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JC MATHEMATICS (H2) STUDY TIPS

THE SECRET CODE OF
SKETCHING A SET OF PERIODIC
GRAPHS

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JC_H2Maths_018



19. Sketching a periodic graph involving multiple equations

Example 23

It is given that

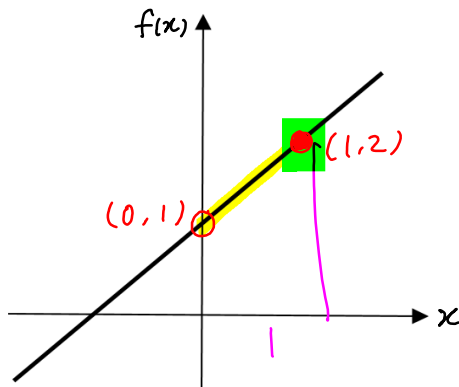
$$f(x) = \begin{cases} x+1 & \text{for } 0 < x \leq 1, \\ x^2 - 4x + 5 & \text{for } 1 < x \leq 2, \end{cases}$$

and that $f(x) = f(x+2)$ for all real values of x .

Sketch the graph of $y = f(x)$ for $-3 \leq x \leq 4.5$.

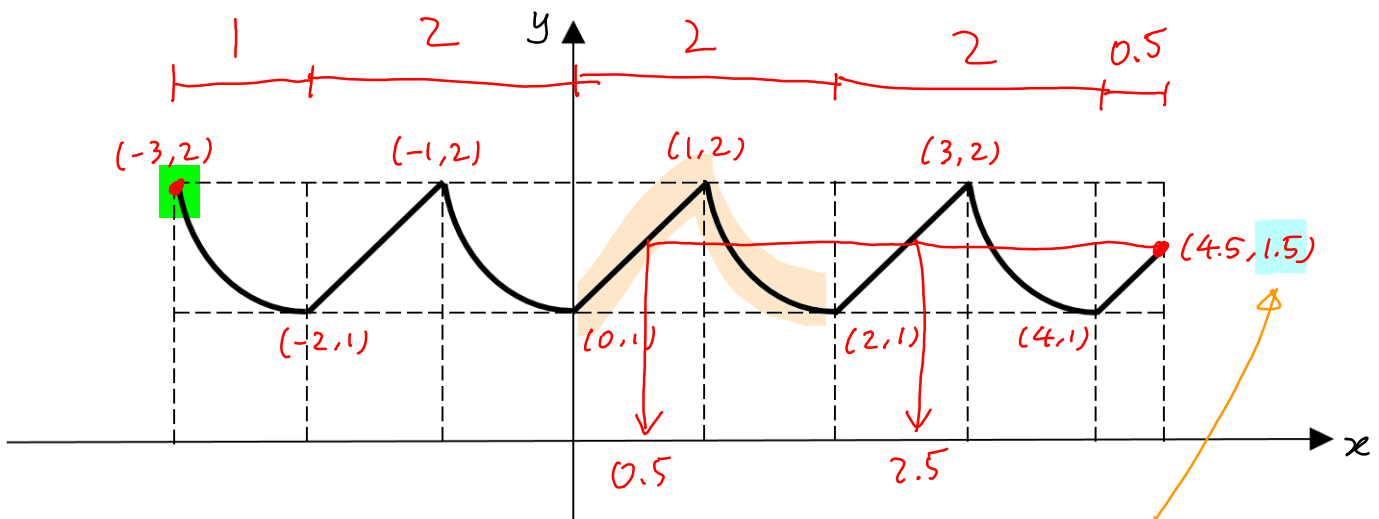
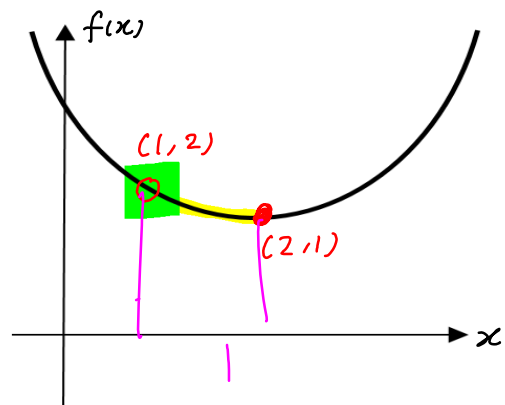
For every 2 units of x , the graph repeats itself.

$$f(x) = x+1, \quad 0 < x \leq 1$$



$$\begin{aligned} x^2 - 4x + 5 &= x^2 - 4x + 4 + 1 \\ &= (x-2)^2 + 1 \end{aligned}$$

$$f(x) = x^2 - 4x + 5, \quad 1 < x \leq 2$$



$$\begin{aligned} f(4.5) &= f(2.5) = f(0.5) \\ &= 0.5 + 1 \\ &= 1.5 \end{aligned}$$



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Explanation

Here is the secret to uncovering how this whole thing works. The prompt hides a quiet rule where the two units matches the periodic duration, meaning the entire graph secretly copies and mirrors itself over that exact horizontal span.

Every single line and curve born within that short interval becomes a hidden blueprint, repeating forever across the grid.

But here is the real trick you need to watch out for: when the required boundary suddenly cuts off mid-cycle, extra effort is likely needed to find the exact y -value of at least one end point.

