

# GUIDED NOTES – 1.2 EXPONENTS AND SCIENTIFIC NOTATION

## LEARNING OBJECTIVES

In this section, you will:

- Use the product rule of exponents.
- Use the quotient rule of exponents.
- Use the power rule of exponents.
- Use the zero exponent rule of exponents.
- Use the negative rule of exponents.
- Find the power of a product and a quotient.
- Simplify exponential expressions.

## USING THE PRODUCT RULE OF EXPONENTS

Study the box in your textbook section titled “the product rule of exponents.”

- For any real number  $a$  and natural numbers  $m$  and  $n$ , the product rule of exponents states that

$$a^m \cdot a^n = \underline{\hspace{2cm}}$$

**Try It:** Read Example 1 in the text, then answer the following.

Write each of the following products with a single base. Do not simplify further.

a.  $k^6 \cdot k^9$

b.  $t^3 \cdot t^6 \cdot t^5$

## USING THE QUOTIENT RULE OF EXPONENTS

Study the box in your textbook section titled “the quotient rule of exponents.”

- For any real number  $a$  and natural numbers  $m$  and  $n$ , such that  $m > n$ , the quotient rule of exponents states that

$$\frac{a^m}{a^n} = \underline{\hspace{2cm}}$$

**Try It:** Read Example 2 in the text, then answer the following.

Write each of the following expressions with a single base.

a.  $\frac{s^{75}}{s^{68}}$

b.  $\frac{x^5 \cdot x^4}{x^3}$

### USING THE POWER RULE OF EXPONENTS

Study the box in your textbook section titled “the power rule of exponents.”

- For any real number  $a$  and positive integers  $m$  and  $n$ , the power rule of exponents states that

$$(a^m)^n = \underline{\hspace{2cm}}$$

**Try It:** Read Example 3 in the text, then answer the following.

Write each of the following products with a single base.

a.  $(t^5)^7$

b.  $((y^3)^2)^5$

### USING THE ZERO EXPONENT RULE OF EXPONENTS

Study the box in your textbook section titled “the zero exponent rule of exponents.”

- For any nonzero real number  $a$ , the zero exponent rule of exponents states that

$$a^0 = \underline{\hspace{2cm}}$$

### USING THE NEGATIVE RULE OF EXPONENTS

Study the box in your textbook section titled “the negative rule of exponents.”

- For any nonzero real number  $a$  and natural number  $n$ , the negative rule of exponents states that

$$a^{-n} = \underline{\hspace{2cm}}$$

**Try It:** Read Examples 5 and 6 in the text, then answer the following.

Write each of the following quotients with a single base. Do not simplify further. Write answers with positive exponents.

a.  $\frac{f^{47}}{f^{49} \cdot f}$

b.  $t^{-11} \cdot t^6$

**Homework:** You should now be ready to attempt problems 1-3 in “Homework – Algebra 1.2” on WeBWork.

## FINDING THE POWER OF A PRODUCT

Study the box in your textbook section titled “the power of a product rule of exponents.”

- For any nonzero real numbers  $a$  and  $b$  and natural number  $n$ , the power of a product rule of exponents states that

$$(ab)^n = \underline{\hspace{2cm}}$$

**Try It:** Read Example 7 in the text, then answer the following.

Simplify each of the following products as much as possible using the power of a product rule. Write answers with positive exponents.

a.  $(g^2h^3)^5$

b.  $(-3y^5)^3$

c.  $(r^3s^{-2})^4$

**Homework:** You should now be ready to attempt problems 4-9 in “Homework – Algebra 1.2” on WeBWorK.

## REVIEW QUESTIONS

Answer the following questions in your own words.

1. Is  $2^3$  the same as  $3^2$ ? Explain.
  
  
  
  
  
  
  
  
  
  
2. When can you add two exponents?
  
  
  
  
  
  
  
  
  
  
3. Explain what a negative exponent does.