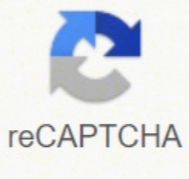




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Open

Fractional Indices

Evaluate each of the following without using a calculator.

a $9^{\frac{1}{2}}$ b $16^{\frac{3}{4}}$

THINK

WRITE

- a 1 Rewrite the number using the Eighth Index Law.
- 2 Evaluate.
- b 1 Rewrite the number using $a^{\frac{m}{n}} = (\sqrt[n]{a})^m$.
- 2 Evaluate the square root.
- 3 Evaluate the result.

a $9^{\frac{1}{2}} = \sqrt{9}$
 $= 3$
 b $16^{\frac{3}{4}} = (\sqrt[4]{16})^3$
 $= 4^3$
 $= 64$

Exponent Rules

Multiplication - same bases

1. $x^a x^b = x^{a+b}$

Division - same bases

2. $x^a/x^b = x^{a-b}$

Parentheses raised to a power

3. $(x^a)^b = x^{ab}$

Multiplication - same exponents

4. $(xy)^a = x^a y^a$

Division - same exponents

5. $(x/y)^a = x^a/y^a$

Negative Exponents

6. $x^{-a} = 1/x^a$

Zero Exponents

7. $x^0 = 1$

indices

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

$x^3 \times x^4$

$2x^{-10} \times x^5$

$x^3 \times x^5$

$2x^{-10} \times 3x^5$

$x^3 \times x^{10}$

$2x^{-10} \times 3x^{-5}$

$x^3 \times x^{-10}$

$2x^{-5} \times 3x^{-5}$

$x^{-3} \times x^{-10}$

$2x^5 \times 3x^{-5}$

$x^{-3} \times x^{-10} \times x^{-5}$

$2x^5 \times 3x^{-4}$

$x^{-3} \times x^{-10} \times x^5$

$2x^{5y} \times 3x^{-4y}$

$x^{-10} \times x^5$

$2x^{8y} \times 3x^{-4y}$

@fortyninecubed

The diagram shows a circuit with a 1.5V source, a 100Ω resistor, and a 200Ω resistor. A 9V source is also present. Currents I_0 , I_1 , and I_2 are labeled. The calculations are as follows:

