Surds 1

To be able to simplify surds

No Calculator

Mini WB

Connect

(Q1) Write below as index form

$$\frac{1}{y^n}$$

(Q2) Write below as a fraction

$$2x^{-2}$$

(Q3) Express as a power of 2:

16

(Q4)

$$\left(\frac{81}{16}\right)^{-\frac{3}{4}}$$

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(Q1) Write below as index form

$$\frac{1}{y^n} \qquad y^{-n}$$

(Q2) Write below as a fraction

$$2x^{-2} \qquad \frac{2}{x^2}$$

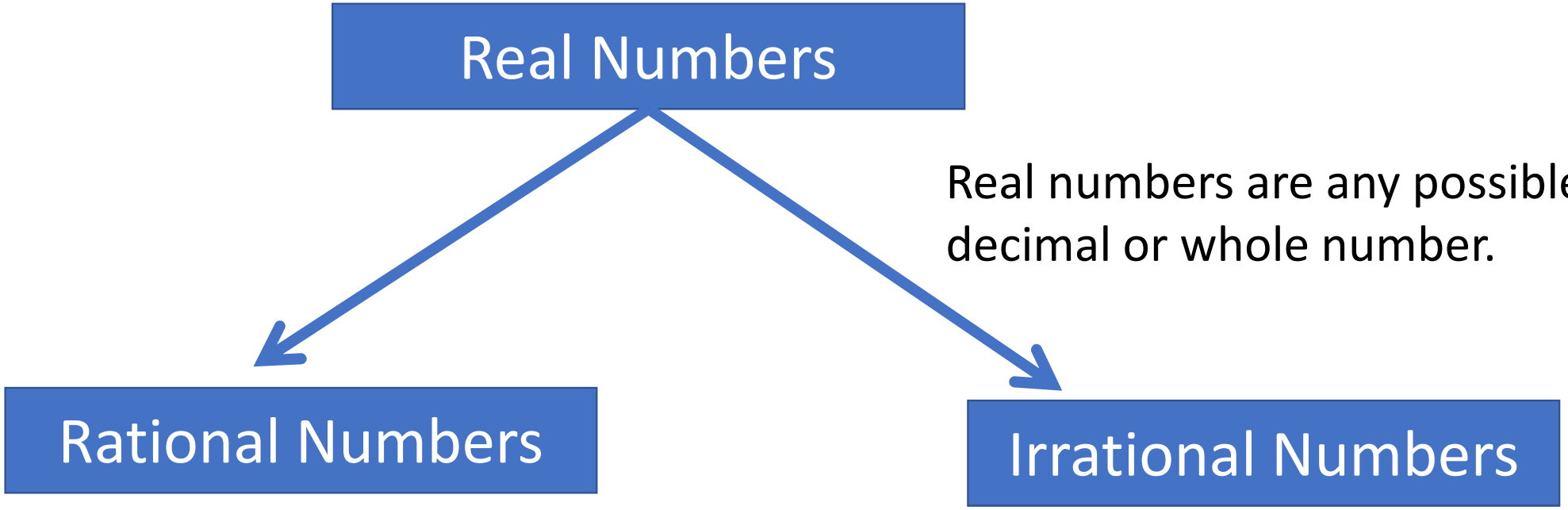
(Q3) Express as a power of 2:

$$16 \qquad 2^4$$

(Q4)

$$\left(\frac{81}{16}\right)^{-\frac{3}{4}} \qquad \frac{8}{27}$$

Activate



Real numbers are any possible decimal or whole number.

are all numbers which can be expressed as some fraction involving integers (whole numbers), e.g. $\frac{1}{4}$, $3\frac{1}{2}$, -7.

are real numbers which are not rational.

What is a surd?

A surd is a root of a number that cannot be simplified to a rational number.

$\sqrt{2}$	Not a surd	Surd
$\sqrt{9}$	Not a surd	Surd
$\sqrt{5}$	Not a surd	Surd
$\sqrt{\frac{1}{4}}$	Not a surd	Surd
$\sqrt[3]{7}$	Not a surd	Surd

What is a surd?

A surd is a root of a number that cannot be simplified to a rational number.

