PERFECT SOLUTION EDUCATION GROUP

JC MATHEMATICS (H2)

STUDY TIPS

USING CLEVER BRACKET TO SIMPLIFY COMPLICATED EXPANSION INVOLVING THREE TERMS

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JC_H2Maths_026

Expand the following expressions, up to and including x^2.

Example 10

$\sqrt{1+x+x^2}$ $= \left[1+(x+x^2)\right]^{\frac{1}{2}}$

$= 1+\frac{1}{2}(x+x^2)+\frac{\frac{1}{2}\left(-\frac{1}{2}\right)}{2!}(x+x^2)^2+\ldots$

$= 1+\frac{1}{2}x+\frac{1}{2}x^2-\frac{1}{8}(x^2+2x^3+x^4)+\ldots$

$\approx 1+\frac{1}{2}x+\frac{3}{8}x^2$ ☆

Quick Practice

(a) $\frac{1}{1+2x-x^2}$ $= \left[1+(2x-x^2)\right]^{-1}$

$= 1+(-1)(2x-x^2)+\frac{(-1)(-2)}{2!}(2x-x^2)^2+\ldots$

$= 1-2x+x^2+(4x^2-4x^3+x^4)+\ldots$

$\approx 1-2x+5x^2$ ☆

(b) $\left(2-x+x^2\right)^{-2}$ $= 2^{-2}\left[1+\left(\frac{-x+x^2}{2}\right)\right]^{-2}$

$= \frac{1}{4}\left[1+(-2)\left(\frac{-x+x^2}{2}\right)+\frac{(-2)(-3)}{2!}\left(\frac{-x+x^2}{2}\right)^2+\ldots\right]$

$= \frac{1}{4}\left[1+x-x^2+\frac{3}{4}(x^2-2x^3+x^4)+\ldots\right]$

$\approx \frac{1}{4}\left(1+x-\frac{1}{4}x^2\right)$ ☆

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Explanation

Let me tell you a big secret about how this math works. The real trick is not using a super hard formula at all, but rather using a clever little disguise.

The solver secretly places a pair of brackets around two separate terms to combine them. This action creates a brilliant illusion that tricks a messy math problem into looking like a very simple two-term pair.

By doing this, you can easily slide a complicated expression right through the basic expansion rules without any trouble.

Once you are safely past the hard part, you can quietly open the brackets back up, unpack the hidden terms, and finish the calculation smoothly.

SIGN UP NOW BEFORE IT'S TOO LATE

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MATHS TUITION BY MR JACKIE LEE

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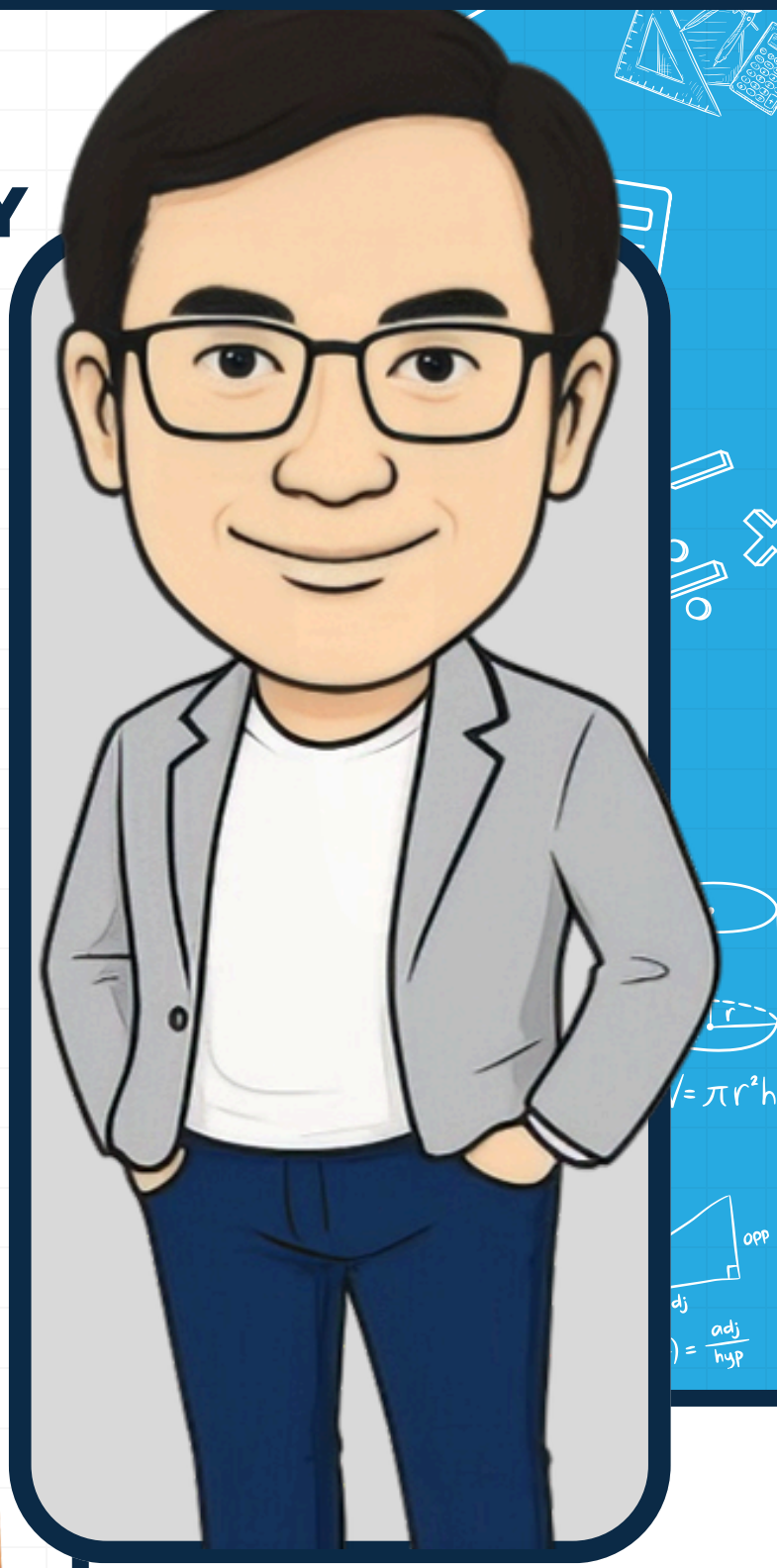

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