

Index Rules: Quick Questions

Mini whiteboard questions, with solutions

Contents

Wykładnik wykładniki

- Index rules with positive indices

Wykładnik wykładniki

- Index rules with negative indices

Upraszczanie wyrażenia prawa działań na potęgach

- Simplifying expressions with index laws

Oszacowanie pierwiastki potęgi

- Estimating roots and powers

Wykładniki

- Indices of the form $\frac{1}{a}$

Wykładniki

- Indices of the form $\frac{a}{b}$

Upraszczanie wyrażenia wykładniki ułamkowe

- Simplifying expressions with negative fractional indices

Wykładnik Index rules with positive wykładniki indices

True or false?

4^3 means $4 \times 4 \times 4$

True or false?

4^3 means $4 \times 4 \times 4$

True. The ^{wykładnik} index counts how many 4s are multiplied together, so $4^3 = 64$.

True or false?

$$2^5 \times 2^3 = 2^8$$

True or false?

$$2^5 \times 2^3 = 2^8$$

True. Five 2s multiplied by three 2s gives eight 2s, so the

wykładniki
indices are added.

True or false?

$$2^5 \times 2^3 = 4^8$$

True or false?

$$2^5 \times 2^3 = 4^8$$

False. Only the ^{wykładniki} indices are added; the ^{podstawa} base stays as 2.

The answer is $2^8 = 256$, not $4^8 = 65\,536$.

True or false?

$$\frac{7^8}{7^2} = 7^4$$

True or false?

$$\frac{7^8}{7^2} = 7^4$$

False. The ^{wykładniki} indices are subtracted, not divided.

$$7^8 \div 7^2 = 7^{8-2} = 7^6$$

True or false?

$$(5^2)^3 = 5^5$$

True or false?

$$(5^2)^3 = 5^5$$

False. $(5^2)^3 = 5^2 \times 5^2 \times 5^2$, which is six 5s.

The ^{wykładniki} indices are multiplied: 5^6 .

Uprość
Simplify $2^3 \times 2^4$

Uprość
Simplify $2^3 \times 2^4$

$(2 \times 2 \times 2) \times (2 \times 2 \times 2 \times 2)$ — seven 2s

$$2^3 \times 2^4 = 2^{3+4} = 2^7$$

Uprość
Simplify $5^6 \div 5^2$

Uprość
Simplify $5^6 \div 5^2$

$$5^{6-2} = 5^4$$

Simplify ^{Uprość} $7^5 \times 7$

Uprość
Simplify $7^5 \times 7$

7 on its own is 7^1 .

$$7^{5+1} = 7^6$$

Uprość
Simplify $(3^2)^4$

Uprość
Simplify $(3^2)^4$

$$3^{2 \times 4} = 3^8$$

Simplify ^{Uprość} $4^3 \times 4^2 \times 4^5$

Uprość
Simplify $4^3 \times 4^2 \times 4^5$

$$4^{3+2+5} = 4^{10}$$

Simplify ^{Uprość} $\frac{6^8}{6^3 \times 6^2}$

Uprość
Simplify $\frac{6^8}{6^3 \times 6^2}$

$$6^3 \times 6^2 = 6^5$$

$$\frac{6^8}{6^5} = 6^{8-5} = 6^3$$

Simplify ^{Uprość} $(2^3)^2 \times 2^4$

Uprość
Simplify $(2^3)^2 \times 2^4$

$$(2^3)^2 = 2^6$$

$$2^6 \times 2^4 = 2^{10}$$

Uprość

Simplify $\frac{(5^3)^4}{5^{10}}$

Uprość

Simplify $\frac{(5^3)^4}{5^{10}}$

$$(5^3)^4 = 5^{12}$$

$$\frac{5^{12}}{5^{10}} = 5^{12-10} = 5^2$$

$$3^n \times 3^5 = 3^{12}$$

Find the value of n

$$3^n \times 3^5 = 3^{12}$$

Find the value of n

The ^{wykładniki} indices add, so $n + 5 = 12$.

$$n = 7$$

Write 8^4 as a ^{potęga}power of 2

Write 8^4 as a ^{potęga}power of 2

$$8 = 2^3, \text{ so } 8^4 = (2^3)^4.$$

$$8^4 = 2^{12}$$

Index rules with negative indices

Wykładnik

wykładniki

True or false?

