

THE CHART - recognize these chart numbers as something to some power.

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

* keep this handy

e.g. $\text{Webassign(a)} \quad 64^{-2/3}$

$$= (4^3)^{-2/3}$$

$$= 4^{\underbrace{(\frac{3}{1})(-\frac{2}{3})}_{-\frac{3 \cdot 2}{1 \cdot 3} = -\frac{6}{3}}}$$

$$= 4^{-2}$$

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

steps:

- (1) Replace the chart number with it's equivalent exponential expression
- (2) multiply the exponent.
- (3) deal with the negative exponent

q(b) $\left(\frac{16}{625}\right)^{-3/4}$

$$= \left(\frac{2^4}{5^4}\right)^{-3/4}$$

$$= \left(\frac{2^{(4)(-\frac{3}{4})}}{5^{(4)(-\frac{3}{4})}}\right)$$

$$= \left(\frac{2^{-3}}{5^{-3}}\right) = \frac{5^3}{2^3} = \boxed{\frac{125}{8}}$$

- (1) replace the chart number such that the denominator & numerator has the same power, which should be the same as the fraction on the exponential.
- (2) multiply exponent
- (3) deal with negative exponents.

$$\begin{aligned}
 10a. \quad & \left(-\frac{1}{8}\right)^{-1/3} \\
 & = \left(-\frac{1}{2^3}\right)^{-1/3} \\
 & = -\frac{1}{2^{(3)(-1/3)}} \\
 & = -\frac{1}{2^{-1}} \\
 & = -\frac{2^1}{1} = \boxed{-2}
 \end{aligned}$$

$$\begin{aligned}
 10b. \quad & \left(\frac{1}{\sqrt[5]{32}}\right)^{-2/5} \\
 & = \left(\frac{1}{\sqrt[5]{2^5}}\right)^{-2/5} \\
 & = \left(\frac{1}{2^{5/2}}\right)^{-2/5} \\
 & = \frac{1}{2^{\underbrace{(5/2)(-2/5)}}} = \frac{1}{2^{-5 \cdot 2 / 2 \cdot 5}} = \frac{1}{2^{-10/10}} = \frac{1}{2^{-1}} \\
 & = \frac{2^1}{1} = \boxed{2}
 \end{aligned}$$

← deal with the radical first, so that this simplifies to ~~an~~ an exponential expression.

$$\sqrt[5]{8^2} = \sqrt[5]{8^2}$$

keep this good example to refer back to, when you simplify radical expressions into exponential expressions.

$$11a. \quad -(16^{1/2}) = -\sqrt[2]{16} = \boxed{-\sqrt{16}}$$

← on WebAssign, click $\sqrt{\square}$ on the right panel.

$$11b. \quad (-7776)^{1/5} = \sqrt[5]{-7776}$$

← base is (-7776) !!

★ on WebAssign, hit 

$$15. \quad \frac{x^{4/3} \cdot y^{2/3}}{(xy)^{1/3}}$$

$$= \frac{x^{4/3} \cdot y^{2/3}}{x^{1/3} \cdot y^{1/3}}$$

$$= x^{(4/3 - 1/3)} \cdot y^{(2/3 - 1/3)}$$

$$= x^1 \cdot y^{1/3} = \boxed{x \cdot y^{1/3}}$$

(1). power to a power on denominator.

(2) 3rd property of exponent, same base on top & bottom in a fraction, subtract power.

