7^2 Exponent
Base

Remember:
-Never multiply base by the exponent
-Must have same base to use laws.

Rule: | **Theory:**

$2^3 \times 2^2 = 2^{3+2} = \boxed{2^5} = \boxed{32}$ ✓ $\quad 2^3 \times 2^2 = (2 \times 2 \times 2) \times (2 \times 2) = 2^5 \qquad$ *Add exponents*

$\dfrac{3^5}{3^2} = 3^{5-2} = 3^3 = \boxed{27}$ ✓ $\quad \dfrac{3^5}{3^2} = \dfrac{3 \times 3 \times 3 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}} = 3^3 \qquad$ *Subtract exponents*

$(2^2)^3 = 2^{2 \times 3} = 2^6 = \boxed{64}$ ✓ $\quad (2^2)^3 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) = 2^6$

$(2^1 x^1)^3 = 2^3 x^3 = \boxed{8x^3}$ ✓ $\quad (2x)^3 = (2x) \times (2x) \times (2x) = 8x^3$

$\left(\dfrac{3}{5}\right)^2 = \dfrac{3^2}{5^2} = \boxed{\dfrac{9}{25}}$ ✓ $\quad \left(\dfrac{3}{5}\right)^2 = \dfrac{3}{5} \times \dfrac{3}{5} = \dfrac{3^2}{5^2} = \dfrac{9}{25}$

Multiply exponents
Distribute exponents

$a^b \times c^b = (a \times c)^b$

$\dfrac{a^b}{c^b} = \left(\dfrac{a}{c}\right)^b$

Step 1 ——— ←Over

$2^{-3} = \dfrac{1}{2^3} = \boxed{\dfrac{1}{8}}$ ✓ *Bring to the bottom*
Make exponent positive

$\dfrac{1}{3^{-2}} = \dfrac{3^2}{1} = \boxed{9}$ ✓ *Bring to the top*
Make exponent positive

$\left(\dfrac{a}{b}\right)^{-c} = \left(\dfrac{b}{a}\right)^c$

$\dfrac{4^{-2}}{2^{-3}} = \dfrac{2^3}{4^2} = \dfrac{8}{16} = \boxed{\dfrac{1}{2}}$

$\dfrac{3^{-2} + 1}{5} = \boxed{\dfrac{\frac{1}{3^2} + 1}{5}}$

$\dfrac{3^{-2} + 1}{5} \neq \dfrac{1}{3^2 5}$

$-2^2 = -2 \times 2 = \boxed{-4}$ ✓ $\boxed{-2^2 = (-2^2)}$ *WITHOUT brackets stay NEGATIVE* $\boxed{\text{Negative Numbers}}$

$(-2)^2 = (-2) \times (-2) = \boxed{4}$ ✓ *WITH brackets to EVEN exponents become POSITIVE*

$(-4)^3 = (-4) \times (-4) \times (-4) = \boxed{-64}$ ✓ *WITH brackets to ODD exponents stay NEGATIVE*

$5^0 = \boxed{1}$ ✓ *Anything (nonzero) to the 0 is 1.* $\qquad 1^{12} = \boxed{1}$ ✓ *1 to the anything is 1.*

$8^1 = \boxed{8}$ ✓ *Anything to the 1 is itself.* $\qquad 0^5 = \boxed{0}$ ✓ *0 to the (positive) anything* is 0.*

$8 = \boxed{2^3}$ $\qquad$ ## Change of Base

$25 = \boxed{5^2}$

$\boxed{\begin{array}{l} 3 \times 3 = 3^2 \\ 3 \times 3^2 = 3^3 \end{array}}$ ✓

$3^3 = 27$ ## Theory

$3^2 = 9 \quad \Big\} \div 3$

$3^1 = 3 \quad \Big\} \div 3$

$3^0 = 1 \quad \Big\} \div 3$

$3^{-1} = \dfrac{1}{3^1} = \dfrac{1}{3} \quad \Big\} \div 3$

$3^{-2} = \dfrac{1}{3^2} = \dfrac{1}{9} \quad \Big\} \div 3$

$\dfrac{3^3}{3^2} = \dfrac{3 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}} = 3$ ✓

$\dfrac{3^2}{3} = \dfrac{3 \times \cancel{3}}{\cancel{3}} = 3$

$\dfrac{3^3}{3} = \dfrac{3 \times 3 \times \cancel{3}}{\cancel{3}} = 3^2$ ✓

$\dfrac{3}{3} = 1$

$\dfrac{3}{3^2} = \dfrac{\cancel{3}}{3 \times \cancel{3}} = \dfrac{1}{3}$

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

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

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

$\dfrac{3}{3^2} = \dfrac{1}{3}$

$\dfrac{3}{3^3} = \dfrac{1}{3^2}$