2^{-3} is a negative number

True or false?

2^{-3} is a negative number

wykładnik odwrotność

False. A negative index gives a reciprocal, not a negative answer.

$$2^{-3} = \frac{1}{2^3} = \frac{1}{8}, \text{ which is positive.}$$

$$2^3 = 8$$

↓

$$2^2 = 4$$

↓

$$2^1 = 2$$

↓

$$2^0 = 1$$

↓

halve each time

$$2^{-1} = \frac{1}{2}$$

↓

$$2^{-2} = \frac{1}{4}$$

↓

$$2^{-3} = \frac{1}{8}$$

True or false?

$$5^{-1} = \frac{1}{5}$$

True or false?

$$5^{-1} = \frac{1}{5}$$

True. An ^{wykładnik} index of -1 gives the ^{odwrotność} reciprocal of the ^{podstawa} base .

True or false?

$$4^{-2} = \frac{1}{8}$$

True or false?

$$4^{-2} = \frac{1}{8}$$

False. The -2 is an ^{wykładnik} index , not a multiplier.

$$4^{-2} = \frac{1}{4^2} = \frac{1}{16}$$

True or false?

$$2^4 \div 2^7 = 2^{-3}$$

True or false?

$$2^4 \div 2^7 = 2^{-3}$$

True. The ^{wykładniki} indices are subtracted: $4 - 7 = -3$.

True or false?

$$2^{-3} \times 2^5 = 2^{-15}$$

True or false?

$$2^{-3} \times 2^5 = 2^{-15}$$

False. The ^{wykładniki} indices are added, not multiplied.

$$2^{-3+5} = 2^2 = 4$$

Write 2^{-1} as a ^{ułamek}fraction

Write 2^{-1} as a ^{ułamek} fraction

$$2^{-1} = \frac{1}{2}$$

$2^3 = 8$	↓	
$2^2 = 4$	↓	
$2^1 = 2$	↓	
$2^0 = 1$	↓	halve each time
$2^{-1} = \frac{1}{2}$	↓	
$2^{-2} = \frac{1}{4}$	↓	
$2^{-3} = \frac{1}{8}$	↓	

Write 3^{-2} as a ^{ułamek}fraction

Write 3^{-2} as a ^{ułamek}fraction

$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

Write $\frac{1}{5^3}$ using a negative ^{wykładnik} index

Write $\frac{1}{5^3}$ using a negative wykładnik index

$$\frac{1}{5^3} = 5^{-3}$$

Write 10^{-3} as a ułamek dziesiętny
decimal

Write 10^{-3} as a ułamek dziesiętny
decimal

$$10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = 0.001$$

Uprość
Simplify $2^3 \times 2^{-5}$

Uprość
Simplify $2^3 \times 2^{-5}$

$$2^{3+(-5)} = 2^{-2}$$

Uprość
Simplify $7^{-2} \div 7^3$

^{Uprość}
Simplify $7^{-2} \div 7^3$

$$7^{-2-3} = 7^{-5}$$

Uprość
Simplify $(4^{-2})^3$

Uprość
Simplify $(4^{-2})^3$

$$4^{-2 \times 3} = 4^{-6}$$

Work out $\frac{5^{-3}}{5^{-7}}$

Work out $\frac{5^{-3}}{5^{-7}}$

$$5^{-3-(-7)} = 5^{-3+7}$$

$$5^4 = 625$$

Work out $\left(\frac{2}{-3}\right)^{-2}$

Work out $\left(\frac{2}{-3}\right)^{-2}$

A negative ^{wykładnik} index gives the ^{odwrotność} reciprocal of the ^{ułamek} fraction.

