Surds

We can multiply surds together (or divide surds)

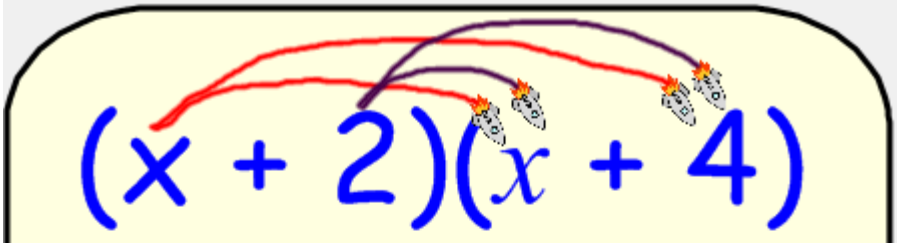
$\sqrt{2} \times \sqrt{2} = \sqrt{4}$ $\qquad \frac{\sqrt{100}}{\sqrt{4}} = \sqrt{25}$

Express $\sqrt{50}$ in the form $a\sqrt{b}$

We have to look for a square number in 50:

$50 = 25 \times 2$ $\quad \sqrt{50} = \sqrt{25}\,\sqrt{2}$

Root 25 = 5 $\quad \sqrt{50} = 5\sqrt{2}$



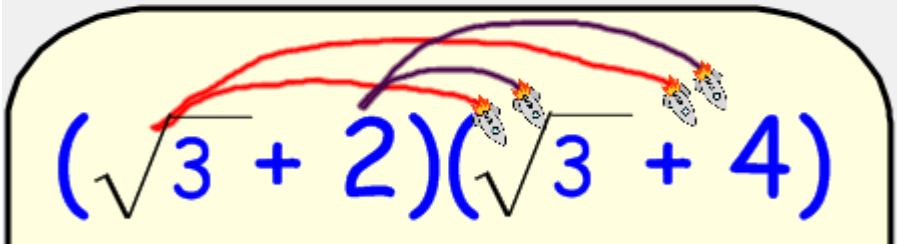
$(x + 2)(x + 4)$

Four rockets so four multiplications

$x^2 + 4x + 2x + 8$

This can be simplified by adding the things that are the same:

$x^2 + 6x + 8$



$(\sqrt{3} + 2)(\sqrt{3} + 4)$

Four rockets so four multiplications

$3 + 4\sqrt{3} + 2\sqrt{3} + 8$

This can be simplified by adding the things that are the same:

$11 + 6\sqrt{3}$

Rationalise the denominator $\frac{10}{\sqrt{2}}$

$\frac{10 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$

Rationalise the denominator means get rid of the surd from the bottom

$\frac{10\sqrt{2}}{\sqrt{4}}$

We can do this by multiplying top and bottom by root 2

$\frac{10\sqrt{2}}{2}$

Root 4 is 2

$5\sqrt{2}$

Simplifying

Rationalise the denominator $\frac{12}{\sqrt{2}+1}$

$\frac{12}{\sqrt{2}+1} \times \frac{(\sqrt{2}-1)}{(\sqrt{2}-1)}$

When we have 2 terms on the bottom we have to change the sign to eliminate the surd. You will see why...

$\frac{12(\sqrt{2}-1)}{(\sqrt{2}+1)(\sqrt{2}-1)}$

We have to expand the top and the bottom

$\frac{12\sqrt{2}-12}{2-\sqrt{2}+\sqrt{2}-1}$

minus root 2 plus root 2 is 0, so we have eliminated the surd from the bottom

$\frac{12\sqrt{2}-12}{1}$

simplifying

$12\sqrt{2}-12$