Rearranging formulae: fact sheet

Planner week 10 · Learn these facts

The subject

$T = 4v + 3$

T is the subject

The letter on its **own** on one side

Make v the subject: v = ...

Undo in reverse

$y = 3w - 10$

$+ 10$: $y + 10 = 3w$

$w = (y + 10) \div 3$

Same steps as solving an equation

Undo − before ÷

Dividing a whole side

$p - 7 = 6q$

$q = (p - 7)/6$

Divide **everything** on the other side

Use brackets or a fraction line

Fractions

$p = (h - 5)/3$

$\times 3$: $3p = h - 5$

$h = 3p + 5$

Multiply by the bottom first

Then the + or −

Square roots

$T = \sqrt{(g + 6)/2}$

square: $T^2 = (g + 6)/2$

$g = 2T^2 - 6$

Undo a root by squaring

Undo a square with a root

Substitute first

$v^2 = u^2 + 2as$

$144 - 108 = 36$

$v = 6$

Put the numbers in, then work out

v could also be −6

Check

$w = (y + 10)/3$

$y = 5$: $w = 5$

$3 \times 5 - 10 = 5$ ✓

Test with a number

Both formulas should agree

Opposites

+	−
×	÷
^{2}	√

Key words

- **Subject** the letter on its own
- **Rearrange** change the subject
- **Inverse** the opposite operation
- **Formula** a rule linking letters

Exam tips

- Write a new line for every step.
- Do the same to **both** sides.
- Undo + and − before × and ÷ (reverse BIDMAS).
- Divide the **whole** side, not just one term.
- Finish with "letter = ...".
- Check by putting in a number.

Changing the subject: fact sheet

Rearranging formulae · Planner week 10 · Learn the method

Worked example

QUESTION

Make x the subject of the formula $y = 3x + 5$

ANSWER

1. Undo the + 5: take 5 from both sides. $y - 5 = 3x$
2. Undo the × 3: divide both sides by 3.

$$x = \frac{y - 5}{3}$$

Undo the operations around the letter, one at a time.

How to do it

1. Find the letter you want on its own.
2. Undo + or − terms first.
3. Then undo × or ÷.
4. Squares and roots: undo with the opposite.
5. Write the answer as “letter = …”.

Model answer:

$$x = \frac{y - 5}{3}$$

Watch out

- Only dividing one term: y + 10 ÷ 3.
- Doing the steps in the wrong order.
- Leaving the letter on the right with no “=”.