$$\left(\frac{3}{-2}\right)^2 = \frac{9}{4}$$

$$2^n \times 2^{-5} = 2^{-1}$$

Find the value of n

$$2^n \times 2^{-5} = 2^{-1}$$

Find the value of n

The ^{wykładniki} indices add, so $n - 5 = -1$.

$$n = 4$$

Simplifying expressions with index laws

Upraszczenie wyrażenia
prawa działań na potęgach

True or false?

$$x^3 \times x^4 = x^{12}$$

True or false?

$$x^3 \times x^4 = x^{12}$$

False. The ^{wykładniki} indices are added, not multiplied.

$$x^3 \times x^4 = x^7$$

True or false?

$$2a^3 \times 3a^2 = 6a^5$$

True or false?

$$2a^3 \times 3a^2 = 6a^5$$

True. The numbers are multiplied and the ^{wykładniki} indices are added.

True or false?

$$(2x^3)^2 = 2x^6$$

True or false?

$$(2x^3)^2 = 2x^6$$

False. Everything inside the bracket is podniesione do kwadratu squared,
including the 2.

$$(2x^3)^2 = 2^2 \times x^6 = 4x^6$$

True or false?

$$x^5 + x^3 = x^8$$

True or false?

$$x^5 + x^3 = x^8$$

False. Wykładniki **Indices** are added when **wyrazy** **terms** are multiplied, not when they are added.

$x^5 + x^3$ cannot be **uproszczone** **simplified**.

True or false?

$$\frac{12x^5}{3x^5} = 4$$

True or false?

$$\frac{12x^5}{3x^5} = 4$$

True. $12 \div 3 = 4$ and $x^5 \div x^5 = x^0 = 1$.

Uprość
Simplify $x^3 \times x^4$

Uprość
Simplify $x^3 \times x^4$

$$x^{3+4} = x^7$$

Uprość
Simplify $y^8 \div y^3$

Uprość
Simplify $y^8 \div y^3$

$$y^{8-3} = y^5$$

Uprość
Simplify $3a^2 \times 4a^5$

Uprość
Simplify $3a^2 \times 4a^5$

$$3 \times 4 = 12 \text{ and } a^{2+5} = a^7$$

$$12a^7$$

Uprość

Simplify $\frac{20b^7}{5b^2}$

Uprość
Simplify $\frac{20b^7}{5b^2}$

$$20 \div 5 = 4 \text{ and } b^{7-2} = b^5$$

$$4b^5$$

Uprość
Simplify $(x^4)^3$

Uprość
Simplify $(x^4)^3$

$$x^{4 \times 3} = x^{12}$$

Uprość
Simplify $(3m^2)^3$

^{Uprość}
Simplify $(3m^2)^3$

The 3 is ^{sześcian} cubed as well as the m^2 .

$$3^3 \times m^6 = 27m^6$$

Uprość
Simplify $5p^3q^2 \times 4p^2q^5$

Uprość
Simplify $5p^3q^2 \times 4p^2q^5$

$$5 \times 4 = 20, p^{3+2} = p^5, q^{2+5} = q^7$$
$$20p^5q^7$$

Uprość
Simplify

$$\frac{18x^6y^4}{6x^2y^4}$$

Uprość
Simplify $\frac{18x^6y^4}{6x^2y^4}$

$$18 \div 6 = 3, x^{6-2} = x^4, y^{4-4} = y^0 = 1$$

$$3x^4$$

Uprość
Simplify $\frac{(2x^3)^4}{8x^5}$

Uprość
Simplify $\frac{(2x^3)^4}{8x^5}$

$$(2x^3)^4 = 16x^{12}$$

$$\frac{16x^{12}}{8x^5} = 2x^7$$

Uprość
Simplify

$$\frac{6a^5b^2 \times 3a^2b^4}{9a^4b^3}$$

Uprość
Simplify

$$\frac{6a^5b^2 \times 3a^2b^4}{9a^4b^3}$$

$$6a^5b^2 \times 3a^2b^4 = 18a^7b^6$$

$$\frac{18a^7b^6}{9a^4b^3} = 2a^3b^3$$

Estimating ^{Oszacowanie}roots ^{pierwiastki}and ^{potęgi}powers

True or false?

