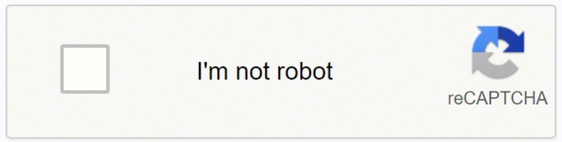
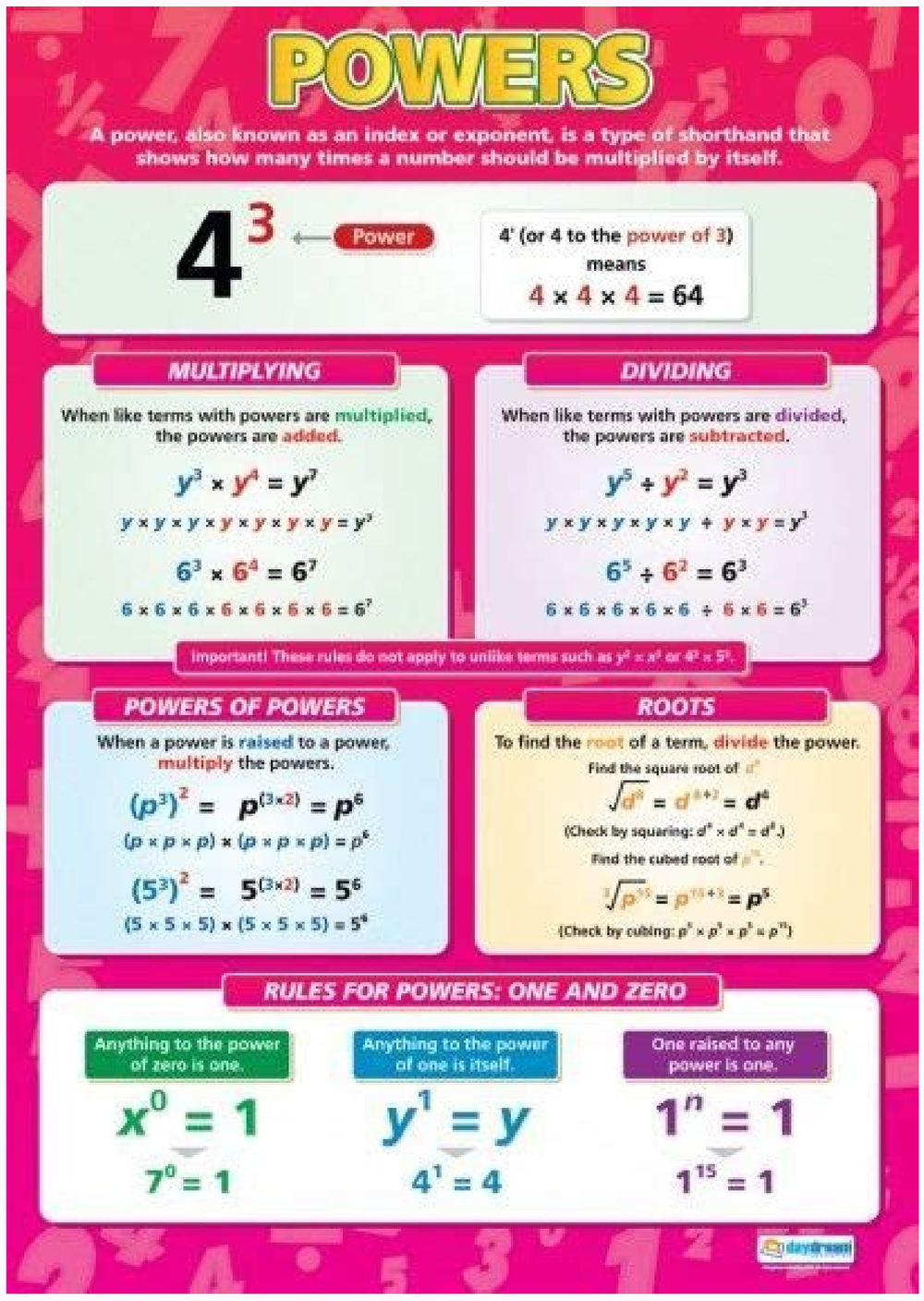


