

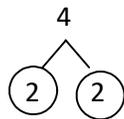
M9 - 3.3 - Change of Base Notes

Change to Exponential Form (Change of Base)

$$4 = 2^2$$

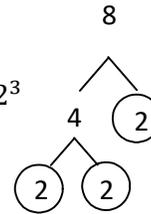
↑ Base ↘ Exponent

$$4 = 2 \times 2$$



$$8 = 2^3$$

$$8 = 2 \times 2 \times 2 = 2^3$$



$16 = 2^4$ $16 = 2 \times 2 \times 2 \times 2$

OR

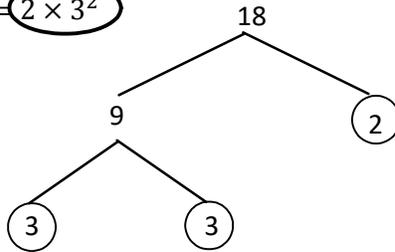
$16 = 4^2$ $16 = 4 \times 4$

Check on Calculator!

Finger Counting

Change to Exponential Form with Lowest Bases

$$18 = 2 \times 3 \times 3 = 2 \times 3^2$$

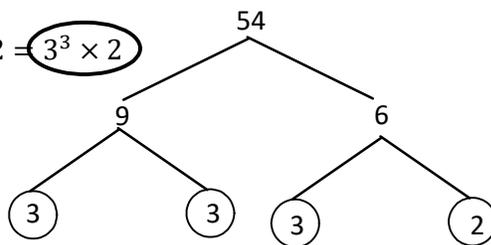


Perfect Squares
1,4,9,16,25,36,49,64,81...

$$\frac{18}{4} = 4.5 \quad \frac{18}{9} = 2$$

OR Divide by Perfect Squares/Cubes

$$54 = 3 \times 3 \times 3 \times 2 = 3^3 \times 2$$



Perfect Cubes
1,8,27,64,125,216,343...

$$\frac{54}{4} = 13.5 \quad \frac{54}{27} = 2$$

Change to Exponential Form with Lowest Bases

$$4^3$$

$$(4)^3$$

$$(2^2)^3$$

$$2^6$$

$$4^3 = 64$$

$$2^6 = 64 \quad \checkmark$$

$$4 = 2^2$$

Brackets Around Base

Change Base

Multiply Exponents

$$6^3$$

$$(3 \times 2)^3$$

$$(3^1 \times 2^1)^3$$

$$3^3 \times 2^3$$

$$6 = 2 \times 3$$

$$3 = 3^1, 2 = 2^1$$

Write as Product (×)

Write Exponents (1's)

Multiply Exponents

$$4^3 \times 8^2$$

$$(2^2)^3 \times (2^3)^2$$

$$2^6 \times 2^6$$

$$2^{12}$$

Change of Base

Multiply Exponents

Add Exponents

Change to Certain Base
Multiply Exponents
Go Both Ways!

$$64^3 = 8^6 = 4^9 = 2^{18} = 262144 = 64^3$$

M9 - 3.3 - Negative Coefficient Laws Notes

<p>Negative Coefficients</p> $-2^2 = -2^2 = -2 \times 2 = -4$ <p><i>Negative numbers WITHOUT brackets stay NEGATIVE</i></p>	<p>Adding a Negative In Front</p> $-(-2^2) = 4$	<p>Unnecessary brackets</p> $-(2)^2 = -4$ $(-2^2) = -4$
$(-2)^3 = (-2) \times (-2) \times (-2) = -8$ <p><i>Negative numbers with brackets to ODD exponents stay NEGATIVE</i></p>	$-(-2)^3 = 8$	
$(-2)^4 = (-2) \times (-2) \times (-2) \times (-2) = 16$ <p><i>Negative numbers with brackets to EVEN exponents become POSITIVE</i></p>	$-(-2)^4 = -16$	