$\sqrt{50}$ lies between 7 and 8

True or false?

$\sqrt{50}$ lies between 7 and 8

True. $7^2 = 49$ and $8^2 = 64$, and 50 lies between those two kwadratowe square numbers.



True or false?

$$\sqrt{20} = 10$$

True or false?

$$\sqrt{20} = 10$$

False. Podnieść do kwadratu
Square rooting is not halving.

$10^2 = 100$, not 20. In fact $\sqrt{20}$ is between 4 and 5.

True or false?

$\sqrt{1000}$ is about 100

True or false?

$\sqrt{1000}$ is about 100

False. $100^2 = 10\,000$, not 1000.

$31^2 = 961$ and $32^2 = 1024$, so $\sqrt{1000}$ is about 31.6.

True or false?

$\sqrt[3]{30}$ lies between 3 and 4

True or false?

$\sqrt[3]{30}$ lies between 3 and 4

True. $3^3 = 27$ and $4^3 = 64$, and 30 lies between those two sześćcienne cube numbers.



True or false?

$\sqrt{0.64}$ is smaller than 0.64

True or false?

$\sqrt{0.64}$ is smaller than 0.64

False. Podnieść do kwadratu
Square rooting only makes a number
smaller when it is bigger than 1.

$0.8^2 = 0.64$, so $\sqrt{0.64} = 0.8$, which is larger than 0.64.

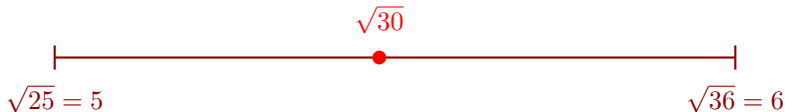
Between which two liczby całkowite nieujemne whole numbers

does $\sqrt{30}$ lie?

Between which two liczby całkowite nieujemne whole numbers

does $\sqrt{30}$ lie?

Between 5 and 6, because $5^2 = 25$ and $6^2 = 36$.



Between which two liczby całkowite nieujemne whole numbers

does $\sqrt{75}$ lie?

Between which two liczby całkowite nieujemne whole numbers

does $\sqrt{75}$ lie?

Between 8 and 9, because $8^2 = 64$ and $9^2 = 81$.



Oszacuj
Estimate 3.9^3

Oszacuj
Estimate 3.9^3

Round 3.9 to 4.

$4^3 = 64$, so 3.9^3 is about 64.

Between which two liczby całkowite nieujemne whole numbers

does $\sqrt[3]{50}$ lie?

Between which two liczby całkowite nieujemne whole numbers

does $\sqrt[3]{50}$ lie?

Between 3 and 4, because $3^3 = 27$ and $4^3 = 64$.



Oszacuj
Estimate $\sqrt{17}$

to one ^{miejsce dziesiętne}
decimal place

Oszacuj
Estimate $\sqrt{17}$

to one ^{miejsce dziesiętne}
decimal place

$\sqrt{16} = 4$, so the answer is just above 4.

$4.1^2 = 16.81$ and $4.2^2 = 17.64$, so $\sqrt{17} \approx 4.1$.

Oszacuj
Estimate $\sqrt{90}$

to one ^{miejsce dziesiętne}
decimal place

Oszacuj
Estimate $\sqrt{90}$

to one ^{miejsce dziesiętne}
decimal place

$\sqrt{81} = 9$ and $\sqrt{100} = 10$, so the answer is between 9 and 10.

$9.5^2 = 90.25$, so $\sqrt{90} \approx 9.5$.

Which is larger,
 $\sqrt{40}$ or 6.5?

Which is larger,
 $\sqrt{40}$ or 6.5?

