Guide to:
Changing the subject

maths Links

Explanation:

To change the subject of a formula, use inverse operations step by step to isolate the target letter on one side of the equals sign (multiply out fractions first, expand brackets, and undo powers with roots or vice versa).

If the letter you want appears **twice** in the formula, expand any brackets, collect all terms containing the target letter on one side and all other terms on the opposite side, then **factorise** out the target letter before dividing.

Example 1: Make **v** the subject of $\mathbf{E = \frac{1}{2}mv^2}$.

Solution:

Multiply both sides by 2: $\mathbf{2E = mv^2}$

Divide both sides by m: $\mathbf{\frac{2E}{m} = v^2}$

Square root both sides to isolate v:

Answer: $\mathbf{v = \pm\sqrt{\left(\frac{2E}{m}\right)}}$

Example 2: Make **x** the subject of $\mathbf{y = \frac{3x + 2}{x - 4}}$.

Solution:

Multiply by (x − 4): $\mathbf{y(x - 4) = 3x + 2 \rightarrow xy - 4y = 3x + 2}$

Collect x terms on left: $\mathbf{xy - 3x = 4y + 2}$

Factorise out x: $\mathbf{x(y - 3) = 4y + 2}$

Answer: $\mathbf{x = \frac{4y + 2}{y - 3}}$

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