

Adding and Subtracting Surds

To add or subtract surds, they must be **like surds** - the numbers underneath the square root signs must be the same.

 **Example**

$$\sqrt{3} + \sqrt{3} + 2\sqrt{3} = 4\sqrt{3}$$

All of these surds contain $\sqrt{3}$
They are **like surds** so can be
added together.

 **Example**

$$8\sqrt{5} + 4\sqrt{3} - 2\sqrt{5} = 6\sqrt{5} + 4\sqrt{3}$$

Here we can only combine the
surds containing $\sqrt{5}$ because
 $\sqrt{5}$ and $\sqrt{3}$ are not like surds.

If the surds are not like surds initially, simplifying one or both may enable you to convert them to like surds and then add or subtract.

 **Example**

$$\sqrt{24} + 3\sqrt{6}$$

1 Simplify $\sqrt{24}$: $\sqrt{24} = \sqrt{4} \times \sqrt{6}$
 $= 2 \times \sqrt{6} = 2\sqrt{6}$

2 Combine like surds:
 $2\sqrt{6} + 3\sqrt{6} = 5\sqrt{6}$