Ex. 1 Write as a single power, without changing the base.

a) $(2^2)^4$

b) $(3^3)^2$

Power of a Power
A base to the power of a power is the base to the product of the exponents

$(m^a)^b = m^{a \cdot b}$

Ex. 2 Simplify

a) $(xy^2)^3$

Power of a Product
The exponent is applied to each part of the base

$(ab)^n = a^n b^n$

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

Ex. 3 Simplify then evaluate if possible

a) $\left(\dfrac{2}{3}\right)^3$

Power of a Quotient
The exponent is applied to each part of the base

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

b) $\left(\dfrac{5}{x}\right)^2$

Ex 4: Simplify (using the laws of exponents)
   Be careful of the coefficients

Raise the coefficient by the exponent

Multiply the exponents

$$(4m^3)^2$$

SUMMARY

1. Simplify (using the laws of exponents)

Multiply powers	Divide powers	Power of a power

$$m^3 \cdot m^4 =$$ $$m^6 \div m =$$ $$\left(m^6\right)^3 =$$

⇨ add exponents   ⇨ subtract exponents   ⇨ multiply exponents

2. Simplify (using the laws of exponents)

Mutiplication	Division	Power of a Power

$$3m^2 \cdot 4m^5 =$$ $$50m^8 \div 2m^3 =$$ $$\left(4m^3\right)^2 =$$

⇨ Multiply the coefficients   ⇨ Divide the coefficients   ⇨ Exponent affects **each part** of the base

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Ex. 1 Simplify

a) $\left(a^2 b^3\right)^4$

b) $\left(-4m^2\right)^3$

c) $\left(-x^3\right)^2 \left(2x^4\right)^3$

d) $\dfrac{\left(5c^3 d\right)\left(4c^2 d^2\right)}{\left(2c^2 d\right)^2}$

e) $\dfrac{\left(-3m^2 n^6\right)\left(2m^4 n^8\right)^3}{\left(4mn^2\right)^3}$

f) $\dfrac{\left(2m^3\right)^4}{24m^5}$

1.7B
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Handout 1.7 B