

① Regular Exponent Rules

② Rational Exponents

③ More complex Rational Exponents

④ Simplify Radicals  $\sqrt[3]{x^9 y^2}$

⑤ Solving Exponential Equations

$$\frac{x^5 y^2 z^4}{x^6 z^{-3} y^2}^2$$

$$\frac{z^7}{x}^2 =$$

$$\frac{z^{14}}{x^2}$$

$$\left( \frac{3x^5}{6x^2} \right)^{-2}$$

$$\left( \frac{6x^2}{3x^5} \right)^2 \rightarrow \left( \frac{2}{x^3} \right)^2 = \frac{4}{x^6}$$

$$\left(8n^3\right)^{-\frac{1}{3}}$$

$$\frac{1}{\left(8n^3\right)^{\frac{1}{3}}}$$

=

$$\frac{1}{2n}$$

$$\sqrt[7]{x^9 y^7 z^{21}}$$

$$\sqrt[7]{\cancel{x^7} \cdot x^2 \cdot \cancel{y^7} \cdot \cancel{z^{21}}}$$

$$x y z^3 \sqrt[7]{x^2}$$

$$4^{3x} = 4^{2x+2}$$

$$3x = 2x + 2 \quad \text{since same base}$$

$-2x$                        $-2x$

$$x = 2$$

$$5^{6x-4} = 5^{2x+4}$$

$$6x - 4 = 2x + 4$$

$$4x - 4 = 4$$

$$4x = 8$$

$$x = 2$$

$$3^{2x} = 9^1$$



$$3^{2x} = 3^2$$

create a same  
base!

$$2x = 2$$

$$x = 1$$



$$2^{x+1} = 4^x \rightarrow (2^2)^x$$

$$2^{x+1} = 2^{2x}$$

$$x+1 = 2x$$

$$1 = x$$

$$5^{3x+2} = 25^{x-1}$$

$$5^{3x+2} = 5^2 \cdot 5^{x-1}$$

$$5^{3x+2} = 5^{2x-2}$$

$$3x+2 = 2x-2$$

$$x = -4$$

$$4^x = 16^{2-x}$$

$$4^x = (4^2)^{2-x}$$

$$4^x = 4^{4-2x}$$

$$x = 4 - 2x$$

$$3x = 4$$

$$x = \frac{4}{3}$$

$$4^{3x+2} = 64$$

$$4^{3x+2} = 4^3$$

$$3x+2 = 3$$

$$3x = 1$$

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

$$(64^{\frac{1}{3}})^{3x+2} = 64^1$$

$$64^{x+\frac{2}{3}} = 64^1$$

$$x + \frac{2}{3} = 1$$

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

$$9^{2x} = 27^{x+4}$$

$$(3^2)^{2x} = (3^3)^{x+4}$$

$$3^{4x} = 3^{3x+12}$$

$$4x = 3x + 12$$

$$x = 12$$

$$10^{3x+2} = \frac{1}{10}$$

$$10^{3x+2} = 10^{-1}$$

$$3x+2 = -1$$

$$3x = -3$$

$$x = -1$$

$$2^{4x} \cdot 16^{x+3} = 4^{x-1}$$

$$2^{4x} \cdot (2^4)^{x+3} = (2^2)^{x-1}$$

$$2^{4x} \cdot 2^{4x+12} = 2^{2x-2}$$

$$2^{8x+12} = 2^{2x-2}$$

$8x+12=2x-2$   
 $6x = -14$   
 $x = \frac{-14}{6}$   
 $x = \frac{-7}{3}$