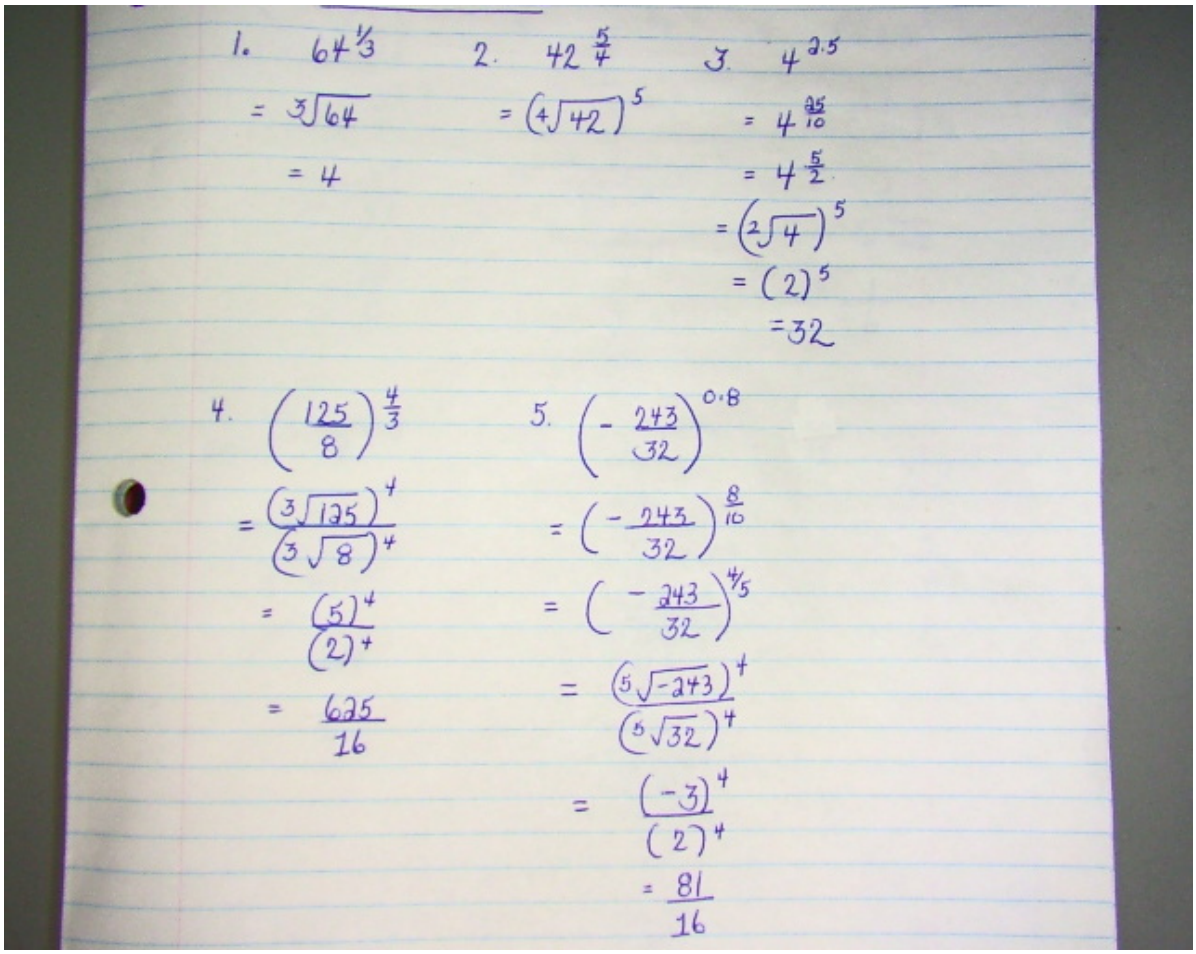


1. $64^{1/3}$

$= \sqrt[3]{64}$

$= 4$

2. $42^{\frac{5}{4}}$

$= \left(\sqrt[4]{42}\right)^5$

3. $4^{2.5}$

$= 4^{\frac{25}{10}}$

$= 4^{\frac{5}{2}}$

$= \left(\sqrt[2]{4}\right)^5$

$= (2)^5$

$= 32$

4. $\left(\frac{125}{8}\right)^{\frac{4}{3}}$

$= \frac{\left(\sqrt[3]{125}\right)^4}{\left(\sqrt[3]{8}\right)^4}$

$= \frac{(5)^4}{(2)^4}$

$= \frac{625}{16}$

5. $\left(-\frac{243}{32}\right)^{0.8}$

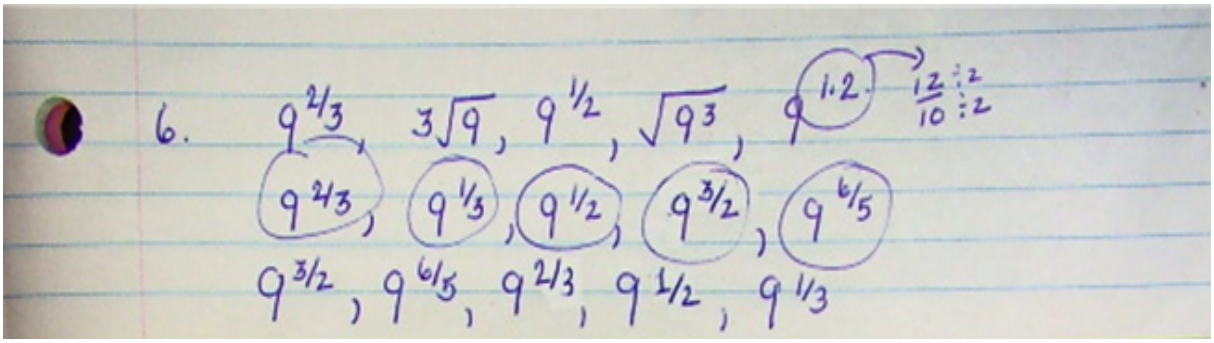
$= \left(-\frac{243}{32}\right)^{\frac{8}{10}}$

$= \left(-\frac{243}{32}\right)^{4/5}$

$= \frac{\left(\sqrt[5]{-243}\right)^4}{\left(\sqrt[5]{32}\right)^4}$

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

$= \frac{81}{16}$


6.
$9^{2/3}$, $\sqrt[3]{9}$, $9^{1/2}$, $\sqrt{9^3}$, $9^{1.2}$
12 : 2
10 : 2
$9^{2/3}$, $9^{1/3}$, $9^{1/2}$, $9^{3/2}$, $9^{6/5}$
$9^{3/2}$, $9^{6/5}$, $9^{2/3}$, $9^{1/2}$, $9^{1/3}$

