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JC MATHEMATICS (H2) STUDY TIPS

**HOW TO MASTER THE RANGE OF
A FUNCTION: THE INSIDER
SECRET BEYOND THE
ENDPOINTS**

PREPARED BY
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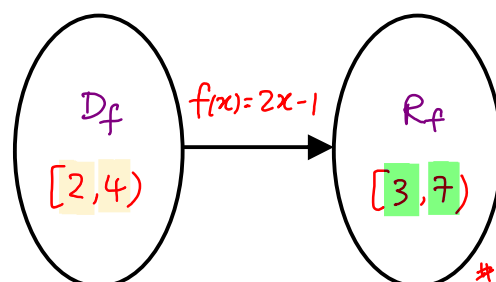
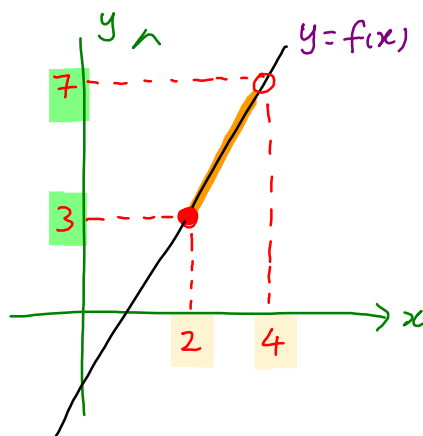
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1. Rule, Domain and Range

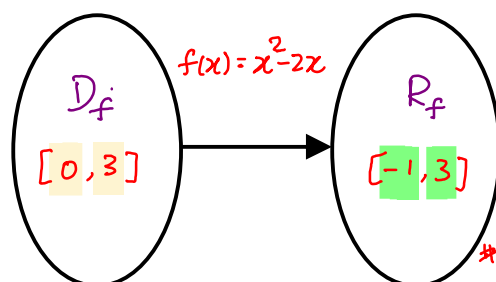
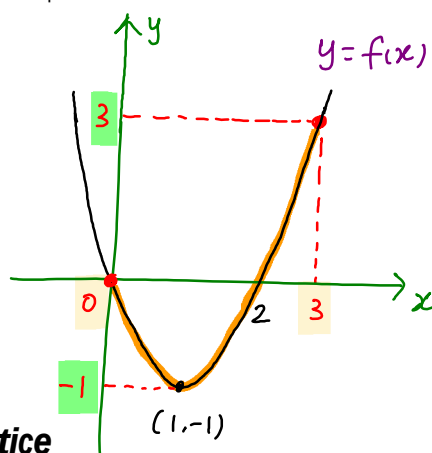
Example 1 Range Rule Domain

Given that $f : x \mapsto 2x - 1$ for $2 \leq x < 4$, determine the range of $f(x)$.



Example 2

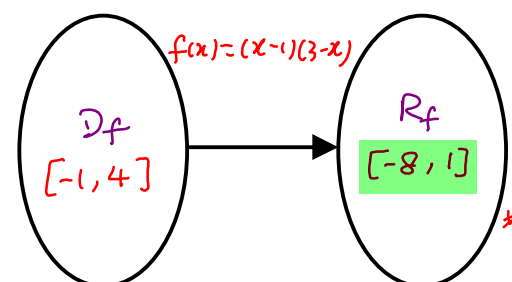
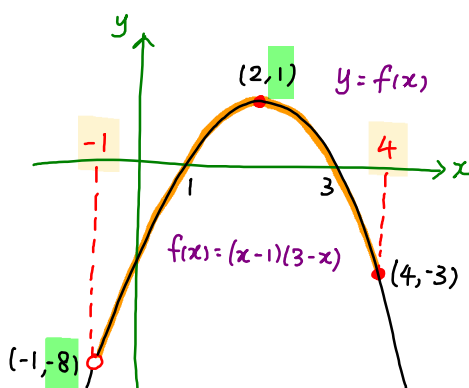
Given that $f : x \mapsto x^2 - 2x$ for $0 \leq x \leq 3$, determine the range of $f(x)$.



Quick Practice

Given that $f : x \mapsto (x-1)(3-x)$ for $-1 < x \leq 4$, determine the range of $f(x)$.

$$f(-1) = (-2)(4) = -8 \quad f(4) = (3)(-1) = -3 \quad f\left(\frac{1+3}{2}\right) = f(2) = (1)(1) = 1$$





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Explanation

Here is a secret to finding the range of a function: never blindly just trust the endpoints. While linear equations play nice and let you get away with checking the two outer edges of your domain, curves have a mind of their own.

The real trick is hunting down the turning point before you do anything else. If a curve peaks or bottoms out inside your domain interval, that hidden vertex completely hijacks the boundary, setting your absolute maximum or minimum.

If you skip this step, you will completely miss the true peak or valley of your graph and get the wrong answer.

In short, looking at the entire landscape of the curve, not just its borders, is the only foolproof way to map its true range.

