

Name: _____

Date: _____

Learning Goal 5.1

Express an entire radical as a simplified mixed radical and vice versa. Identify and order irrational numbers.

$a = 8$	$b = 4$	$c = 3$
Base	Bigger Exponent	Smaller Exponent

Multiplying powers of the same base.

ex. $8^4 \times 8^3 = (8 \times 8 \times 8 \times 8) \times (8 \times 8 \times 8)$
 $= 8^{4+3} = 8^7$

$$x^a x^b = x^{a+b}$$

$$x^a y^b = (x \times y)^{a+b}$$

$$2^4 \times 3^2 = (2 \times 3)^{4+2}$$

$$= 16 \times 9 = 6^8 = 6^8$$

$$= 144$$

Dividing powers of the same base.

ex. $\frac{8^4}{8^3} = \frac{8 \times 8 \times 8 \times 8}{8 \times 8 \times 8} = 8$
 $= 8^{4-3}$
 $= 8^1$
 $= 8$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$\frac{8^4}{4^2} = \frac{(2^3)^4}{(2^2)^2}$$

When the power of a base is another power.

$$\begin{aligned} (8^4)^3 &= 8^4 \times 8^4 \times 8^4 \\ &= (8 \times 8 \times 8 \times 8) \times (8 \times 8 \times 8 \times 8) \times (8 \times 8 \times 8 \times 8) \\ &= 8^{12} \end{aligned}$$

$$\begin{aligned} &= 8^{4 \times 3} \\ &= 8^{12} \end{aligned}$$

$$(x^a)^b = x^{a \times b}$$

Dividing two powers of the same base and exponent.

$$\frac{8^3}{8^3} = \frac{\overset{|}{8} \times \overset{|}{8} \times \overset{|}{8}}{\underset{|}{8} \times \underset{|}{8} \times \underset{|}{8}} = 1$$

$$\begin{aligned} &= 8^{3-3} \\ &= 8^0 \\ &= 1 \end{aligned}$$

$$x^0 = 1$$