This content is extracted from our lesson resources. Welcome to contact us for more tailor-made and in-depth learning.



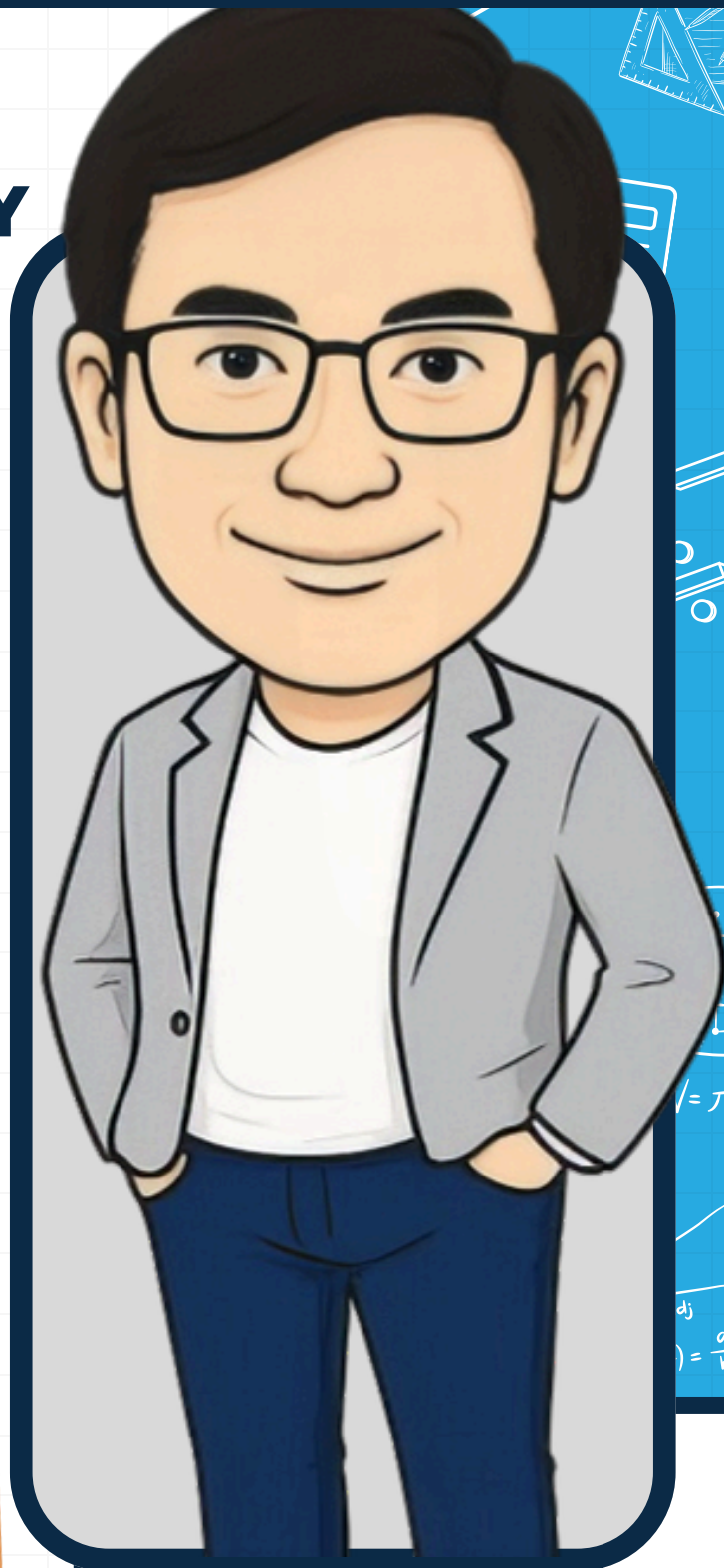
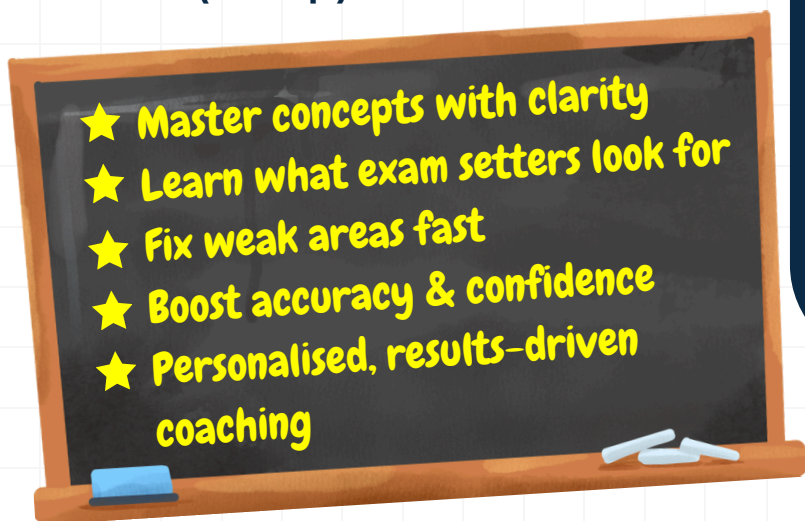
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