Podnieś do kwadratu
Square

both: $(\sqrt{40})^2 = 40$ and $6.5^2 = 42.25$.

6.5 is larger.

Oszacuj
Estimate $\sqrt{2000}$

to the nearest $\text{liczba całkowita nieujemna}$
whole number

Oszacuj
Estimate $\sqrt{2000}$

to the nearest $\text{liczba całkowita nieujemna}$
whole number

$$44^2 = 1936 \text{ and } 45^2 = 2025.$$

2000 is nearer to 2025, so $\sqrt{2000} \approx 45$.

Oszacuj
Estimate $\frac{\sqrt{101}}{4.9}$

Oszacuj
Estimate

$$\frac{\sqrt{101}}{4.9}$$

Round each part: $\sqrt{101} \approx \sqrt{100} = 10$ and $4.9 \approx 5$.

$$\frac{10}{5} = 2$$

A ^{kwadratowy} **square** patio has an ^{pole} **area** of 150 m^2 .

^{Oszacuj}
Estimate the length of one side.

A ^{kwadratowy} **square** patio has an ^{pole} **area** of 150 m^2 .

^{Oszacuj}
Estimate the length of one side.

The side is $\sqrt{150}$.

$12^2 = 144$ and $13^2 = 169$, so the side is just over 12.

$12.2^2 = 148.84$, so the side is about 12.2 m.

Wykładowcy Indices of the form $\frac{1}{a}$

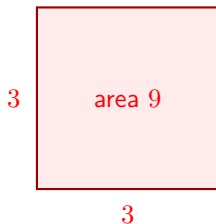
True or false?

$$9^{\frac{1}{2}} = 3$$

True or false?

$$9^{\frac{1}{2}} = 3$$

True. An ^{wykładnik} index of $\frac{1}{2}$ means the ^{pierwiastek} square root, and $3^2 = 9$.



True or false?

$$9^{\frac{1}{2}} = 4.5$$

True or false?

$$9^{\frac{1}{2}} = 4.5$$

False. The ^{wykładnik} index is not a multiplier, so this is not half of 9.

$$9^{\frac{1}{2}} = \sqrt{9} = 3$$

True or false?

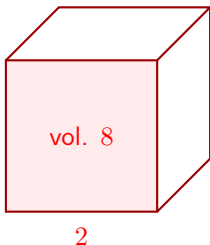
$$8^{\frac{1}{3}} = 2$$

True or false?

$$8^{\frac{1}{3}} = 2$$

True. An **index** of $\frac{1}{3}$ means the **cube root**, and $2^3 = 8$.

wykładnik pierwiastek sześcienny



True or false?

$$16^{\frac{1}{4}} = 4$$

True or false?

$$16^{\frac{1}{4}} = 4$$

False. An ^{wykładnik} index of $\frac{1}{4}$ means the ^{pierwiastek czwartego stopnia} fourth root,
not the ^{pierwiastek} square root.

$2^4 = 16$, so $16^{\frac{1}{4}} = 2$. It is $16^{\frac{1}{2}}$ that equals 4.

True or false?

$$100^{\frac{1}{3}} = 10$$

True or false?

$$100^{\frac{1}{3}} = 10$$

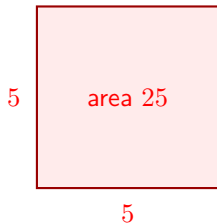
False. $10^3 = 1000$, not 100.

$\sqrt[3]{100}$ is about 4.6. It is $100^{\frac{1}{2}}$ that equals 10.

Work out $25^{\frac{1}{2}}$

Work out $25^{\frac{1}{2}}$

$$25^{\frac{1}{2}} = \sqrt{25} = 5$$



Work out $64^{\frac{1}{2}}$

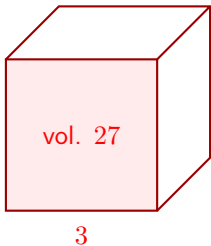
Work out $64^{\frac{1}{2}}$

$$\sqrt{64} = 8, \text{ because } 8^2 = 64.$$

Work out $27^{\frac{1}{3}}$

Work out $27^{\frac{1}{3}}$

$\sqrt[3]{27} = 3$, because $3^3 = 27$.



