Surds

Things you need to learn to do

- Simplify surds.
- Rationalize denominator/numerator.

Simplifying surds

In mathematics which of the following $3\sqrt{2}$ or $\sqrt{18}$ is simpler depends on the context.

Simplifying surds

In mathematics which of the following $3\sqrt{2}$ or $\sqrt{18}$ is simpler depends on the context. You need to be able to change from one form to the other quickly.

Simplifying surds

If we have an expression like $3\sqrt{2}$ and we want to move the 3 under the square root sign we simply make sure to adjust its power. For example:

- $3\sqrt{2} = \sqrt{3^2 \times 2} = \sqrt{18}$,

Simplifying surds

If we have an expression like $3\sqrt{2}$ and we want to move the 3 under the square root sign we simply make sure to adjust its power. For example:

- $3\sqrt{2} = \sqrt{3^2 \times 2} = \sqrt{18}$,
- $3\sqrt[3]{2} = \sqrt[3]{3^3 \times 2} = \sqrt[3]{54}$,

Simplifying surds

If we have an expression like $3\sqrt{2}$ and we want to move the 3 under the square root sign we simply make sure to adjust its power. For example:

- $3\sqrt{2} = \sqrt{3^2 \times 2} = \sqrt{18}$,
- $3\sqrt[3]{2} = \sqrt[3]{3^3 \times 2} = \sqrt[3]{54}$,
- $3\sqrt[4]{2} = \sqrt[4]{3^4 \times 2} = \sqrt[4]{162}$,

Simplifying surds

If we have an expression like $3\sqrt{2}$ and we want to move the 3 under the square root sign we simply make sure to adjust its power. For example:

- $3\sqrt{2} = \sqrt{3^2 \times 2} = \sqrt{18}$,
- $3\sqrt[3]{2} = \sqrt[3]{3^3 \times 2} = \sqrt[3]{54}$,
- $3\sqrt[4]{2} = \sqrt[4]{3^4 \times 2} = \sqrt[4]{162}$,
- $3\sqrt[5]{2} = \sqrt[5]{3^5 \times 2} = \sqrt[5]{486}$.

Simplifying surds

Some practice:

- $2\sqrt{3} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} = \sqrt{4^2 \times 3} = \sqrt{48}$,

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} = \sqrt{4^2 \times 3} = \sqrt{48}$,
- $3\sqrt{3} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} = \sqrt{4^2 \times 3} = \sqrt{48}$,
- $3\sqrt{3} = \sqrt{3^2 \times 3} = \sqrt{27}$,

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} = \sqrt{4^2 \times 3} = \sqrt{48}$,
- $3\sqrt{3} = \sqrt{3^2 \times 3} = \sqrt{27}$,
- $5\sqrt{2} =$

Simplifying surds

Some practice:

- $2\sqrt{3} = \sqrt{2^2 \times 3} = \sqrt{12}$,
- $4\sqrt{2} = \sqrt{4^2 \times 2} = \sqrt{32}$,
- $3\sqrt{5} = \sqrt{3^2 \times 5} = \sqrt{45}$,
- $4\sqrt{3} = \sqrt{4^2 \times 3} = \sqrt{48}$,
- $3\sqrt{3} = \sqrt{3^2 \times 3} = \sqrt{27}$,
- $5\sqrt{2} = \sqrt{5^2 \times 2} = \sqrt{50}$.

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} = \sqrt[4]{2^4 \times 2} = \sqrt[4]{32}$,

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} = \sqrt[4]{2^4 \times 2} = \sqrt[4]{32}$,
- $2\sqrt[5]{5} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} = \sqrt[4]{2^4 \times 2} = \sqrt[4]{32}$,
- $2\sqrt[5]{5} = \sqrt[5]{2^5 \times 5} = \sqrt[5]{160}$,

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} = \sqrt[4]{2^4 \times 2} = \sqrt[4]{32}$,
- $2\sqrt[5]{5} = \sqrt[5]{2^5 \times 5} = \sqrt[5]{160}$,
- $3\sqrt[5]{3} =$

Simplifying surds

Some more practice:

- $2\sqrt[3]{3} = \sqrt[3]{2^3 \times 3} = \sqrt[3]{24}$,
- $4\sqrt[3]{2} = \sqrt[3]{4^3 \times 2} = \sqrt[3]{128}$,
- $3\sqrt[4]{5} = \sqrt[4]{3^4 \times 5} = \sqrt[4]{405}$,
- $2\sqrt[4]{2} = \sqrt[4]{2^4 \times 2} = \sqrt[4]{32}$,
- $2\sqrt[5]{5} = \sqrt[5]{2^5 \times 5} = \sqrt[5]{160}$,
- $3\sqrt[5]{3} = \sqrt[5]{3^5 \times 3} = \sqrt[5]{729}$.

Simplifying surds

Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

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- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,

Simplifying surds

Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,
- $\sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$,

Simplifying surds

Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,
- $\sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$,
- $\sqrt[3]{16} = \sqrt[3]{8 \times 2} = \sqrt[3]{8} \times \sqrt[3]{2} = 2\sqrt[3]{2}$,

Simplifying surds

Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,
- $\sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$,
- $\sqrt[3]{16} = \sqrt[3]{8 \times 2} = \sqrt[3]{8} \times \sqrt[3]{2} = 2\sqrt[3]{2}$,
- $\sqrt[3]{108} = \sqrt[3]{27 \times 4} = \sqrt[3]{27} \times \sqrt[3]{4} = 3\sqrt[3]{4}$.

