

Unit 1

L6 Laws of Exponents

Question	Expanded Form	Exponent	Law
$5^2 \times 5^4$			$a^m \times a^n =$
$2^5 \div 2^2$			$a^m \div a^n =$ If $m > n$
$2^2 \div 2^5$			$a^m \div a^n =$ If $m < n$
$(4^3)^2$			$(a^m)^n =$
$(5a)^4$			$(ab)^n =$
$\left(\frac{3}{4}\right)^2$			$\left(\frac{a}{b}\right)^n =$

Why is $a^0 = 1$

$$\begin{aligned} 5^3 \div 5^3 &= \frac{5 \times 5 \times 5}{5 \times 5 \times 5} \\ &= \frac{125}{125} \\ &= 1 \end{aligned}$$

$$\begin{aligned} 5^3 \div 5^3 &= 5^{3-3} \\ &= 5^0 \end{aligned}$$

Therefore $5^0 = 1$

Ex 1: Simplify these exponents (DO NOT EVALUATE)

$9^7 \times 9^6 =$

$3^7 \times 3 =$

$4^7 \times 4^{-3} =$

$7^0 \times 7^{12} =$

$2^{22} \times 2^{-20} =$

$(-6)^7 \times (-6)^6 =$

$3^7 \div 3 =$

$9^7 \div 9^6 =$

$4^7 \div 4^{-3} =$

$\frac{7^{12}}{7^9} =$

$2^{22} \div 2^{-20} =$

$\frac{(-6)^5}{(-6)^7} =$

Ex 2: Simplify these exponents

$\frac{3a^2}{9a^4}$

$\frac{15a^5}{25a^2}$

$\frac{3a^4}{6b^2} \times \frac{2a^2}{b^4} \times \frac{b^9}{a^5}$

Ex 3: Simplify these exponents

Ex 4: Simplify these exponents

$(2^7)^2 =$

$(3^3)^2 =$

$(a^4)^3 =$

$(q^n)^m =$

$(5^5)^5 =$

$((-3)^2)^4 =$

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

$\frac{(2^3)(a^2)^3(b^3)^3}{4a^6b^8}$

Ex 5: Simplify

$(3a)^6 =$

$(6b)^3 =$

$(2a^3)^2 =$

$(a \times b)^n =$

$\left(\frac{5}{3}\right)^4 =$

$\left(\frac{7}{x}\right)^3 =$

$\left(\frac{b}{8}\right)^2 =$

$\left(\frac{a}{b}\right)^n =$

Ex 6: Express each power as a new power with the given base

$$16^2 = \underline{\hspace{2cm}} = 2^{\underline{\hspace{1cm}}}$$

$$16^2 = \underline{\hspace{2cm}} = 4^{\underline{\hspace{1cm}}}$$

$$25^3 = \underline{\hspace{2cm}} = 5^{\underline{\hspace{1cm}}}$$

$$27^3 = \underline{\hspace{2cm}} = 3^{\underline{\hspace{1cm}}}$$

Ex : Simplify $4^4 \div 2^2 =$

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Ex 7: Fill in with $=$ or $\neq$

$$1) 5^2 + 5^3 \quad 5^5$$

$$2) 2^4 \times 2^3 \quad 2^{12}$$

$$3) 4^2 \times 5^3 \quad 20^5$$

$$4) 5^2 + 5^2 \quad 10^4$$

$$5) 5^6 - 5^2 \quad 5^4$$

$$6) 6^4 / 2^2 \quad 3^2$$

$$7) 5^6 / 5^2 \quad 5^3$$

$$8) x \quad x^0$$

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Ex 8: Simplify

$$a) (5x^3)^2 = \underline{\hspace{2cm}}$$

$$b) (3a^4b^2)^2 (-a^5b)^2 (2a^3b^2)^2$$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

$$c) \left(\frac{3x^2}{y^3}\right)^3 \left(\frac{y^4}{9x^4}\right)^2 = \underline{\hspace{2cm}}$$

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Ex 9: Extra Practice - Simplify

$$a) \frac{(3x^3y^5)^2}{3x^2y^4}$$

$= \underline{\hspace{2cm}}$

$$b) \frac{(4a^2b^3)^3}{(2a^3b^4)^2}$$

$= \underline{\hspace{2cm}}$

$$c) \frac{(5a^6b^4)^3}{(5a^2)^3}$$

$= \underline{\hspace{2cm}}$

$$d) \frac{(6x^2y^3)^3}{(2x^4y^2)^2}$$

$= \underline{\hspace{2cm}}$

Evaluate at
 $a = -2$ and
 $b = -1$

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Practice:

Day 1: 1.3 # 1-5

Day 2: 1.4 # 1-4

Day 3: 1.5 # 1-3



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