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|  | ***Exponent Law***  | ***Example*** |
| #1 | ***Multiplication Law:*****am x an = am+n** | a3 x a4 = a3+4 = a7(x2)(x7) = x2+7 = x932 x 33 = 32+3  = 35 = 243 |
| #2 | ***Division Law:*****am/an = am-n****or****am÷an = am-n**(a≠0) | a9/a5 = a9-5 = a4d5/d3 = ~~d~~•~~d~~•~~d~~•d•d = d•d = d2 ~~d~~•~~d~~•~~d~~ 175÷73 = 75-3 = 72 = 49 |
| #3 | ***Power Rules*****(am)n = amn** | (a2)3 = a2x3 = a6(23)3 = 23x3 = 29 = 512  |
| #4 | **(ab)m = ambm** | (2•3)2  = 22 • 32 = 4 • 9 = 36 |
| #5 | **(a/b)m = am/bm** (b≠0) | (3/4)2 = 32/42 = 9/16 |
| #6 | ***Negative Exponents*****a-m = 1/am** (a≠0) | 52/54 = 52-4 = 5-2*or*52/54 = \_~~5~~•~~5~~\_\_ = \_1\_ = \_1\_ ~~5~~•~~5~~•5•5 5•5 52*Therefore...* 5-2 = \_1\_ 52 |
| #7 | **(a/b)-m = a-m/b-m** **= bm/am** (a≠0)  | *Think...* (a/b)-m = 1/(a/b)m (from #6) = 1/(am/bm) (from #5) = 1 ÷ (am/bm)**invert and multiply** = 1 x (bm/am)  = bm/am |

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|  | ***Exponent Law***  | ***Example*** |
| #8 | ***Exponent of Zero*****a0 = 1** | *We know...* 25 ÷ 25 = 1*but,* 25=52  so, 52 ÷ 52  = 1*which means,* 52-2 = 1 (from #2)*but,* 2-2=0 *so,* 50 = 1   |
| #9 | ***Product Rule for Square Roots:***$\sqrt{ab}$ **=** $\sqrt{a}$ **x** $\sqrt{b}$ | $ \sqrt{36}$ = $\sqrt{2}$ x $\sqrt{18}$  or $\sqrt{36}$ = $\sqrt{4}$ x $\sqrt{9}$ or $\sqrt{36}$ = $\sqrt{6}$ x $\sqrt{6}$ |
| #10 | ***Product Rule for Cube Roots:***$\sqrt[3]{ab}=$ $\sqrt[3]{a}$ **x** $\sqrt[3]{b}$ | $$ $$$ \sqrt[3]{40}=$ $\sqrt[3]{8}$ x $\sqrt[3]{5}$ = 2$\sqrt[3]{5}$ *because* $\sqrt[3]{8}$= 2 |
| #11 | ***Rational Exponents***$a^{\frac{1}{n}}$*=* $\sqrt[n]{a}$ |  $8^{\frac{1}{3}}$*=* $\sqrt[3]{8}$= 2 $125^{\frac{1}{3}}$*=* $\sqrt[3]{125}$= 5  |
| #12 | ***Rational Exponents***$a^{\frac{m}{n}}$*=* $\sqrt[n]{a^{m}}$*=* ($\sqrt[n]{a}$)m |  $27^{\frac{2}{3}}$ *=* $\sqrt[3]{27^{2}}$ *=* ($\sqrt[3]{27}$)2 = (3)2 = 9 |