Work out $81^{\frac{1}{4}}$

Work out $81^{\frac{1}{4}}$

The ^{pierwiastek czwartego stopnia} fourth root : $3 \times 3 \times 3 \times 3 = 81$.

$$81^{\frac{1}{4}} = 3$$

Work out $1000^{\frac{1}{3}}$

Work out $1000^{\frac{1}{3}}$

$$\sqrt[3]{1000} = 10, \text{ because } 10^3 = 1000.$$

Write $\sqrt[5]{x}$ using an wykładnik **index**

Write $\sqrt[5]{x}$ using an ^{wykładnik} index

$$\sqrt[5]{x} = x^{\frac{1}{5}}$$

Work out $\left(\frac{1}{16}\right)^{\frac{1}{2}}$

Work out $\left(\frac{1}{16}\right)^{\frac{1}{2}}$

Pierwiastek licznik mianownik
Square root the numerator and the denominator.

$$\frac{\sqrt{1}}{\sqrt{16}} = \frac{1}{4}$$

Work out $\left(\frac{8}{27}\right)^{\frac{1}{3}}$

Work out $\left(\frac{8}{27}\right)^{\frac{1}{3}}$

Pierwiastek sześcienny
Cube root

licznik
the numerator and the denominator.

$$\frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}$$

Work out $0.04^{\frac{1}{2}}$

Work out $0.04^{\frac{1}{2}}$

$$0.2 \times 0.2 = 0.04$$

$$0.04^{\frac{1}{2}} = 0.2$$

Work out $\left(\frac{1}{32}\right)^{\frac{1}{5}}$

Work out $\left(\frac{1}{32}\right)^{\frac{1}{5}}$

The ^{pierwiastek piątego stopnia} fifth root of 32 is 2, because $2^5 = 32$.

$$\frac{1}{2}$$

Wykładniki Indices of the form $\frac{a}{b}$

True or false?

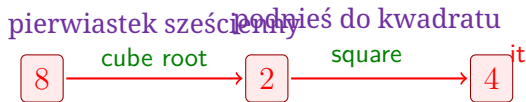
$$8^{\frac{2}{3}} = 4$$

True or false?

$$8^{\frac{2}{3}} = 4$$

True. The **denominator** of the **index** gives the **root** and the **numerator** gives the **power**.

mianownik wykładnik pierwiastek
licznik potęga



True or false?

$$16^{\frac{3}{4}} = 12$$

True or false?

$$16^{\frac{3}{4}} = 12$$

False. This is $\frac{3}{4}$ of 16, not 16 to the ^{potęga} ~~size~~ power $\frac{3}{4}$.

^{pierwiastek czwartego stopnia} ~~size~~ ^{potęga}



True or false?

$$25^{\frac{3}{2}} = 75$$

True or false?

$$25^{\frac{3}{2}} = 75$$

False. The $\frac{3}{2}$ is an ^{wykładnik} index, not a multiplier.

$$\sqrt{25} = 5, \text{ then } 5^3 = 125.$$

True or false?

To work out $32^{\frac{3}{5}}$ you can find $\sqrt[5]{32}$ first,

then ^{sześcian} **cube** the answer

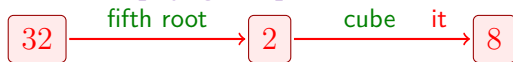
True or false?

To work out $32^{\frac{3}{5}}$ you can find $\sqrt[5]{32}$ first,

then ^{sześcian} **cube** the answer

True. Finding the ^{pierwiastek} **root** first keeps the numbers small.

^{pierwiastek piątego stopnia} ^{sześcian}



True or false?

$4^{\frac{3}{2}}$ and $4^{1.5}$ mean the same thing

True or false?

