

Equality and the balance

MODULE 8 · ALGEBRA — PATTERNS, EXPRESSIONS AND EQUATIONS ALGEBRA

An **equation** is like a pair of scales — both sides must stay equal. Whatever you do to one side (add, subtract, multiply, divide) you must do to the **other side** too.

→ $x + 4 = 9$. Subtract 4 from both sides: $x = 5$.

→ **$3x = 24$** . Divide both sides by 3: $x = 8$.

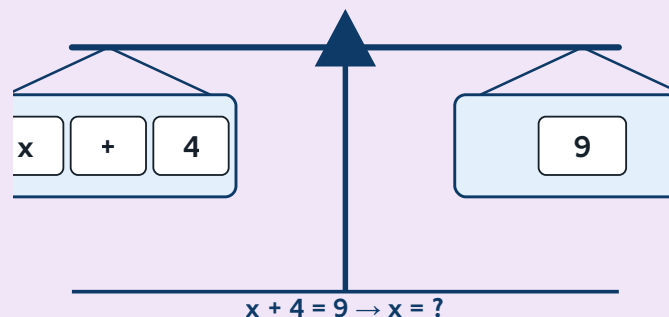
HOW TO ANSWER TODAY

- **Solve for x.** Do the OPPOSITE operation to both sides. + becomes -; $\times$ becomes $\div$.

$$x + 7 = 15 \rightarrow x = 15 - 7 = 8 \cdot 3x = 21 \rightarrow x = 21 \div 3 = 7$$

 TRY IT ON THE LINE

The scales stay level when BOTH sides change by the same amount. For each pair, describe what was done to keep balance — or say where balance was broken.



1. Subtract 4 from BOTH sides of $x + 4 = 9$: $\rightarrow x = \underline{\hspace{2cm}}$
2. Solve $2x = 10$ (two x's on the left, 10 on the right). Divide BOTH sides by 2 $\rightarrow x = \underline{\hspace{2cm}}$
3. Solve $a - 3 = 8$. Add 3 to BOTH sides $\rightarrow a = \underline{\hspace{2cm}}$
4. True or false: 'If I take 5 off ONLY the left side, the scales still balance.' $\underline{\hspace{2cm}}$

 PRACTICE

1



Find x so the scale balances.

Ms Murphy's 5th class collected **81** autumn leaves for an art lesson on the school yard. The leaves are shared equally between **9** groups, with x leaves in each group. Solve $9x = \mathbf{81}$ to find how many leaves each group gets.

2



Find x so the scale balances.

The school canteen orders milk cartons in equal trays. 7 trays hold 84 cartons in total. If x is the number of cartons in one tray, solve $7x = 84$ to find how many cartons are in each tray.