

2/4

Quiz Questions about negative exponents

$$1) \frac{x^7}{x^4} = x^7 \cdot x^{-4} = x^{7-4} = x^3$$

$$2) \frac{x^7}{x^{10}} = x^7 \cdot x^{-10} = x^{7-10} = x^{-3} = \frac{1}{x^3}$$

$$3) \frac{35 a b^9}{20 a^5 b^5} = \frac{7 a^{1-5} b^{9-5}}{4} = \frac{7 a^{-4} b^4}{4} = \frac{7 b^4}{4 a^4}$$

$$4) (2^{-2})^{-2} = 2^{-2 \cdot -2} = 2^4 = 16$$

Handy Dandy Method

$$5) \frac{4}{7} - \frac{2}{9} = \frac{(4 \cdot 9) - (2 \cdot 7)}{7 \cdot 9} = \frac{36 - 14}{63} = \frac{22}{63}$$

IV. Rational (Fractional) Exponents

Etymology

Root of the word Rational is Ratio
a ratio is usually a fraction $\frac{2}{3}$

Ex: $8^{2/3} = \left(\sqrt[3]{8} \right)^2 = (2)^2 = 4$

index \swarrow
radicand \nearrow ← number in the radical
2 ← exponent

$\sqrt[3]{8}$ - what number may be used as a factor 3 times with the result of 8?

$$8^{2/3} = \left(\sqrt[3]{8} \right)^2 \text{ or } \sqrt[3]{8^2} \quad \text{Since } \left(\sqrt[3]{8} \right)^2 = \sqrt[3]{8^2}$$

$$a^{b/c} = \sqrt[c]{a^b}$$

$$\left(\sqrt[3]{2} \right)^5 = 2^{5/3}$$

$$\sqrt{7} = 7^{1/2}$$

If there is no visible index then it is a 2. If there is no visible exponent then it is implied to be a 1.

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

Webassign problems on fractional exponents

$$\begin{aligned} 1) \quad 64^{-2/3} &= (4^3)^{-2/3} \\ &= 4^{3 \cdot \frac{-2}{3}} \\ &= 4^{-\frac{6}{3}} \\ &= 4^{-2} \\ &= \frac{1}{4^2} \\ &= \frac{1}{16} \end{aligned}$$

Helpful Exponent chart

x	x ²	x ³	x ⁴	x ⁵	x ⁶
2	4	8	16	32	64
3	9	27	81	243	729
4	16	64	256	1024	4096
5	25	125	625	3125	15625

Steps for these kinds of problems

1) Replace large number with chart number

2) multiply exponents

3) get rid of negative exponents.