7. $\left(\frac{2}{3}\right)^{-3}$

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

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

$= \frac{27}{8}$

8. $64^{-4/3}$

$= \frac{1}{64^{4/3}}$

$= \frac{1}{(\sqrt[3]{64})^4}$

$= \frac{1}{4^4}$

$= \frac{1}{256}$

9. $(-216)^{-1/3}$

$= \frac{1}{(-216)^{1/3}}$

$= \frac{1}{\sqrt[3]{-216}}$

$= \frac{1}{-6}$

10. $49^{-0.5}$

$= 49^{-1/2}$

$= \frac{1}{49^{1/2}}$

$= \frac{1}{\sqrt{49}}$

$= \frac{1}{7}$

11. $81^{-0.75}$

$= \frac{1}{81^{0.75}}$

$= \frac{1}{81^{75/100}}$

$= \frac{1}{81^{3/4}}$

$= \frac{1}{(\sqrt[4]{81})^3}$

$= \frac{1}{3^3}$

$= \frac{1}{27}$

12. $\frac{1}{125}$

$= \frac{1}{5^3}$

$= 5^{-3}$

13. $\dfrac{(3.5^{-6})(3.5^{5})}{3.5^{-1}}$

$= \dfrac{3.5^{-1}}{3.5^{-1}}$ ⟹ $-1 - -1$, $-1+1$, $=0$

$= 3.5^{0}$

$= 1$

14. (a) $\left(\frac{5}{2}a^{-4}b^{7}\right)^{-3}$

$= \frac{5^{-3}}{2^{-3}}a^{+12}b^{-21}$ ← make exponents positive !!