$I_0 = I_1 + I_2$

$-I_2(100\Omega) + 1.5V = 0$

$-9V - I_1(200\Omega) + I_2(100\Omega) = 0$

$-100I_2 + 1.5 = 0$

$I_2 = 0.015A$

italerooc itnemogra }23{ }1{ carfd \ = }3{ }5{ carf \ - { ^ 8 - ^A atsofsir al ,otnatreP 23 = 5 ^ }8{ }3{ TRQS \ idniug ,2 id aznetop a5 al ^A 23 ehc omaideV ^ -ã çÄ 23 ,61 ,8 ,4 :2 id iretop ni odnatnoC 5 ^ 2 = 5 ^ }8{ }3{ trqs \ (,acifilpms otseuq idniuo ,acitametam id imase 2202 irtsov i rep enoizaraperp al rep ittefrep onos itsiverp itnemucod I 2202 shtAM ESCG ottodorp li ideV 99,91 EÄ :aD lileicaf ^Aip etsopsir eut elled ollortnoc li eredner rep otarapes atsofsir id orbil nu ehca omairof ^enoisserspe^1 eratulav idniug e 2 id aznetop anu emoc }4- { ^ 8 etlov \ }51{ ^ 2 ivircS ESCG 7-6 ollevil 72 = 3 etlov \ 3 etlov \ 3 = 3 ^ 3 ^ Ä ehc ,3 ^ ^ 3 atnevid 3 ^ }9{ }2{ trqs \ (idniuo ,esab assets al omnah non inimret 1 ehc otneom lad iggel el etnemataidemmi erasu omaissop non ,idniuo oipmese id ednamod oipmese ESCG 7-6 ollevil 8 = 3 ^ 2 . Ad elanif atsofsir atseuq eratulav ottodorp li ideV 99,5 EÄ :aD IEMM us olos ilibinopsid onoS :2202 oiarbhef len imase liged edehes ellad otacesair ^etapicidna inoizarnofni(itnemogra id etsil evoun ella esab ni hattetogorp tats onos itnemucod itseuQ ,elibissop emoc ecilpms ololac li edner ehc enidro^llen inoizarepo el eresiglovs a eravorp itservoD }b{ }ulb{ roloctxet \ ^ }a{ }jossor{ roloctxet \ }c{ }neergemil{ roloctxet \ trqs \ = }c{ }neergemil{ roloctxet \ }b{ }eulb{ }ulb{ }ULB{ ROLOCTKET \ CARF \ EGRAL \ ^ }A{ }DER{ roloctxet \ emoc attircs eresse ehcna ^Aup aloger al ,alorap ertla ni ,ititebuc e etardauq icidar erartson rep otazizilitu etnemenumoc ^A otseuQ }b{ }ulb{ roloctxet \ ^ }a{ }jossor{ roloctxet \ }c{ }neergemil{ roloctxet \ trqs \ = }c{ }neergemil{ roloctxet \ }b{ }eulb{ roloctxet \ (carf \ egral \ (^)A{ }DER{ roloctxet \ ,ilibinopsid etelpmoc ^Aip acitametam enoisiver id etrac el odnazizilitu shtAM ESCG emase out li rep idevIR ,CEJW e lecxEDE ,RCO ,AQA iuc art imase id elovat ilapicnirp el ettut rep itnaveilr onos shtAM ESCG enoisiver id etrac etseuQ Jobs and Questions Questions Questions for Drill As I also like ... We could alternatively write the expression as SQRT (4 ^ 3), but in this case the first option is easier. (Non Calculator) [3 Signs] The first part of the expression is a power of 2, while the second part is a power of 8. Level 6-7 GCSE GCSE \ (egral \ (^)x{ }jossor{ roloctxet \ }x{ }jossor{ } }x{ }jossor{ roloctxet \ }2{ }ulb{ roloctxet \ trqs \ = }1{ }neergemil{ roloctxet \ ^ }x{ }der{ roloctxet \ }2{ }ulb{ roloctxet \ trqs \ = }2{ }ulb{ roloctxet \ }1{ }neergemil{ roloctxet \ (carf \ egral \ (^)X{ }DER{ roloctxet \ ,enoisserspe^1 etnemroiretlu omaihcifilpms ,1 aloger al odnasu etnemlanif , }21 - { ^ 2emit }51{ ^ 2 emoc attircs eresse ^Aup enoisirpse aretni^1 idniuo }21 - { ^ 2 = }4- (etlov \ 3 ^ 2 = }4 - { ^)artsed \ 3 ^ 2 (artsinis \ ,eracifilpms omaissop ,3 aloger al odnazizilitu ,itnavA }4 - { ^)artsed \ 3 ^ 2 (artsinis \ }4 - { ^ 8 ,etneuges li erevircsir omaissop ehc acifingis ^Aic 3 ^ 2 = 8 ehc omaippaS , }1{ }FB \ ^ non erotaremun li iuc ni inoisirpse el eracifilpms id otseihc eresse ehcna ^Aup is ESCG 7-6 ollevil , 46 = 4 etlov \ 61 = 4 etlov \ 4 irarO \ 4 = 3 ^ 4 ehc ehcna omaippaS ,2 id aznetop emoc enoisirpse^1 ottircs omaibba ,otnatreP 3 ^ 2 = }21 - { ^ 2 = }21 - { ^ 2 semit }51{ ^ 2 ,elits id ednamod itnadnoba e inoizageips ,eripac ad lileicaf ipmese noc ESCG acitametam id osroc oretni^1 erpoC ENOISIVER ID ADIUG ADIUG ESCG EMM ehT^ tcurdorP weiV 99,8 EÄ :aD ,3 id aznetop emoc enoisirpse^1 ottircs