ANSWER

	Not a surd	Surd
$\sqrt{2}$	✗	✓
$\sqrt{9}$	✓	✗
$\sqrt{5}$	✗	✓
$\sqrt{\frac{1}{4}}$	✓	✗
$\sqrt[3]{7}$	✗	✓

Laws of Surds

$$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$$

Examples:

$$\sqrt{3} \times \sqrt{2}$$

$$= \sqrt{3 \times 2}$$

$$= \sqrt{6}$$

$$\sqrt{x^2} = x$$

Examples:

$$\sqrt{4x^2}$$

$$= \sqrt{4}\sqrt{x^2}$$

$$= 2x$$

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

Examples:

$$\sqrt{\frac{1}{9}}$$

$$= \frac{\sqrt{1}}{\sqrt{9}}$$

$$= \frac{1}{3}$$

Simplifying Surds

$$\sqrt{8} = \sqrt{4}\sqrt{2} = 2\sqrt{2}$$

Could we somehow use $\sqrt{ab} = \sqrt{a}\sqrt{b}$ to break the 8 up in a way that one of the surds will simplify?

Method 1: Find the largest square factor of the number, and put that first.

$\sqrt{27} =$?

$\sqrt{32} =$?

$2\sqrt{50} =$?

$4\sqrt{12} =$?

Activate

Method 2: Write the number as a product of its prime.

Simplifying Surds

Activate

$$\sqrt{8} = \sqrt{4}\sqrt{2} = 2\sqrt{2}$$

Could we somehow use $\sqrt{ab} = \sqrt{a}\sqrt{b}$ to break the 8 up in a way that one of the surds will simplify?

Method 1: Find the largest square factor of the number, and put that first.

Method 2: Write the number as a product of its prime.

$$\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$$

$$\sqrt{32} = \sqrt{16}\sqrt{2} = 4\sqrt{2}$$

ANSWER

$$2\sqrt{50} = 2\sqrt{25}\sqrt{2} = 10\sqrt{2}$$

$$4\sqrt{12} = 4\sqrt{4}\sqrt{3} = 8\sqrt{3}$$

MINI WB

Demonstrate

(Q1) Simplify the following:

$\sqrt{75} =$?

(Q2) Simplify the following:

$\sqrt{20} =$?

(Q3) Simplify the following:

$\sqrt{48} =$?

(Q4) Simplify the following:

$3\sqrt{200} =$?

ANSWER

Demonstrate

(Q1) Simplify the following:

$$\sqrt{75} = \sqrt{\mathbf{25}}\sqrt{\mathbf{3}} = \mathbf{5}\sqrt{\mathbf{3}}$$

(Q2) Simplify the following:

$$\sqrt{20} = \sqrt{\mathbf{4}}\sqrt{\mathbf{5}} = \mathbf{2}\sqrt{\mathbf{5}}$$

(Q3) Simplify the following:

$$\sqrt{48} = \sqrt{\mathbf{16}}\sqrt{\mathbf{3}} = \mathbf{4}\sqrt{\mathbf{3}}$$

(Q4) Simplify the following:

$$3\sqrt{200} = \mathbf{3}\sqrt{\mathbf{100}}\sqrt{\mathbf{2}} = \mathbf{30}\sqrt{\mathbf{2}}$$

Do them in your book and show all the steps

Demonstrate

1 Simplify the following:

a $\sqrt{8} =$?

b $\sqrt{18} =$?

c $\sqrt{50} =$?

d $\sqrt{80} =$?

e $\sqrt{72} =$?

2 Simplify the following:

a $5\sqrt{80} =$?

b $2\sqrt{125} =$?

c $8\sqrt{12} =$?

d $3\sqrt{72} =$?

e $2\sqrt{28} =$?

ANSWER

Demonstrate

1 Simplify the following:

a $\sqrt{8} = \mathbf{2\sqrt{2}}$

b $\sqrt{18} = \mathbf{3\sqrt{2}}$

c $\sqrt{50} = \mathbf{5\sqrt{2}}$

d $\sqrt{80} = \mathbf{4\sqrt{5}}$

e $\sqrt{72} = \mathbf{6\sqrt{2}}$

2 Simplify the following:

a $5\sqrt{80} = \mathbf{20\sqrt{5}}$

b $2\sqrt{125} = \mathbf{10\sqrt{5}}$

c $8\sqrt{12} = \mathbf{16\sqrt{3}}$

d $3\sqrt{72} = \mathbf{18\sqrt{2}}$

e $2\sqrt{28} = \mathbf{4\sqrt{7}}$