$= \frac{2^{3}\,a^{12}}{5^{3}\,b^{21}}$

(b) $m^{-2}n^{6} \cdot m^{3}n^{-8}$

$= m^{1}n^{-2}$

$= \frac{m}{n^{2}}$

(c) $\left(\frac{w^{-15}y^{12}}{-64x^3}\right)^{-\frac{1}{3}}$

$= \left(\frac{-64x^3}{w^{-15}y^{12}}\right)^{\frac{1}{3}}$

$= \frac{(-64)^{\frac{1}{3}}x^1}{w^{-5}y^4}$

$= \frac{(-64)^{1/3}w^5x^1}{y^4}$

$3 \times \frac{1}{3} = \frac{3}{3} = 1$

$-15 \times \frac{1}{3} = \frac{-15}{3} = -5$

$12 \times \frac{1}{3} = \frac{12}{3} = 4$

(d) $\dfrac{(m^3n^{-3})^{-1}}{(m^{-2}n)^4}$

$-3--8$
$-3+8$
$=+5$

$= \dfrac{m^{-3}n^3}{m^{-8}n^4}$

$= m^5n^{-1}$

$= \dfrac{m^5}{n^1}$

15. $\frac{0.64^{7/2}}{0.64^{5}}$ $=$

$\frac{7}{2} - \frac{5}{1} \times 2$

$\frac{7}{2} - \frac{10}{2}$

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

$= 0.64^{-\frac{3}{2}}$

$= \frac{1}{0.64^{3/2}}$

$= \frac{1}{(\sqrt{0.64})^{3}}$

$= \frac{1}{0.8^{3}}$

$= \frac{1}{0.512}$

$= 1.953125$

16. $(a^{-4}b^{-3})(a^{3}b^{-4})$ $a=-1,\ b=3.$

$= a^{-1}b^{-7}$

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

$= \frac{1}{(-1)(3)^{7}}$

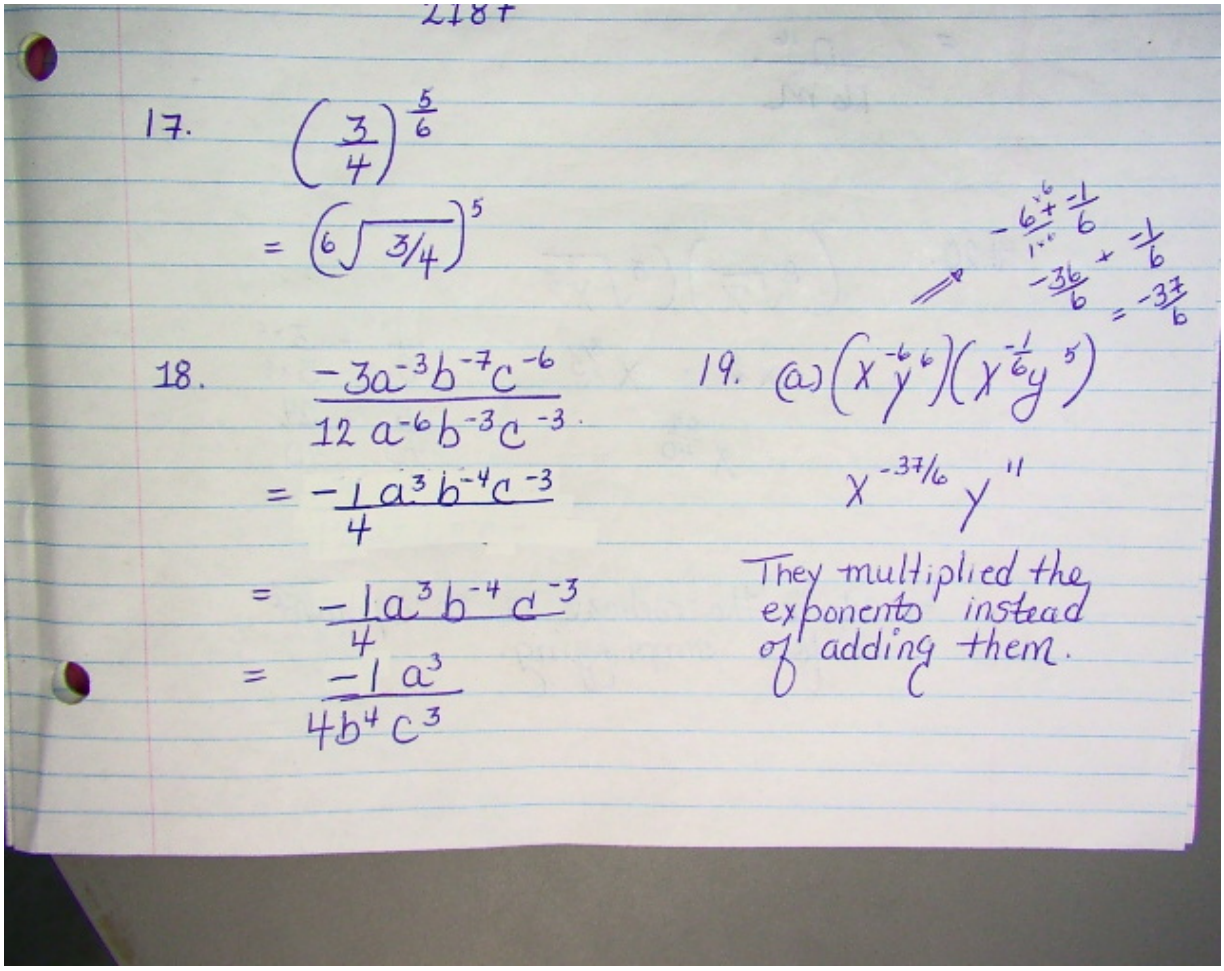
$= -\frac{1}{2187}$