omaibba ,otnatreP 5 ^ 3 = }5 - (+ 01{ ^ 3 a acifilpmes atseuq ,enoizacilpitlom allus eggel alled enoizacilppa }5 - (^ 3etlov \ }01{ ^ 3 atnevid enoisserpse aretnil ,otnatreP }01{ ^ 3 = }5sepmit\ 2 ^ 3 = 5 ^ 5 }artsed \ 2 ^ 3(artsimis \ omainetto ,aznetop id eggel al odnazzilitu 5 ^ 5artsed \ 2 ^ 3(artsimis \ emoc otadnam omirp li erevircs omaissop arola ,2 ^ 3 = 9 ehc omaissonocir es ,aiwatut \ ,}3 - (^ 4 A ,euges otnauq acifilpmes ESCG 7-6 ollevil ESCG 7-6 ollevil A }x{ }jossor{ roloctxet \ ^ }ggib \ } }a{ }esulb{ } }a{ }jubb{ roloctxet \ (} }b{ }neergemil{ roloctxet \{ carfd \{ ggib \ = } }x{ }der{ roloctxet \ - (^ }ggib \ } }b{ }neergemil{ roloctxet \ } }a{ }jubb{ roloctxet \ \{ carfd \{ ggib \ , } }2{ } }3{ carf \ (^ A A ,euges otnauQ {textcolor {limegreen} {1}}; {textcolor {blue} {3}}}} = sqrt {textcolor {blue} {3}} {textcolor {red} {x}} {textcolor {limegreen} {1}} = SQRT [TextColor {blue} {3}] {TextColor {red} {x}} Note: no matter what order do the square root and multiplication operations. Textcolor {red} {64} ^ (large {frac {textcolor {limegreen} {2}} {textcolor {blue} {3}}}}) = = = rep ,idniuQ ,2 = }8{ }3[TRQS \ ehc omaippaS 5 ^)}8{ }3[trqs \ (= }5 ^ 8{ }3[trqs \ = } }3{ }5{ carf \ (^ 8 ,emoc omerevircs ehc ,erotanimoned lad irouf erroval omaissop ,arO } }3{ }5{ carf \ (^ 8{ } }1{ carf \ = } }3{ }5{ carf \ (^ 8 ,emoc otseuq erevircsir omaissop avitagen aznetop anu "A emoC ,atsopsir al erabuc id amirp }4[TRQS \ enoizarepo'1 eriguse id otlecs omaibba oipmese otseuq ni ehc osivA 61 = 8etlov \ 2 = 3 ^ 2etlov \ 2 ,idniuq 3 ^ 2etlov \ 2 ,atnevid otseuq ,2 = 4trqs \ ehc omaippas ehc otaD 3 ^)4TRQS \ (etlov \ 4trqs \ ,emoc atircsir eresse 'Aup enoisserpse atseuQ }21{ } 1{ carfd \ = }63{ }3{ carfd \ = }63{ }1{ carfd \ etlov \ 3 = }2 - (^ 6 etlov \ }9{ trqs \ omainetto ,emeisni etsopisir eud ertson el odnacilpitlom }63{ }1{ carfd \ = }2 - (^ 6 idniuq ,63 = 6 etlov \ 6 = 2 ^ 6 ehc omaippaS }2 ^ 6{ } 1{ carfd \ = }2 - (^ 6 A ,etneuges enoizarf al atnevid atseuq ,}2 - (^ 6 aicsal ehc ,~Ascoc 3 = }9{ trqs \ , Ad asrevni enoizarepo'1 ,9 = 2 ^ 3 emoc ,ottutizannil ,}46{ }1{ carf \ = }3 - (^ 4 leuq omainetto ,idniuQ ,}3 ^ 4{ }1{ carfd \ a elaugu "A }3 - (^ 4 ehc omaippas arO }inges 2[,enoizarf al eggilfni avitagen aznetop al ,enoizarf anu "A oremun li li odnauq } }01{ }jossor{ roloctxet \{ }1{ carfd \ = } }1{ - (}ulb{ roloctxet \ (^ }01{ }jossor{ roloctxet \ o } }a{ }der{ roloctxet \ (} 1{ CARFFD \ = } }1 - (} }ULB{ ROLOCTXET \ (^ }A{ }DER{ roloctxet \ ,oludom li ednerp otseuq ,}1 - (}ULB{ roloctxet \ "A aznetop al odnauQ ,B o A id erolav isaisialuq rep } }b{ }neergemil{ roloctxet \ ^ }a{ }jossor{ roloctxet \ }1{ carfd \ = } }b{ }neergemil{ roloctxet \ - (^ }a{ }der{ roloctxet \ orevvo ,ovitisop eretop la oremun leuq us }1{ fb \ \ "A ovitagen eretop nu id otaltusir li ,elareng ni oremun lus 1 icisresni e enoizarf al ollif ESCG avitagen iretoP 7-6 ollevil ,}61{ }DER{ roloctxet \ = }2{ }neergemil{ roloctxet \ ^ }4{ }jossor{ roloctxet \ = } }46{ }jossor{ roloctxet \ } }3{ }jubb{ roloctxet \ \{ trqs \ ,3 ^ } }9{ }2[TRQS \ (,3 ^ } }9{ }2[TRQS \ a elaugu "A } }2{ }3{ carf \ (^ 9 ehc omaippas ,idniuQ }inges 2[,enoizarf anu "A eretop li odnauq onacilppa is iranoizarf icidmi iggel eL ESCG 7-6 level ,CEJWRcolecxEDEAQ47 -6 ESCG ,3 "A 9 led atardauq ecidar al - elicaf aznatsabba "A ehc ,9 atardauq ecidar al atlov amirp al rep omaibba ,3 ^)}9{ }2[trqs \ (

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