

Revision topic: Linear Equations

Objectives:

- ◇ Remind yourself what linear equations are
- ◇ Revise the rules for manipulating (linear) equations

Key points:

Linear refers to an unknown variable appearing by itself and not squared, square-rooted, raised to a power (except 1), inside some other function like sin or cos or generally not by itself. It is only allowed to be multiplied by a constant, so x , $2x$ and $-\pi x$ are linear formulae *in* x . Similarly, $3y$, $7t$ or $-z$ are all linear (in their respective variables y , t and z).

Equations are just where we say some formula equals another formula. So a linear equation has two sides equal to each other and our target variable appears only in linear format. e.g.

$$3x - 4 = 8 - 3x, \quad \text{or} \quad 2 - t = 13$$

If your unknown variable is x then your target should be to get: an equation that says

$x =$ 'something not mentioning x '

or

'something not mentioning x ' $= x$

They're equivalent layouts since saying $x = 3$ and $3 = x$ are the same.

You reach this using the standard rules of re-arranging equations, but for linear equations **you should only ever need at most these rules:**

- ◇ add the same to both sides;
- ◇ subtract the same from both sides;
- ◇ multiply both sides by a number (not zero!); or
- ◇ divide both sides by number (not zero!)

One consequence is that when solving linear equations, if your original equation only contained integers your final answer will not be more complicated than a fraction.

Recommended links:

Highly recommended: HELM notes on linear equations & Mathcentre notes on linear equations

Other links: Khan academy multipart lessons (with practice examples)