17. $\left(\frac{3}{4}\right)^{\frac{5}{6}}$

$= \left(\sqrt[6]{3/4}\right)^{5}$

$-\frac{6}{1} \cdot \frac{-1}{6}$

$-\frac{36}{6} \cdot \frac{-1}{6}$


2187
17. $\left(\frac{3}{4}\right)^{\frac{5}{6}}$
$= \left(\sqrt[6]{3/4}\right)^5$
$-6 + \frac{-1}{6}$
$\frac{-36}{6} + \frac{-1}{6}$
$= \frac{-37}{6}$
18. $\frac{-3a^{-3}b^{-7}c^{-6}}{12a^{-6}b^{-3}c^{-3}}$
$= \frac{-1a^3b^{-4}c^{-3}}{4}$
$= \frac{-1a^3b^{-4}c^{-3}}{4}$
$= \frac{-1a^3}{4b^4c^3}$
19. (a) $(x^{-6}y^6)(x^{\frac{-1}{6}}y^5)$
$x^{-37/6}y^{11}$
They multiplied the exponents instead of adding them.

(b) $\left(\frac{2m^{\frac{1}{4}}}{n^4}\right)^{-4}$

$= \frac{2^{-4} m^{-\frac{4}{4}}}{n^{-16}}$

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

$= \frac{n^{16}}{2^4 m}$

$= \frac{n^{16}}{16m}$

They added the exponents instead of multiplying.

#20. $\left(\sqrt[8]{x}\right)\left(\sqrt[5]{x^3}\right)$

$x^{\frac{1}{8}} \cdot x^{3/5}$

$x^{\frac{29}{40}}$

$\frac{1\times5}{8\times5} + \frac{3\times8}{5\times8}$

$\frac{5}{40} + \frac{24}{40}$

$= \frac{29}{40}$

⇒ Write the radical as an exponent before simplifying.