6.2 Properties of Rational Exponents

Remember the properties of exponents:

1) $a^m \cdot a^n =$ a^{m+n}

ex: $5^{1/8} \cdot 5^{5/6}$

$5^{1/4 + 5/4}$

$5^{23/24}$

2) $(a^m)^n =$ $a^{m \cdot n}$

ex: $(5^{1/3})^3$

$5^{1/3 \cdot 3}$

$5^1 = 5$

3) $(ab)^m =$ $a^m b^m$

ex: $(25 \cdot 49)^{1/2}$

$25^{1/2} \cdot 49^{1/2}$

$5 \cdot 7 = 35$

4) $a^{-m} =$ $\frac{1}{a^m}$

ex: $36^{-1/2}$

$\frac{1}{36^{1/2}} = \frac{1}{6}$

5) $\frac{a^m}{a^n} =$ a^{m-n}

ex: $\frac{10^1}{10^{2/3}}$

$10^{1-2/3}$

$10^{1/3}$

6) $\left(\frac{a}{b}\right)^m =$ $\frac{a^m}{b^m}$

ex: $\left(\frac{49}{25}\right)^{1/2}$

$\frac{49^{1/2}}{25^{1/2}} = \frac{7}{5}$

ex: $4(9^{2/3}) + 8(9^{2/3})$

$4x + 8x$

$12x$

$12(9^{2/3})$

ex: $(32m^5n^{30})^{1/5}$

$32^{1/5} m^{5 \cdot 1/5} n^{30 \cdot 1/5}$

$2 m n^6$

ex: $\frac{56ab^{3/4}}{7a^{5/6}b^{-3}}$ ← b^3

$8 a^{1-5/6} b^{3+3/4}$

$8 a^{1/6} b^{15/4}$

ex: $\frac{x^{1/2}y^{3/2}}{x^2y^{1/2}}$

$x^{1/2-2} \quad y^{3/2-1/2}$

$x^{-3/2} \quad y^1$

$\frac{y}{x^{3/2}}$ ← yuck

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