$4^{\frac{3}{2}}$ and $4^{1.5}$ mean the same thing

True. $\frac{3}{2} = 1.5$, so both are $\sqrt{4}$ sześćcian cubed, which is 8.

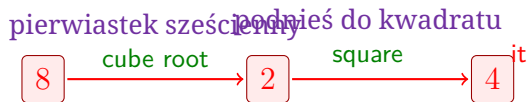
Work out $4\frac{3}{2}$

Work out $4^{\frac{3}{2}}$



Work out $8^{\frac{2}{3}}$

Work out $8^{\frac{2}{3}}$



Work out $9\frac{3}{2}$

Work out $9^{\frac{3}{2}}$



Work out $16^{\frac{3}{4}}$

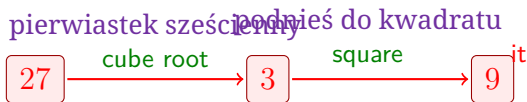
Work out $16^{\frac{3}{4}}$

pierwiastek czwartego stopnia ~~size~~ćian



Work out $27^{\frac{2}{3}}$

Work out $27^{\frac{2}{3}}$



Work out $32^{\frac{3}{5}}$

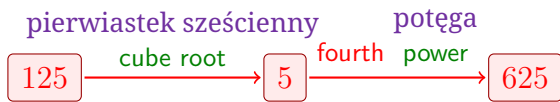
Work out $32^{\frac{3}{5}}$

pierwiastek piątego stopnia ze 32



Work out $125^{\frac{4}{3}}$

Work out $125^{\frac{4}{3}}$



Work out $\left(\frac{4}{9}\right)^{\frac{3}{2}}$

Work out $\left(\frac{4}{9}\right)^{\frac{3}{2}}$

$$\left(\frac{4}{9}\right)^{\frac{1}{2}} = \frac{2}{3}$$

$$\left(\frac{2}{3}\right)^3 = \frac{8}{27}$$

Work out $0.25^{\frac{3}{2}}$

Work out $0.25^{\frac{3}{2}}$

$$\sqrt{0.25} = 0.5, \text{ because } 0.5^2 = 0.25.$$

$$0.5^3 = 0.125$$

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

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

$$\left(\frac{16}{81}\right)^{\frac{1}{4}} = \frac{2}{3}$$
$$\left(\frac{2}{3}\right)^3 = \frac{8}{27}$$

Simplifying expressions with negative fractional indices

Upraszczenie wyrażenia
wykładniki ułamkowe

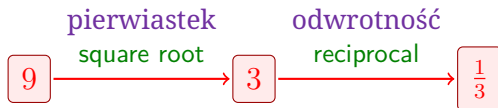
True or false?

$$9^{-\frac{1}{2}} = \frac{1}{3}$$

True or false?

$$9^{-\frac{1}{2}} = \frac{1}{3}$$

True. The $\frac{1}{2}$ gives the **pierwiastek**
square root and the minus sign gives the
odwrotność
reciprocal .



True or false?

$$9^{-\frac{1}{2}} = -3$$

True or false?

$$9^{-\frac{1}{2}} = -3$$

False. A negative ^{wykładnik} index gives a ^{odwrotność} reciprocal, not a negative answer.

$$9^{-\frac{1}{2}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$$

True or false?

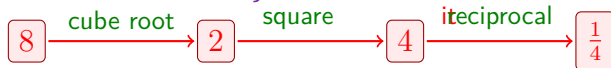
$$8^{-\frac{2}{3}} = \frac{1}{4}$$

True or false?

$$8^{-\frac{2}{3}} = \frac{1}{4}$$

True. Pierwiastek sześcienny podnieś do kwadratu
Cube root , then square , then take the
odwrotność
reciprocal .

pierwiastek sześcienny podnieś do kwadratu odwrotność



True or false?

$$16^{-\frac{3}{4}} = \frac{1}{12}$$

True or false?

$$16^{-\frac{3}{4}} = \frac{1}{12}$$

False. The $\frac{3}{4}$ is an ^{wykładnik} index , not a multiplier.