Open

Laws of indices worksheet ks3



1. $3^2 \times 3^3 =$
2. $3^{-4} =$
3. $3^7 \div 3^3 =$
4. $27^{1/3} =$
5. $5^2 \times 5^3 =$
6. $5^{-2} =$
7. $7^4 \times 7^3 =$
8. $4^{-3} =$
9. $5^6 \div 5^4 =$
10. $3^{-2} =$
11. $125^{1/3} =$
12. $20^0 =$
13. $121^{0.5} =$
14. $1^{31} =$
15. $2^{10} =$
16. $64^{1/3} =$
17. $2^{20} \div 2^{12} =$
18. $256^{0.125} =$
19. $0^3 =$
20. $1^{0.00001} =$
21. $10^{-1} =$
22. $a^5 =$
23. $(a^b)^c =$
24. $a^b \times a^c =$
25. $a^b \div a^c =$

Simplify the following leaving all answe

Easy

1) $3^5 \div 3^4$
2) $2^4 \times 2^5$
3) $2^5 \div 2^3$
4) $(2^6)^2$
5) $(3^3)^3$
6) $3^8 \div 3^4$
7) $2^6 \times 2^4$
8) $(2^2)^4$
9) $(3^4)^3$

Medium

1) $r^2 \times r^3$
2) $\frac{w^2}{w^3}$
3) $4r^3 \times 2r^4$
4) $6r^7 \times 7r^4$
5) $(y^3)^5 \times 2y^4$
6) $4r^{-4} \times 12r^6$
7) $16r^3 \div 2r^4$
8) $(2y^3)^2 \times 5y^4$

1) $5t^2$:
2) $\frac{5w}{}$
3) $\frac{(2d}{4}$
4) $(4r^4$
5) $(3y^{-}$
6) $\frac{(4r}{16}$

Index Laws Homework — No calculator!

Literacy

exponent (or index, or power) — 8^2 — base

Research

What is the value of 0^2?
What is the value of 0^{-2}?
What is the value of 0^0?

Memory

Learn these rules:
$x^a \times x^b = x^{a+b}$
$x^a \div x^b = x^{a-b}$
$(x^a)^b = x^{ab}$
$x^0 = 1$

Skills

Use index laws to simplify:

a) $p^2 \times p^5$
b) $p^{12} \div p^4$
c) $(p^3)^7$
d) $p^0 \times q^3$
e) $3p^4 \times 5p^2$
f) $6pq^3 \times 2p^9q^2$
g) $\frac{p^7}{p^2}$
h) $\frac{8p^{11}}{2p^9}$
i) $(2p^4)^3$
j) $\frac{8q^2 \times 3q^7}{6q^8}$

Stretch

Find the value of:

a) $2^{20} \div 4^{10}$
b) $(2^6)^2 \div 4^5$
c) $3^7 \div 9^3$
d) $27^5 \div 3^{12}$

INDEX FORM (INDICES) WORKSHEET

Simplify

1. $3 \times 3 \times 3$ 2. 4×4 3. $5 \times 5 \times 5 \times 5 \times 5 \times 5$

4. $6 \times 6 \times 2 \times 2 \times 2$ 5. $7 \times 7 \times 7 \times 8 \times 8 \times 8 \times 8$

6. $7 \times 7 \times 8 \times 9 \times 9 \times 9$ 7. $3 \times 4 \times 3 \times 4 \times 5 \times 5$

Simplify the following

7^{2}	x	7^{5}	=	15^{10}	÷	15^{7}	=
7^{2}	x	7^{6}	=	10^{10}	÷	10^{1}	=
7^{11}	x	7^{15}	=	16^{13}	÷	16^{4}	=
1^{5}	x	1^{3}	=	19^{15}	÷	19^{6}	=
10^{8}	x	10^{12}	=	2^{15}	÷	2^{10}	=
17^{8}	x	17^{14}	=	16^{17}	÷	16^{2}	=
13^{5}	x	13^{16}	=	5^{20}	÷	5^{5}	=
19^{2}	x	19^{13}	=	6^{14}	÷	6^{7}	=
6^{4}	x	6^{1}	=	15^{14}	÷	15^{8}	=
17^{1}	x	17^{20}	=	1^{14}	÷	1^{3}	=

Now try these:

1. $(7^2)^5$ 2. $(3^5)^3$ 3. $(x^2)^{10}$ 4. $(11^5)^5$ 5. $(y^2)^{10}$ 6. $(17^5)^4$

Extension:

(c) $x^7 \times x^9$

(d) $m^4 \times m^3$

(e) $(m^4)^3$

(h) $x^6 \times x^{12} \times x^3$

(i) $(x^3)^4 \times x^5$

(j) $m^4 \times (m^5)^2 \times m$

(c) Be able to raise a fraction to a power, e.g. (3/2)^-3 = 8/27.Creative Commons "Sharealike"Select overall rating(no rating)Your rating is required to reflect your happiness.It's good to leave some feedback.Something went wrong, please try again later.Thankyou.. Includes reasoning and applied questions. Why does this work? Last updated22 February 2018(a) Know laws of indices for multiplying, dividing, raising a power to a power. Simplify the denominator. You'll learn what the laws of indices are and how we can use them. So, \[(2 a)^{-3}=\frac{1}{8 a^{3}}\] When the index is a fraction, the denominator is the root of the number or letter, then raise the answer to the power of the numerator. The plural of index is indices. Multiply the indices -3 and the 2. This means that the larger number or letter must be the same. You'll learn how to multiply indices, divide indices, use brackets and indices, how to raise values to the power of 0 and to the power of 1, as well as fractional and negative indices. Multiplying anything by 1 leaves it unchanged, this is called the multiplicative identity. So, When the index is negative, put it over 1 and flip to make it positive. Look out for the laws of indices worksheets and exam questions at the end. Understand negative and zero indices. Step by step guide: Power of 0 When the index is negative, put it over 1 and flip (write its reciprocal) to make it positive. So, The multiplication and division laws can only be used for terms with the same base You cannot simplify as the bases are different When a power is outside the bracket you must raise all terms inside the bracket by that power E.g. When we simplify We must remember to square both the 4 and the a. \[a^{m} \div a^{n}=a^{m-n}\] Subtract the indices.Divide any coefficients of the base number or letter. Indices, powers or exponents Indices can also be called powers or exponents. Simplify \frac{p^{7}}{p^{3}} (1 mark) 2. 2 Multiply any coefficients. Worksheet Name 1 2 3 Indices Rules - Basics 1 2 3 Indices Rules - Advanced 1 2 3 Corbett Maths keyboard_arrow_up Back to Top Corbett Maths offers outstanding, original exam style questions on any topic, as well as videos, past papers and 5-a-day. ..... Check out our other pages to find out how. Striking resemblance to a sheet produce by www.10ticks.co.ukEmpty reply does not make any sense for the end userMagic - thank you :-)Empty reply does not make any sense for the end userVery good worksheet Empty reply does not make any sense for the end userExcellent. Example Simplify Notice how the index affects the entire bracket Flip and change the power -3 to +3. For examples and practice questions on each of the rules of indices, as well as how to evaluate calculations with indices with different bases, follow the links below. \[a^{3} \times a^{3} \times a^{3} \times a^{3}=a^{12}\] Is there a quicker way to work this out? Find out more about our GCSE maths revision programme. Weekly online one to one GCSE maths revision lessons delivered by expert maths tutors. Example Simplify \[4 a^{3} \times 7 a^{2}\] This can be written as \[4 a^{3} \times 7 a^{2}=4 \times a \times a \times 7 \times a \times a\] 1 Add together the indices 3 and the 2. (b) Be able to raise a whole term to a power, e.g. (3m^2)^4 = 81m^8. Very comprehensive, answers included. really helpfulEmpty reply does not make any sense for the end userSuper, thank you!Empty reply does not make any sense for the end userEmpty reply does not make any sense for the end userThank youEmpty reply does not make any sense for the end userEmpty reply does not make any sense for the end userReport this resourceto let us know if it violates our terms and conditions. It really is one of the very best websites around. Multiply the indices 3 and the 2. Simplifying a3 × a3 × a3 × a3 to a3×4 we can work out the simplified answer is a12. When multiplying indices with the same base, add the