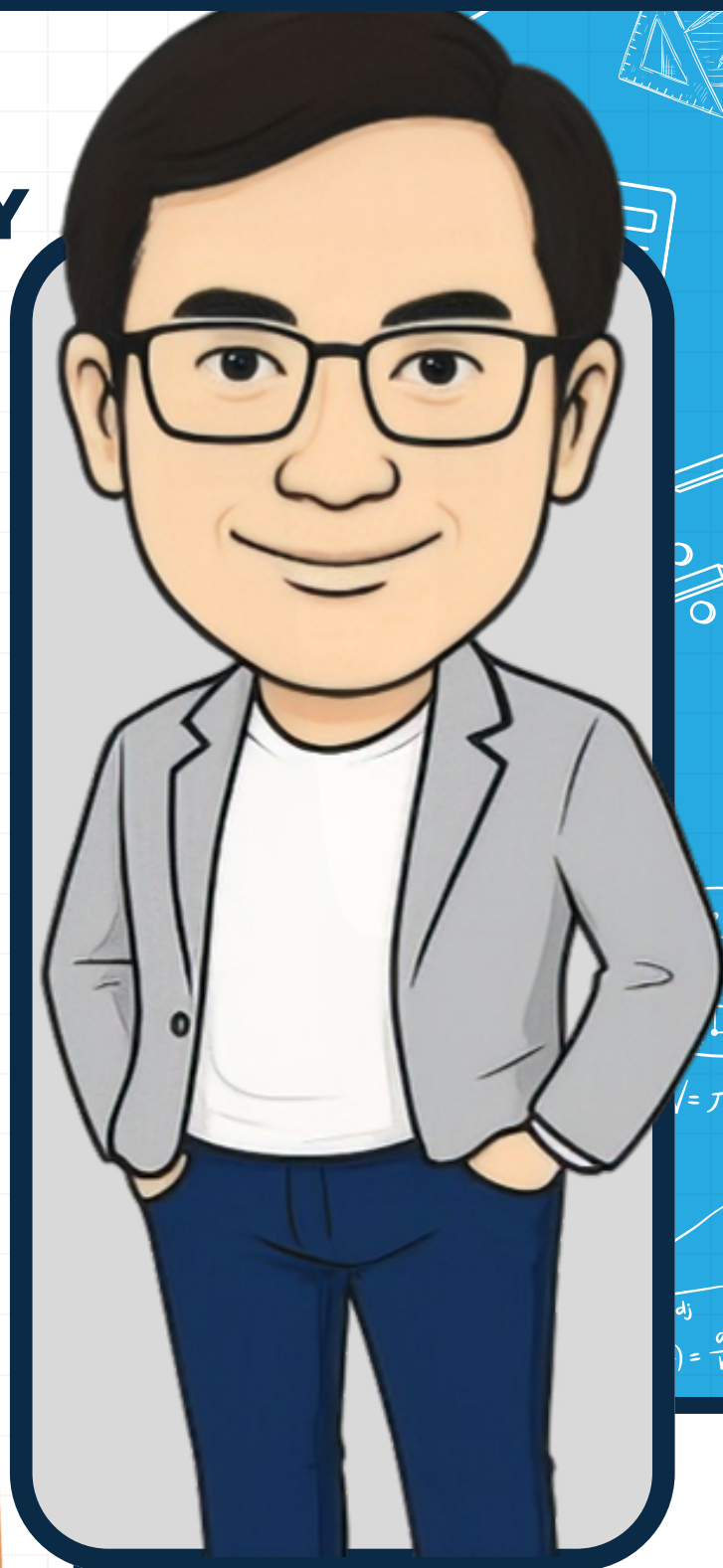
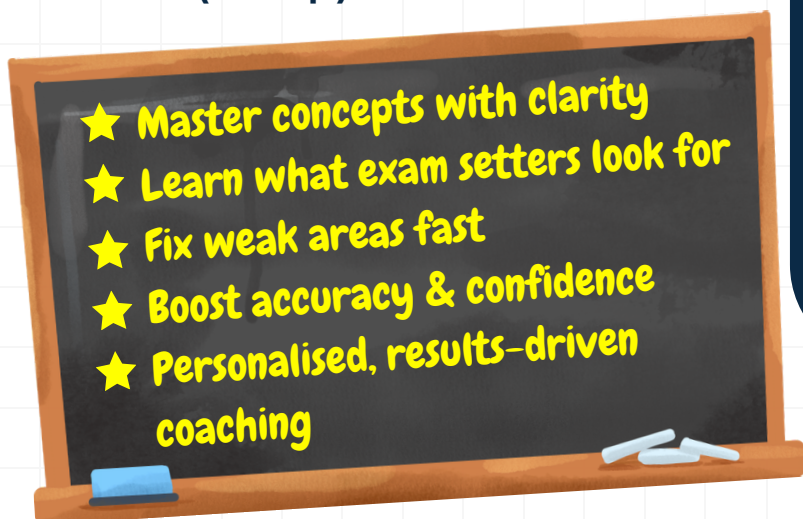
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