

Name: \_\_\_\_\_

# Notesheet. Monomials and Power Laws

Math 1210

**Definition 1.** A monomial is

**Challenge 2.** Find  $2^3 \cdot 2^2$ . Write your final result as a power of 2. If  $m, n \geq 0$ , what is  $x^m \cdot x^n$ ?  
What is  $x \cdot x^m \cdot y^n$ ?

**Definition 3.** Given our example above, what must  $x^m \cdot x^0$  be? We define  $x^0$  to be

**Challenge 4.** Now, given what we have learned, what should  $x^m \cdot x^{-m}$  be equal to?

**Definition 5.** If  $m$  is a natural number and  $x$  is a non-negative number, we define  $x^{\frac{1}{m}}$  to be

**Challenge 6.** What is  $15^2$ ? What is  $81^{\frac{1}{2}}$ ? What is  $27^{\frac{1}{3}}$ ? What is  $(7^2)^{\frac{1}{2}}$ ? Based on your answer, given a positive number  $x$  and positive integer  $m$ , what is  $(x^m)^{\frac{1}{m}}$ ?

**Definition 7.** Given the above challenge, given a positive number  $x$  and rational numbers  $a, b$ , what must  $(x^a)^b$  be equal to?

**Challenge 8.** What is  $9^{\frac{3}{2}}$ ? What is  $(x^4y^6)^5 \cdot (x^{-5}y^{-2})^3$ ?

**Definition 9.** The distributive law is

**Challenge 10.** Use the distributive law to expand  $(x^2 + x^{-2})(x^2 + x^4)$ .