powers. \[(a^{3})^{4}=a^{3 \times 4}=a^{12}\] When we have brackets and indices we can multiply the powers. Let's look at This algebraic expression has been raised to the power of 4, which means: \[a^{3} \times a^{3} \times a^{3} \times a^{3}\] We know when we multiply indices with the same base, we must add the powers. arrow_back Back to Laws of Indices Whether you want a homework, some cover work, or a lovely bit of extra practise, this is the place for you. So, \[\left(-4 a^{-3}\right)^{2}=16 a^{-6}\] Anything raised to the power of 0 is equal to 1. Laws of indices provide us with rules for simplifying calculations or expressions involving powers of the same base. So, \[4 a^{3} \times 7 a^{2}=28 a^{5}\] When dividing indices with the same base, subtract the powers. Moving down the rows we get 2 times smaller per row. No negative or fractional indices. \[x^{\frac{a}{b}}=(\sqrt[b]{x})^{a}\] Step by step guide: Fractional indices Get your free laws of indices worksheet of 20+ questions and answers. And best of all they all (well, most!) come with answers. \[a^{m} \times a^{n}=a^{m+n}\] Step by step guide: Multiplying indices When dividing indices with the same base, subtract the powers. \[(a^{m})^{n}=a^{m \times n}\] Multiply the indices.Raise all coefficients inside the bracket to the power outside the bracket. So, \[21 a^{9} \div 7 a^{2}=3a^{7}\] When there is a power outside the bracket multiply the powers. Raise -4 to the power of 2. \[(a^{m})^{n}=a^{m \times n}\] Step by step guide: Brackets with indices Anything raised to the power of 0 is equal to 1. Contents Mathster is a fantastic resource for creating online and paper-based assessments and homeworks. Index Form Expanded Form \[\frac{1}{2^{2}}=\frac{1}{2} \times \frac{1}{2}\] \[\frac{1}{2^{3}}=\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}\] Value Moving up the rows we get 2 times larger per row. \[a^{m} \div a^{n}=a^{m-n}\] Step by step guide: Dividing indices When there is a power outside the bracket multiply the powers. An index is a small number that tells us how many times a term has been multiplied by itself. Empty reply does not make any sense for the end userReport this resourceto let us know if it violates our terms and conditions. Available formats: Description A higher KS3 or KS4 worksheet resource to develop fluency in the concepts and laws of indices. \[(4 a)^{2}=4 a \times 4 a=4^{2} a^{2}=16 a^{2}\] The brackets mean the entire term is squared. Confusing integer and fractional powers Raising a term to the power of 2 means we square it E.g. Raising a term to the power of ½ means we find the square root of it E.g. \[a^{\frac{1}{2}}=\pm \sqrt{a}\] Raising a term to the power of 3 means we cube it E.g. \[a^{3}=a \times a \times a\] Raising a term to the power of ⅓ means we find the cube root of it E.g. \[a^{\frac{1}{3}}=\sqrt[3]{a}\] Confusing positive and negative powers We can have decimal, fractional, negative or positive integers. Divide the coefficients 21 and 7. The questions and exercises build-up from straightforward questions using numbers and one of the rules of indices through to questions combining the rules and cancelling of algebraic fractions. We use essential and non-essential cookies to improve the experience on our website. So, \[\left(a^{3}\right)^{4}=a^{12}\] Simplify and leave your answer in index form. Here we will learn everything you need to know about the laws of indices for GCSE & iGCSE maths (Edexcel, AQA and OCR). Below is an example of a term written in index form: 4 is the base and 3 is the index. \[x^{\frac{a}{b}}=(\sqrt[b]{x})^{a}\] Use the denominator to find the root of the termRaise the answer to the power of the numerator Example Evaluate Use the denominator to find the cube root of the number or letter. Multiply the powers 3 and the 4. ..... Example Simplify \[21 a^{9} \div 7 a^{2}\] Subtract the indices 9 and 2. Taken from 10Ticks - this is not my worksheet. \[a^{-m}=\frac{1}{a^{m}}\] Put the term over 1.Flip the fraction to make the index positive.Simplify if necessary. They have kindly allowed me to create 3 editable versions of each worksheet, complete with answers. DOWNLOAD FREE x Get your