# Laws of Exponents

Lesson 1

#### Law 1: Product Rule



Click on the link below for a video on the product rule.

https://youtu.be/-TpiL4J yUA

#### Some Practice Problems

1. 
$$z^3z^9$$

4. 
$$(4x^2)(5x)$$

2. 
$$7b^3b^4$$

5. 
$$2x^2(3y)(4xy)$$

3. 
$$(6x^5)(3x)$$

6. 
$$7xyz(2x^2y)(3y^9z^6)$$

1.  $z^{12}$ 

 $4.20x^3$ 

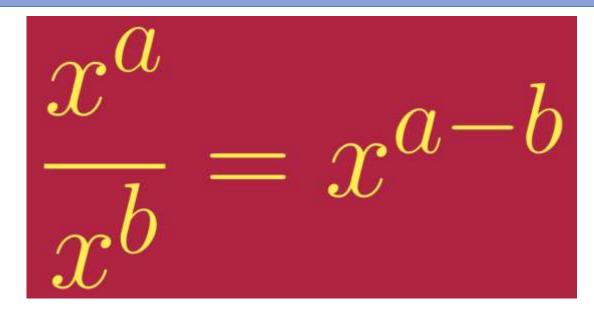
 $2.7b^{7}$ 

5.  $24x^3y^2$ 

 $3.18x^6$ 

6.  $42x^3y^{11}z^7$ 

### Law 2: Quotient Rule



Click on the link below for a video on the quotient rule.

https://youtu.be/tvj42WdKlH4

#### Some Practice Problems

1. 
$$\frac{x^8}{x^5}$$

$$4. \frac{4x^3y^{16}}{5x^2y^5}$$

$$2. \frac{21y^4}{7y^4}$$

$$5. \frac{24x^2y^3(2x^8)}{6xy^2}$$

3. 
$$\frac{a^6b^9}{a^2b(ab^3)}$$

$$6. \frac{9a^7b(3a^6b^2)}{18a^5b^3}$$

1.  $x^3$ 

$$4. \frac{4xy^{11}}{5}$$

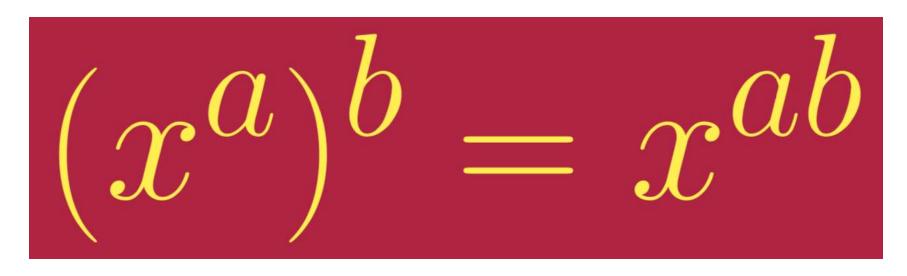
 $2.3y^3$ 

$$5.8x^9y$$

3.  $a^3b^5$ 

6. 
$$\frac{3a^8}{2}$$

#### Law 3: Power Rule



Click on the link below for a video on the power rule.

https://youtu.be/Of8ezQj1hRk

#### Some Practice Problems

1. 
$$(x^3)^5$$

4. 
$$(3x^3y^2)^3(2x^4y^2)^2$$

$$2.(5z^7)^3$$

$$5. \frac{7(x^4)^3}{(3x^2)^2}$$

$$3.3(2a^3)^4$$

6. 
$$5(2x^4y^7)^3(x^3y^5)^2$$

 $1. x^{15}$ 

4.  $108x^{17}y^{10}$ 

 $2.125z^{21}$ 

 $5. \frac{7x^8}{9}$ 

 $3.48a^{12}$ 

6.  $40x^{18}y^{31}$ 

# Summary of Rules Learned

• Product Rule:

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

• Quotient Rule:

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

• Power Rule:

$$(x^a)^b = x^{ab}$$

## A Worked Example

$$\frac{25(a^3)^3b^2}{5a^2b(b^2)}$$

Click on the link below for a video on this worked example.

https://youtu.be/X6zD3SoN3iY

#### Last Batch of Practice Problems

1. 
$$(x^2)^3(x^3)^4$$

$$4. \frac{5x^2y(3xy)^2}{20xy}$$

$$2. \frac{35x^7y^8}{7(xy^2)^3}$$

$$5.5(3a^2b)^3(2ab^3)$$

$$3. \frac{(3xyz)^4x^5y^2}{9x^2y^2z}$$

6. 
$$\frac{(2x^3y^4)^5(3x^2y^7)^2}{6x^5y^{15}}$$

 $1. x^{18}$ 

$$4. \frac{9x^3y^2}{4}$$

 $2.5x^4y^2$ 

5. 
$$270a^7b^6$$

3.  $9x^7y^4z^3$ 

6. 
$$48x^{14}y^{19}$$