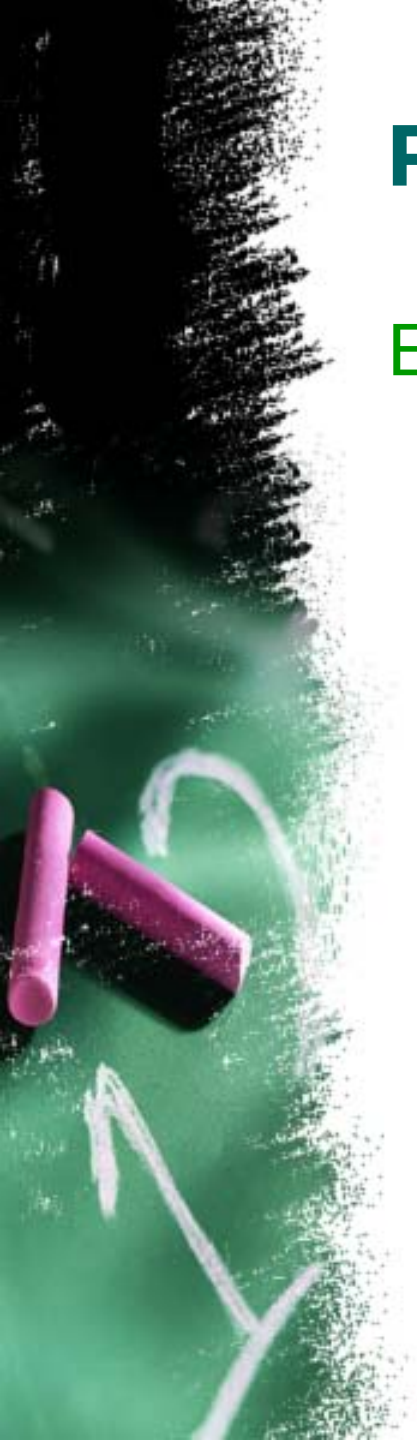
# 6.1 Powers and Exponents

***Objective: Evaluate powers and exponents***



# Powers and Exponents

Exponent – a number that indicates how many times a certain number (the base) is multiplied by itself. It is also called a power

$3^{2}$ ← Exponent (how many)

← Base (what you're multiplying)

$10^{3}$ means 10 x 10 x 10 where the base 10 is repeated 3 times because the exponent is 3

# Examples

1) $2^4$

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

$= 16$

2) $2.3^2$

$2^2 = 2.3 \times 2.3$

$= 5.29$

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

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

$\frac{16}{81}$

4) $5^2$

$5^2 = 5 \times 5$

$= 25$

5) $1.8^2$

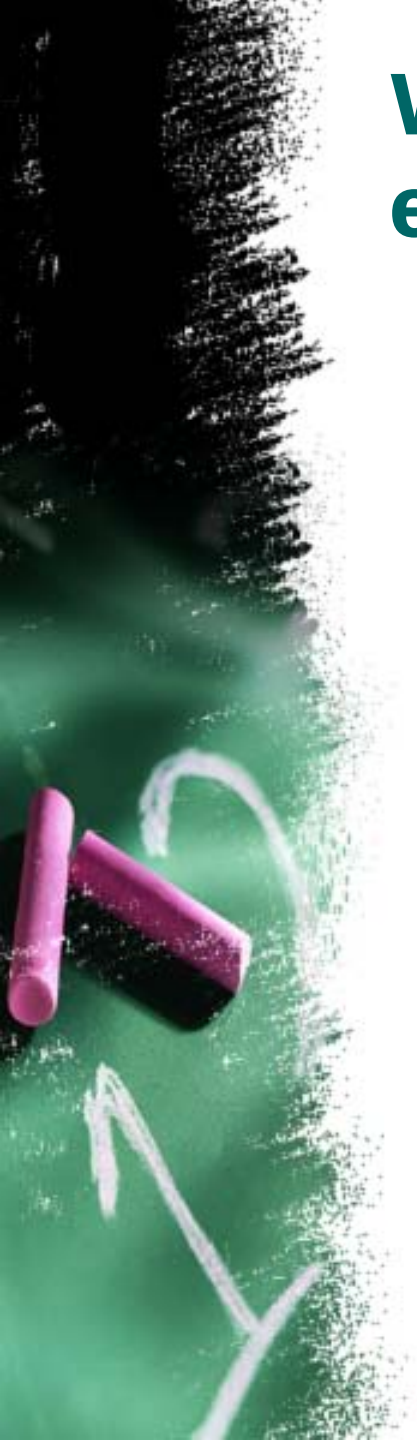
$1.8^2 = 1.8 \times 1.8$

$= 3.24$

6) $(\frac{3}{4})^3$

$(\frac{3}{4})^3 = \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$

$\frac{27}{61}$



# Write each product using an exponent.

7) 8 x 8 x 8

$8^3$

8) 1 x 1 x 1 x 1

$1^4$

9) 75 x 75 x 75 x 75 x 75

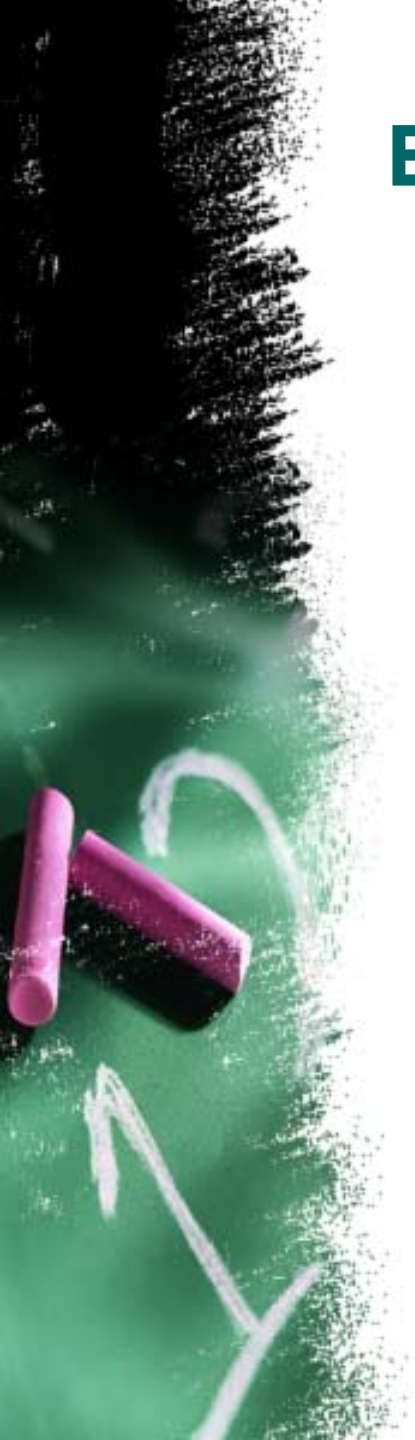
$75^5$

10) ½ x ½ x ½

$(½)^3$

11) 6

$6^1$



# Examples

1. Evaluate the expression

   $x^4$ when x = 2

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

   $= 16$

2. Evaluate the expression

   $100 - 4^x$ when x = 3

   $100 - 4^3$

   $100 - 4 \times 4 \times 4$

   $100 - 16 \times 4$

   $100 - 64 = 36$

# Power of 0

1) $2^0$

1

Any number raised to power of 0 is **ALWAYS 1**

2) $0.2^0$

1

3) $(\frac{1}{4})^0$

1