

# 11.2

Date:

Objective:

## A. Basic Properties of Exponents

1.	$b^0 = 1$	Zero Property	1) $11^0 = \underline{\quad}$
2.	$b^{-n} = \frac{1}{b^n}$ or $\frac{1}{b^{-n}} = b^n$	Negative Exponent Property	1) $5^{-3} = \underline{\quad}$ 2) $\frac{1}{2^{-3}} = \underline{\quad} = \underline{\quad}$ 3) $\left(\frac{1}{6}\right)^{-2}$ 4) $9 = 3^{\square} = \left(\frac{\square}{\square}\right)^{\square}$
3.	$(b^m)(b^n) = b^{m+n}$	Product Rule	1) $x^6x^8 = \underline{\quad}$
4.	$\frac{b^m}{b^n} = b^{m-n}$	Quotient Rule	1) $\frac{x^4}{x^2} = \underline{\quad}$ 2) $\frac{x^6}{x^7} = \underline{\quad}$
5.	$(b^m)^n = b^{m \cdot n}$	Power to a Power Rule	1) $(4x)^2 = \underline{\quad}$ 2) $4x^2 = \underline{\quad}$
6.	$a^{m/n} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$	Positive Rational Exponents	1) $16^{\frac{3}{2}} = \underline{\quad}$ 2) $\frac{1}{8^{\frac{4}{3}}} = \underline{\quad}$

## B. Write numbers as exponents.

Example: $9 = 3^2$ Hint: They all have more than one answer.	1. $4 =$	2. $16 =$	3. $32 =$	4. $27 =$	5. $243 =$
	6. $\frac{1}{25} =$	7. $\frac{1}{2} =$	8. $\frac{1}{6^x} =$	9. $81 =$	10. $\frac{1}{7} =$

## C. Same base

- In the expression,  $5^2$ : **5** is the \_\_\_\_\_ and **2** is the \_\_\_\_\_.
- If the *bases* of both sides of an exponential equation are the **same**:

$$B^m = B^n$$

then

the exponents are equal:  $m = n$

#### D. Steps to Solve by changing the base

$$5^{3x} = \frac{1}{125}$$

Given

$$5^{3x} = \frac{1}{5^3}$$

Express the denominator of the right side with a base of 5. We have  $125 = 5^3$ .

$$5^{3x} = 5^{-3}$$

Apply the Negative Exponent Property.

$$3x = -3$$

At this point, the bases are the same.  
Set the exponents equal to each other.

$$\frac{3x}{3} = \frac{-3}{3}$$

Solve for x.

$$x = -1$$

To solve x, divide both sides by 3. That's it.

#### E. Examples

1. $4^5 = 4^x$	2. $7^{-3x-5} = 7^{2x}$	3. $3^{-3n} = 243$
4. $5^{-3x-3} = \frac{1}{625}$	5. $16^{m+1} = 64$	6. $81^{m+2} = \frac{1}{9}$
7. $\left(\frac{1}{9}\right)^{-3r-2} = 27^r$	8. $\frac{4^{-x}}{4^{5x-2}} = 32$	9. $\frac{16}{2^{2n+1}} = 8$