$\sqrt[4]{16} = 2$, then $2^3 = 8$, so the answer is $\frac{1}{8}$.

True or false?

$25^{-\frac{1}{2}}$ is smaller than $25^{-\frac{3}{2}}$

True or false?

$25^{-\frac{1}{2}}$ is smaller than $25^{-\frac{3}{2}}$

False. The more negative the wykładnik index, the smaller the result for a podstawa base bigger than 1.

$$25^{-\frac{1}{2}} = \frac{1}{5} = 0.2 \text{ and } 25^{-\frac{3}{2}} = \frac{1}{125} = 0.008.$$

Work out $4^{-\frac{1}{2}}$

Work out $4^{-\frac{1}{2}}$

$$4^{-\frac{1}{2}} = \frac{1}{\sqrt{4}} = \frac{1}{2}$$

Work out $8^{-\frac{1}{3}}$

Work out $8^{-\frac{1}{3}}$

$$8^{-\frac{1}{3}} = \frac{1}{\sqrt[3]{8}} = \frac{1}{2}$$

Work out $9^{-\frac{1}{2}}$

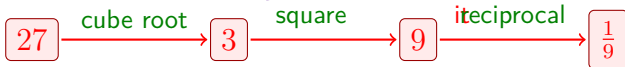
Work out $9^{-\frac{1}{2}}$

$$9^{-\frac{1}{2}} = \frac{1}{\sqrt{9}} = \frac{1}{3}$$

Work out $27^{-\frac{2}{3}}$

Work out $27^{-\frac{2}{3}}$

pierwiastek sześcienny podnieś do kwadratu odwrotność



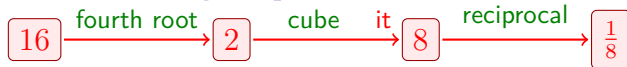
Work out $16^{-\frac{3}{4}}$

Work out $16^{-\frac{3}{4}}$

pierwiastek czwartego stopnia

potężanie

odwrotność



Work out $\left(\frac{1}{-4}\right)^{-\frac{1}{2}}$

Work out $\left(\frac{1}{4}\right)^{-\frac{1}{2}}$

Take the odwrotność reciprocal of the ułamek fraction, then pierwiastek square root.

$$4^{\frac{1}{2}} = 2$$

Work out $\left(\frac{9}{16}\right)^{-\frac{1}{2}}$

Work out $\left(\frac{9}{16}\right)^{-\frac{1}{2}}$

Take the odwrotność reciprocal of the ułamek fraction, then pierwiastek square root.

$$\left(\frac{16}{9}\right)^{\frac{1}{2}} = \frac{4}{3}$$

Work out $\left(\frac{8}{27}\right)^{-\frac{2}{3}}$

Work out $\left(\frac{8}{27}\right)^{-\frac{2}{3}}$

$$\begin{aligned}\left(\frac{8}{27}\right)^{-\frac{2}{3}} &= \left(\frac{27}{8}\right)^{\frac{2}{3}} \\ \left(\frac{27}{8}\right)^{\frac{2}{3}} &= \left(\frac{3}{2}\right)^2 \\ \left(\frac{3}{2}\right)^2 &= \frac{9}{4}\end{aligned}$$

Uprość

Simplify $\frac{x^{\frac{1}{2}}}{x^{-\frac{3}{2}}}$

Uprość

Simplify

$$\frac{x^{\frac{1}{2}}}{x^{-\frac{3}{2}}}$$

wykładniki

The indices are subtracted.

$$x^{\frac{1}{2} - \left(-\frac{3}{2}\right)} = x^2$$

Uprość
Simplify $(16x^8)^{-\frac{3}{4}}$

Uprość
Simplify $(16x^8)^{-\frac{3}{4}}$

$$(16x^8)^{\frac{1}{4}} = 2x^2$$

$$(2x^2)^3 = 8x^6$$

$$(16x^8)^{-\frac{3}{4}} = \frac{1}{8x^6}$$