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Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,
- $\sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$,
- $\sqrt[3]{16} = \sqrt[3]{8 \times 2} = \sqrt[3]{8} \times \sqrt[3]{2} = 2\sqrt[3]{2}$,
- $\sqrt[3]{108} = \sqrt[3]{27 \times 4} = \sqrt[3]{27} \times \sqrt[3]{4} = 3\sqrt[3]{4}$.

The point is that if we are dealing with square roots $\sqrt{\ }$ we want to express the number as a product of a square number (4,9,16,25,...) times something,

Simplifying surds

Of course if we want to go in the opposite direction (as is often the case) we do the exact opposite.

- $\sqrt{75} = \sqrt{25 \times 3} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$,
- $\sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} = 6\sqrt{2}$,
- $\sqrt[3]{16} = \sqrt[3]{8 \times 2} = \sqrt[3]{8} \times \sqrt[3]{2} = 2\sqrt[3]{2}$,
- $\sqrt[3]{108} = \sqrt[3]{27 \times 4} = \sqrt[3]{27} \times \sqrt[3]{4} = 3\sqrt[3]{4}$.

The point is that if we are dealing with square roots $\sqrt{\ }$ we want to express the number as a product of a square number (4,9,16,25,...) times something, if we're dealing with a cube root $\sqrt[3]{\ }$ we want a cube number (8,27,64,125,...) times something, etc.

Simplifying surds

Practice:

- $\sqrt{32} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$,

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$,
- $\sqrt{80} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$,
- $\sqrt{80} = \sqrt{16 \times 5} = 4\sqrt{5}$,

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$,
- $\sqrt{80} = \sqrt{16 \times 5} = 4\sqrt{5}$,
- $\sqrt{125} =$

Simplifying surds

Practice:

- $\sqrt{32} = \sqrt{16 \times 2} = 4\sqrt{2}$,
- $\sqrt{162} = \sqrt{81 \times 2} = 9\sqrt{2}$,
- $\sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}$,
- $\sqrt{63} = \sqrt{9 \times 7} = 3\sqrt{7}$,
- $\sqrt{80} = \sqrt{16 \times 5} = 4\sqrt{5}$,
- $\sqrt{125} = \sqrt{25 \times 5} = 5\sqrt{5}$.

Simplifying surds

More practice:

- $\sqrt[3]{32} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} = \sqrt[3]{8 \times 7} = 2\sqrt[3]{7}$,

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} = \sqrt[3]{8 \times 7} = 2\sqrt[3]{7}$,
- $\sqrt[4]{162} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} = \sqrt[3]{8 \times 7} = 2\sqrt[3]{7}$,
- $\sqrt[4]{162} = \sqrt[4]{81 \times 2} = 3\sqrt[4]{2}$,

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} = \sqrt[3]{8 \times 7} = 2\sqrt[3]{7}$,
- $\sqrt[4]{162} = \sqrt[4]{81 \times 2} = 3\sqrt[4]{2}$,
- $\sqrt[4]{80} =$

Simplifying surds

More practice:

- $\sqrt[3]{32} = \sqrt[3]{8 \times 4} = 2\sqrt[3]{4}$,
- $\sqrt[3]{81} = \sqrt[3]{27 \times 3} = 3\sqrt[3]{3}$,
- $\sqrt[3]{250} = \sqrt[3]{125 \times 2} = 5\sqrt[3]{2}$,
- $\sqrt[3]{56} = \sqrt[3]{8 \times 7} = 2\sqrt[3]{7}$,
- $\sqrt[4]{162} = \sqrt[4]{81 \times 2} = 3\sqrt[4]{2}$,
- $\sqrt[4]{80} = \sqrt[4]{16 \times 2} = 2\sqrt[4]{5}$.

Rationalizing

Sometimes we may want to have a rational number in a denominator/numerator.

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Sometimes we may want to have a rational number in a denominator/numerator. We start with a number like $\frac{5}{\sqrt{2}}$ and we don't want the irrational number in the denominator. The trick here is to multiply this number by 1 (we can't multiply by anything else as it would change the number), but 1 written in the form $\frac{\sqrt{2}}{\sqrt{2}}$:

Rationalizing

Sometimes we may want to have a rational number in a denominator/numerator. We start with a number like $\frac{5}{\sqrt{2}}$ and we don't want the irrational number in the denominator. The trick here is to multiply this number by 1 (we can't multiply by anything else as it would change the number), but 1 written in the form $\frac{\sqrt{2}}{\sqrt{2}}$:

$$\frac{5}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{5 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{5\sqrt{2}}{2}$$

Rationalizing

Sometimes we may want to have a rational number in a denominator/numerator. We start with a number like $\frac{5}{\sqrt{2}}$ and we don't want the irrational number in the denominator. The trick here is to multiply this number by 1 (we can't multiply by anything else as it would change the number), but 1 written in the form $\frac{\sqrt{2}}{\sqrt{2}}$:

$$\frac{5}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{5 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{5\sqrt{2}}{2}$$

And we no longer have an irrational number in the denominator.

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$,

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$,
- $\frac{6}{\sqrt{3}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$,
- $\frac{6}{\sqrt{3}} = \frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$,
- $\frac{6}{\sqrt{3}} = \frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$,

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
- $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$,
- $\frac{6}{\sqrt{3}} = \frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$,
- $\frac{10}{\sqrt{2}} =$

Rationalizing

Examples:

- $\frac{4}{\sqrt{3}} = \frac{4}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$,
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$$\frac{1}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{\sqrt{3}+1}{(\sqrt{3}-1)(\sqrt{3}+1)} = \frac{\sqrt{3}+1}{3-1} = \frac{\sqrt{3}+1}{2}$$

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In case of any questions you can message me via Librus or MS Teams.