

# Exponents and Polynomial Equations

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## 1 Solving Exponents

Express each of the exponents below as a literal:

1.  $2^3$

2.  $10^7$

3.  $-6^2$

4.  $8^{-2}$

5.  $480349^0$

6.  $(-4)^{-3}$

7.  $2^3 \times 2^{-2}$

8.  $\sqrt{64}$

9.  $(-8)^{\frac{1}{3}}$

## 2 Scientific Notation

Express each number below in scientific notation:

1. 187

2. 5010000

3. 0.065

4.  $\frac{1}{2}$

5. 6

### 3 Simplifying Exponents

Simplify each problem below as a single power (remove all brackets and express powers with negative exponents as fractions):

1.  $2x^2 + 4x^2$

2.  $y^8 \times y^{-9}$

3.  $(a^2)^3$

4.  $\frac{2x^2}{x^5}$

5.  $(3n)^{-3} \times (3n)^5$

6.  $z^{-1} \times z^{\frac{1}{2}}$

7.  $\frac{p^3}{p^{\frac{4}{5}}}$

### 4 Word and Thinking Problems

1. Taking the cube of a number, then subtracting 8 to the result, gives an answer of 56. What was the original number?
2. A rectangle with a length of 9 and a width of 16 has the same area as a square with certain dimensions. What is the length of the square?
3. (a) Find one solution for  $x$  to the equation  $x^2 + 5x + 8 = 2$ .  
  
(b) Find another solution to the equation in Part (a).  
  
(c) Find all possible solutions for  $x$  to the equation  $x^3 + 2x^2 - x - 2 = 0$ .  
  
(d) Given an equation in the form of  $a_1x^n + a_2x^{n-1} + \dots + a_{n-1}x + a_n = 0$  (where  $n$  is an integer and the coefficients  $a$  can be any real number), how many maximum unique solutions can there be to the equation if  $n = 5$ ?