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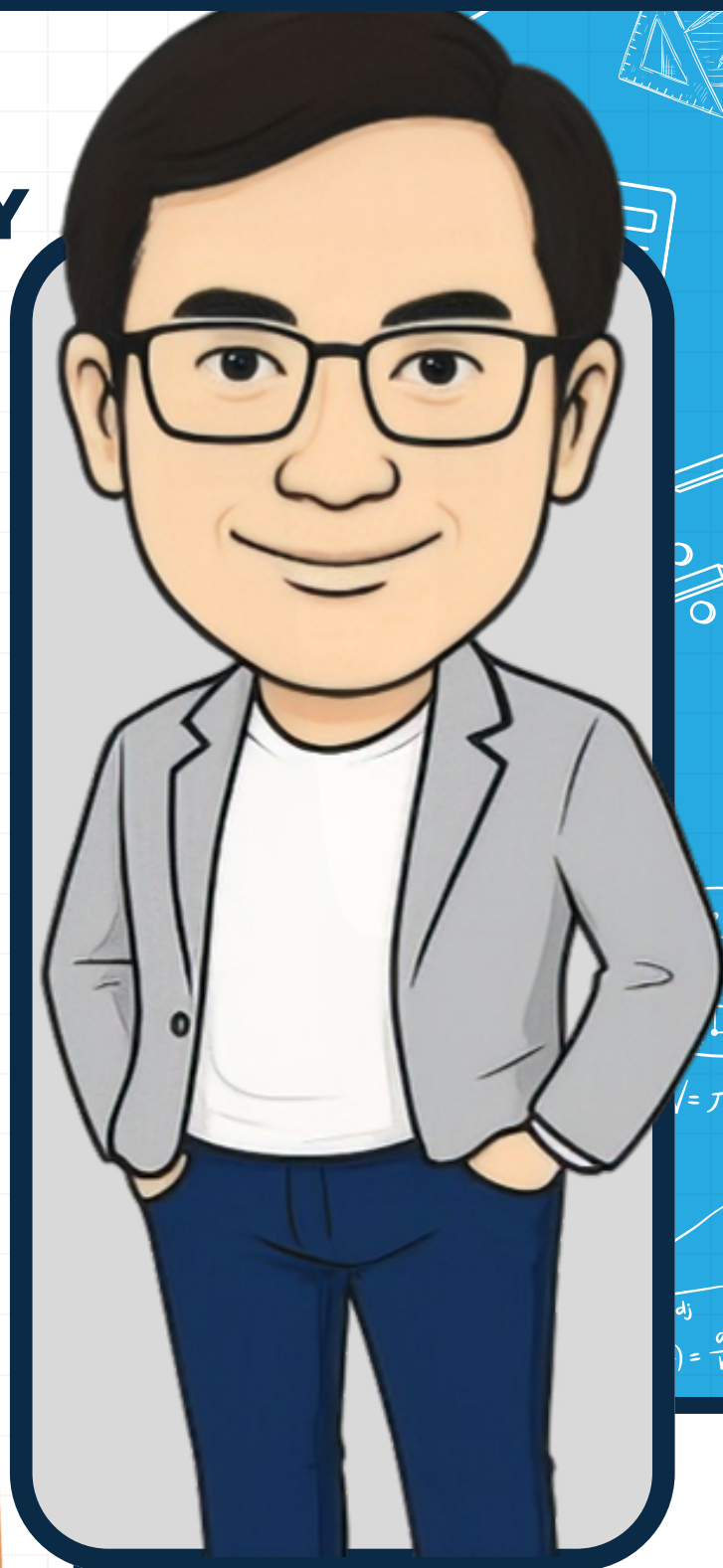
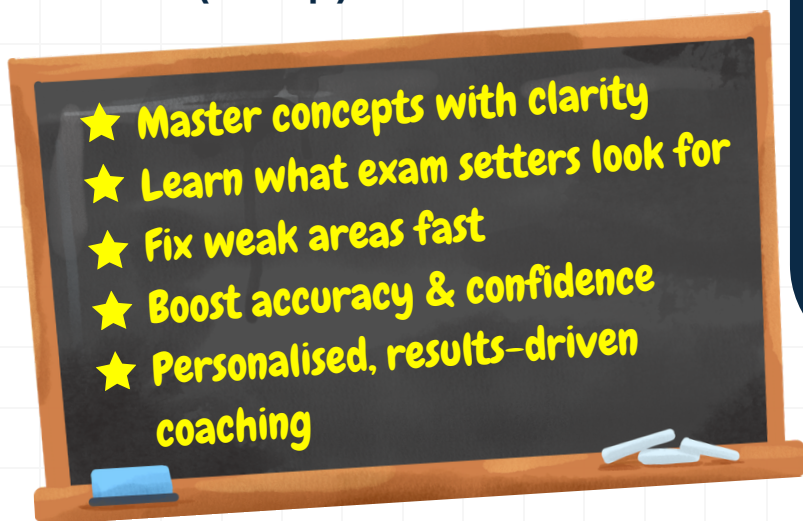
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