I. Review Quiz...

#5) $\left(\frac{125}{64}\right)^{4/3}$

$$\frac{125^{4/3}}{64^{4/3}} = \frac{\left(\sqrt[3]{125}\right)^4}{\left(\sqrt[3]{64}\right)^4} = \left(\frac{5}{4}\right)^4 = \frac{625}{256}$$

#1) A) $(2^2)^{70} = 2^{140}$

B) $(2^4)^{40} = 2^{160}$

C) $(2^3)^{60} = 2^{180}$

D) $(2^5)^{30} = 2^{150}$.

#9) $\left(\frac{5}{4}a^{-4}b^{7}\right)^{-3}$

$= \left(\frac{5}{4}\right)^{-3}\left(a^{-4}\right)^{-3}\left(b^{7}\right)^{-3}$

$= \left(\frac{4}{5}\right)^{3} a^{12} b^{-21}$

$= \frac{64\,a^{12}}{125\,b^{21}}$

(B)

$\frac{1}{\left(\frac{5}{4}a^{-4}b^{7}\right)^{3}}$

$\frac{1}{125\,a^{-12}b^{21}}$

$\frac{a^{12}}{125\,b^{21}}$

$\frac{1}{\left(\frac{3}{5}\right)} = \frac{5}{3}$

#16) $\dfrac{(m^6 n^{-2})^{-1}}{(m^{-5} n)^3}$

$= \dfrac{m^{-6} n^2}{m^{-15} n^3}$

$= m^9 n^{-1}$

$= \dfrac{m^9}{n}$ (B)

11) $\dfrac{9p^3q^{-7}}{21pq^6}$

$\dfrac{3p^2q^{-13}}{7}$

$\dfrac{3p^2}{7q^{13}}$

$\dfrac{9 \div 3}{21 \div 3}$

$\dfrac{3}{7}$

18 $\left(\dfrac{a^{-5/2}\,b^{10/3}}{a^{-4/1}\,b^{4/1}}\right)$ $a=16 \quad b=-27$

$= \dfrac{a^{-5/2}\,b^{10/3}}{a^{-8/2}\,b^{12/3}}$

$= a^{3/2}b^{-2/3}$

$= \dfrac{a^{3/2}}{b^{2/3}} = \dfrac{(16)^{3/2}}{(-27)^{2/3}} = \dfrac{64}{9}$

$-27^{2/3} = -9$

$(-27)^{2/3} = 9$

23/ $\left(\frac{w^{-9}y^{6}}{-64x^{3}}\right)^{-1/3}$

$\left(\frac{-64x^{3}}{w^{-9}y^{6}}\right)^{1/3}$

$(x^{3})^{1/3} =$ $3 \times \frac{1}{3} = \frac{3}{3}$

$= \frac{-4x}{w^{-3}y^{2}}$

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

25/ $b = 0.01\ m^{2/3}$

$b = 0.01(256)^{2/3}$

$b =$

256^(2/3)

256^2/3

$(256^2) \div 3$

256^2,3

27. $\sqrt{72}$

$\sqrt{36 \times 2}$

$\sqrt{36} \times \sqrt{2}$

$6\sqrt{2}$

$\frac{10}{20} = \frac{5}{10}$

28. $5\sqrt[3]{4}$

$= \sqrt[3]{5^3 \times 4} = \sqrt[3]{500}$

Bonus:

$$\frac{x^{\frac{110}{30}}}{y^{\frac{83}{30}} z^{\frac{67}{4}}}$$

Operations Involving Radicals

- **Addition and Subtraction**

Like radicals such as $5\sqrt{7}$ and $3\sqrt{7}$ can be added or subtracted using the distributive law.
Unlike radicals such as $6\sqrt{2}$ and $4\sqrt{5}$ cannot be combined.

Radicand

$11\sqrt{6} + 5\sqrt{6} =$ $\qquad$ $6\sqrt{2} - 4\sqrt{2} + \sqrt{2} =$ $\qquad$ $4\sqrt{5} + 2\sqrt{10} =$

$3\sqrt[3]{5} + 2\sqrt[3]{5}$

$= 5\sqrt[3]{5}$

Simplifying radicals will sometimes be necessary...

$\sqrt{32} + \sqrt{8} =$

$4\sqrt{2} + 2\sqrt{2}$

$= 6\sqrt{2}$

$5\sqrt{12} - 2\sqrt{48} - 7\sqrt{75} =$

$= 5(\sqrt{4 \times 3}) - 2(\sqrt{16 \times 3}) - 7(\sqrt{25 \times 3})$

$= 5(2\sqrt{3}) - 2(4\sqrt{3}) - 7(5\sqrt{3})$

$= 10\sqrt{3} - 8\sqrt{3} - 35\sqrt{3}$

$= -33\sqrt{3}$

$3\sqrt{7} + 2\sqrt{11} - 1\sqrt{11} + 4\sqrt{7} =$

$= 7\sqrt{7} + \sqrt{11}$

- Multiplication

Product Rule of Radicals: $a\sqrt[m]{b}\cdot c\sqrt[m]{d}=ac\sqrt[m]{bd}$

Have a look at these examples...

$3\sqrt{2}\times\sqrt{5}=$

$=3\sqrt{2\times5}$

$=3\sqrt{10}$

$4\sqrt{3}\times\sqrt{12}=$

$4\sqrt{36}$

$4(6)$

$=24$

$4\sqrt{3}\times2\sqrt{3}$

$=8(3)$

$=24$

$\sqrt{36}$

$=6$

$\sqrt{6}$

$(-3\sqrt{8})(2\sqrt{5})$

$=-6\sqrt{40}$

$=-6(\sqrt{4\times10})$

$=-6(2\sqrt{10})$

$=-12\sqrt{10}$

$=-3(2\sqrt{2})(2\sqrt{5})$

$=-12\sqrt{10}$

Example:

$2\sqrt{3}(\sqrt{6}-5\sqrt{6})$

$= 12\sqrt{3}-10\sqrt{18}$

$= 12\sqrt{3}-10(3\sqrt{2})$

$= 12\sqrt{3}-30\sqrt{2}$