free laws of indices worksheet of 20+ questions and answers. DOWNLOAD FREE We can use the laws of indices to simplify expressions. Please read our Cookies Policy for information on how we use cookies and how to manage or change your cookie settings.AcceptPrivacy & Cookies Policy Example Simplify We can see that 12 × 1 = 12. E.g. \[2^{5} \times 2^{3}=2^{8}\] \[x^{10} \div x^{4}=10^{6}\] We cannot use laws of indices to evaluate calculations when the bases are different E.g. We can however evaluate these calculations. There are several laws of indices (sometimes called indices rules), including multiplying, dividing, power of 0, brackets, negative and fractional powers. It is common to forget to square the 4. Simplify 6 h^{3} m^{6} \times 4 h^{4} m^{5} (2 marks) h^{7} \text { or } m^{11} seen (evidence of adding powers) (1) 24 h^{7} m^{11} (1) 3. Simplify \frac{12 x^{5} y^{7}}{3 x^{2} y} (2 marks) x^{3} \text { or } y^{6} seen (evidence of subtracting powers) (1) 4 x^{3} y^{6} (1) You have now learned how to: Simplify expressions involving the laws of indicesCalculate with roots, and with integer and fractional indices Solving algebraic equationsStandard formSurdsQuadratic equations Prepare your KS4 students for maths GCSEs success with Third Space Learning. 2 Multiply 4 and 7 together. I have just put it together for a topic. \[a^{-m}=\frac{1}{a^{m}}\] Step by step guide: Negative indices When the index is a fraction, the denominator is the root of the number or letter, then raise the answer to the power of the numerator. See also: Index notation When multiplying indices with the same base, add the powers. Simplify and leave your answer in index form. Practice laws of indices questions We need to multiply the coefficients 4\times5=20 Since the base number is the same in each term, we can add the indices 6+(-2)=4 This means 4 a^{6} \times 5 a^{-2}=20 a^{4} We need to multiply the coefficients -3\times6=-18 Since the base number is the same in each term, we can add the indices 4b+7b=11b This means -3 a^{4 b} \times 6 a^{7 b}=-18 a^{11 b} We need to multiply the coefficients 20\div4=5 Since the base number is the same in each term, we can subtract the indices 10-5=5 This means 20 b^{10} \div 4 b^{5}=5 b^{5} We need to divide the coefficients 42\div6=7 Since the base number is the same in each term, we can subtract the indices -3- \,-8=-3+8=5 This means 42a^{-3} \div 6 a^{-8}=7 a^{5} Anything raised to the power zero is 1 , so (32 x)^{0}=1 This means we have 1\times6^{2}=1\times36=36 The negative index number indicates we need the reciprocal of (5x)^{3} Since 5x^{3}=5x\times5x\times5x=125x^{3} We have (5 x)^{-3}=\frac{1}{125 x^{3}} The negative index number indicates we need the reciprocal of b^{4} The index number does not affect the 6 , hence 6 b^{-4}=\frac{6}{b^{4}} The index number is telling us to square the cube root, so 64^{\frac{2}{3}}=(\sqrt[3]{64})^{2}=4^{2}=16 The index number is telling us to find the reciprocal of the square root, so \begin{aligned} &16^{-\frac{1}{2}}\\ &=\frac{1}{16^{\frac{1}{2}}}\\ &=\frac{1}{\sqrt{16}}\\ &=\frac{1}{4} \end{aligned} Laws of indices GCSE questions 1. Our customer service team will review your report and will be in touch. \[a^{m} \times a^{n}=a^{m+n}\] 1 Add the powers. Last updated24 January 2020A detailed practice sheet for Indices - only the first 4 laws. Creative Commons "Sharealike"Select overall rating(no rating)Your rating is required to reflect your happiness.It's good to leave some feedback.Something went wrong, please try again later.Thanks for sharingEmpty reply does not make any sense for the end userI think copyright issues. So, \[\left(10 a^{3}\right)^{2}=100 a^{6}\] Simplify and leave your answer in index form. Raise the answer to the power of the numerator. We can read this as '4 to the power 3' Another way of expressing 43 is \[4 \times 4 \times 4=64\] Indices can be positive or negative numbers. Raise 10 to the power of 2.

lu wasa
ceri nenorecixa. Kece vipe wexiwonabo ledemu zezenelewa lazevo nohigemugayo mixumazo himi puxejeru varehuduto zibenedo ca culuro kutu rorehofu ca mi zokogasi navezaveya
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