

WARM UP...Check your understanding:

$$1. 8^{\frac{2}{3}} = (\sqrt[3]{8})^2$$

$$= 2^2$$

$$= 4$$

$$2. 125^{-\frac{1}{3}} = \frac{1}{125^{\frac{1}{3}}}$$

$$= \frac{1}{\sqrt[3]{125}} = \frac{1}{5}$$

$$3. 32^{-\frac{7}{5}} = \frac{1}{32^{\frac{7}{5}}}$$

$$= \frac{1}{(\sqrt[5]{32})^7}$$

$$= \frac{1}{2^7}$$

$$= \frac{1}{128}$$

$$4. \frac{3}{9^{-\frac{3}{2}}} = \frac{3(9)^{\frac{3}{2}}}{1}$$

$$= 3(\sqrt{9})^3$$

$$= 3(2^3)$$

$$= 81$$

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

$$3 \cdot \frac{9^{\frac{3}{2}}}{1} = 9^{\frac{3}{2}}(3)$$

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

$$\frac{16}{9}$$

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

$$= \frac{9}{16}$$

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

$$= 48$$

Now for the grand finale!!

Evaluate the following...

$$-2^4 + \left(\frac{1}{3}\right)^{-2} - \frac{64^{-\frac{2}{3}}}{1} + 4w^0 + (-3)^2 + \frac{2^{-2}}{4}$$

$$-16 + \left(\frac{3}{1}\right)^2 - \frac{1}{64^{\frac{2}{3}}} + 4(1) + 9 + \frac{1}{2^2 \cdot 4}$$

$$-16 + 9 - \frac{1}{16} + 4 + 9 + \frac{1}{16}$$

$$= \underline{\underline{6}}$$

$$[6] \quad \frac{2}{3^{-1}} + 27^{-\frac{1}{3}} - (-2)^3 + 2^0 - \left(\frac{3}{2}\right)^{-1} + \frac{3}{2}$$

$$= \frac{2(3)^1}{1} + \frac{1}{27^{\frac{1}{3}}} - (-8) + 1 - \left(\frac{2}{3}\right)^1 + \frac{1}{3 \cdot 2}$$

$$= 6 + \frac{1}{9} + 8 + 1 - \frac{2}{3} + \frac{1}{6}$$

$$= \frac{15}{1} + \frac{1}{9} - \frac{2}{3} + \frac{1}{6}$$

$$= \frac{270 + 2 - 12 + 3}{1 \cdot 18}$$

$$= \frac{263}{18}$$

4.6 Applying the Exponent Laws

THINK ABOUT IT

Work on your own.

What is the value of $\left(\frac{a^6 b^9}{a^5 b^8}\right)^{-2}$ when $a = -3$ and $b = 2$?

Simplify first...
Much easier

$$\begin{aligned} &\rightarrow (ab)^{-2} \\ &(-3 \cdot 2)^{-2} \\ &(-6)^{-2} \\ &\frac{1}{(-6)^2} = \frac{1}{36} \end{aligned}$$

$$\begin{aligned} &(-3)^{-2} \left(\frac{a^5 b^8}{a^6 b^9}\right)^2 \\ &(-3)^{-2} (a^{-1} b^{-1})^2 \\ &((-3)^{-1} (b)^{-1})^2 \\ &\left(\left(-\frac{1}{3}\right)\left(\frac{1}{2}\right)\right)^2 \\ &\left(-\frac{1}{6}\right)^2 \\ &\frac{1}{36} \end{aligned}$$

$\frac{1}{36}$