

Quotients with Like Bases: $\frac{b^x}{b^y} = b^{x-y}$

1. $\left(\frac{x^2}{x^5}\right) = x^{-3}$ $\left(\frac{1}{x^3}\right)$	2. $\left(\frac{x^3}{x^1}\right) = x^2$	3. $\left(\frac{m^7}{m^8}\right) = m^{-1}$ $\left(\frac{1}{m}\right)$	4. $\frac{y^1}{y^2} = y^{-1}$ $\left(\frac{1}{y}\right)$
5. $\frac{5^4}{5^2} = 5^2$ (25)	6. $\frac{9^3}{9^5} = 9^{-2} = \frac{1}{9^2}$ $\left(\frac{1}{81}\right)$	7. $\frac{6^3}{6^{-1}} = 6^4$ $(1,296)$	8. $\frac{x^3}{x^{-2}}$ (x^5)
9. $\frac{y^{-2}}{y^{-5}}$ (y^3)	10. $\frac{11^{4/5}}{11^{2/5}} = 11^{2/5}$ $\sqrt[5]{11^2} = \left(\sqrt[5]{121}\right)$	11. $\frac{25^{3/2}}{25} = 25^{1/2} = \sqrt{25}$ (5)	12. $\frac{81^{3/4}}{81^{1/4}} = 81^{1/2} = \sqrt{81}$ (9)

Zero Exponent: $b^0 = 1$

1. x^0 (1)	2. 25^0 (1)	3. $(y)^0$ (1)	4. $(1)^0$ (1)
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Rewrite Radicals as Rational Exponents: $\sqrt[n]{b^x} = b^{x/n}$

1. $x^{2/3}$ $\sqrt[3]{x^2}$	2. $\sqrt{x^3} = x^{3/2}$ $\sqrt{x^3} = x\sqrt{x}$	3. $\sqrt[4]{y} = y^{1/4}$ $y^{1/4} = \sqrt[4]{y}$	4. $x^{1/2}$ \sqrt{x}
5. $\sqrt[5]{x^{15}}$ $x^{15/5} = x^3$	6. $\sqrt[3]{y^9}$ $y^{9/3} = y^3$	7. $\sqrt[5]{m^{20}}$ $m^{20/5} = m^4$	8. $\sqrt[3]{y^2}$ $y^{2/3} = y^{1/4} = \sqrt[4]{y}$
9. $b^{12/3}$ b^4	10. $y^{2/5}$ $\sqrt[5]{y^2}$	11. $w^{3/2}$ $\sqrt{w^3} = w\sqrt{w}$	12. $m^{1/5}$ $\sqrt[5]{m}$

Evaluate Without a Calculator: 1st take root of the denominator, 2nd raise to numerator

1. $27^{1/3} = \sqrt[3]{27}$ 3	2. $1000^{1/2} = (10^3)^{1/2}$ $= 10^{3/2} = \sqrt{10^3}$ $10\sqrt{10}$	3. $16^{1/4} = \sqrt[4]{16}$ 2	4. $1^{1/2} = \sqrt{1}$ 1
5. $81^{3/2} = (\sqrt{81})^3$ $= 9^3 = 729$	6. $81^{3/4} = (\sqrt[4]{81})^3$ $= 3^3 = 27$	7. $32^{3/5} = (\sqrt[5]{32})^3$ $= 2^3 = 8$	8. $25^{3/2} = (\sqrt{25})^3$ $= 5^3 = 125$
9. $49^{3/2} = (\sqrt{49})^3$ $= 7^3 = 343$	10. $8^{4/3} = (\sqrt[3]{8})^4$ $= 2^4 = 16$	11. $121^{3/2} = (\sqrt{121})^3$ $= 11^3 = 1331$	12. $625^{3/4} = (\sqrt[4]{625})^3$ $= 5^3 = 125$