

Algebra I

Notes 10.1, Part 1 Defining Exponents

Objectives: Be able to describe the purpose and function of an exponent.
Simplify exponential expressions.

An exponent represents repeated multiplication of a base number.

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2$$

$$3 \cdot 3 \cdot 3 \cdot 3 = 3$$

$$x \cdot x \cdot x = x$$

$$y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y = y$$

For an exponential expression x^n , x is the _____ and n is the _____.

SAYING AND READING EXPONENTS

x^1 is read " _____ "

x^2 is read " _____ " or " _____ "

x^3 is read " _____ " or " _____ "

x^4 is read " _____ "

x^5 is read " _____ "

x^n is read " _____ "

COMPUTING EXPONENTS

Use your calculator's multiplication key to evaluate the following:

Re-write each with a base and an exponent

Identify and record the key sequence for exponents

1. $9 \cdot 9 \cdot 9 \cdot 9 =$ _____

9

2. $6 \cdot 6 \cdot 6 =$ _____

6

3. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 =$ _____

10

4. $17 \cdot 17 =$ _____

17

5. $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 =$ _____

5

PROPERTIES OF EXPONENTS

Complete the following exponent problems:

$$1. \quad (2 \cdot 2 \cdot 2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2 \cdot 2) =$$
$$2 \quad \cdot \quad 2 \quad = 2$$

$$2. \quad (3 \cdot 3 \cdot 3 \cdot 3) \cdot (3 \cdot 3 \cdot 3) =$$
$$3 \quad \cdot \quad 3 \quad = 3$$

$$3. \quad (4 \cdot 4 \cdot 4) \cdot (4 \cdot 4) =$$
$$4 \quad \cdot \quad 4 \quad = 4$$

$$4. \quad (5 \cdot 5) \cdot (5 \cdot 5 \cdot 5 \cdot 5 \cdot 5) =$$
$$5 \quad \cdot \quad 5 \quad = 5$$

$$5. \quad (10 \cdot 10) \cdot (10 \cdot 10 \cdot 10) =$$
$$10 \quad \cdot \quad 10 \quad = 10$$

$$6. \quad (x \cdot x \cdot x \cdot x \cdot x) \cdot (x \cdot x \cdot x \cdot x)$$
$$x \quad \cdot \quad x \quad = x$$

$$7. \quad (b \cdot b \cdot b) \cdot (b \cdot b)$$
$$b \quad \cdot \quad b \quad = b$$

$$8. \quad (y \cdot y \cdot y \cdot y) \cdot (y \cdot y)$$
$$y \quad \cdot \quad y \quad = y$$

$$9. \quad (z \cdot z \cdot z \cdot z) \cdot (z \cdot z \cdot z)$$
$$z \quad \cdot \quad z \quad = z$$

Re-write these exponential expressions:

$$10. \quad x \cdot x \cdot x \cdot y \cdot y = x \ y$$

$$11. \quad a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b = a \ b$$

$$12. \quad a \cdot c \cdot c \cdot c \cdot c = a \ c$$

$$13. \quad a \cdot b \cdot b \cdot b \cdot b \cdot b = a \ b$$

$$14. \quad a \cdot b \cdot b \cdot c = a \ b \ c$$

$$15. \quad a \cdot a \cdot b \cdot b \cdot a \cdot a \cdot a = a \ b$$

$$16. \quad a \cdot a \cdot b \cdot c \cdot c \cdot c \cdot c = a \ b \ c$$

$$17. \quad m \cdot m \cdot n \cdot m \cdot n \cdot n \cdot n = m \ n$$

$$18. \quad 2 \cdot a \cdot a \cdot a \cdot a = \underline{\quad} a$$

$$19. \quad 3 \cdot b \cdot b \cdot b \cdot b = \underline{\quad} b$$

$$20. \quad 2 \cdot a \cdot a \cdot 2 \cdot 2 \cdot 2 \cdot a = 2 \ a = \underline{\quad} a$$

$$21. \quad 3 \cdot 2 \cdot a \cdot b \cdot c \cdot a \cdot c \cdot 6 = \underline{\quad} a \ b \ c$$

$$22. \quad x \cdot x \cdot 3 \cdot y \cdot 2 \cdot 2 = 2 \cdot 3x \ y = \underline{\quad} x \ y$$

$$23. \quad r \cdot r \cdot r \cdot 2^3 \cdot r = \underline{\quad} r$$

$$24. \quad 2^3 \cdot x \cdot x \cdot x \cdot 2^3 = 2 \ x = \underline{\quad} x$$

$$25. \quad 4^3 \cdot 4^3 \cdot 4^3 \cdot c \cdot c \cdot c \cdot c \cdot c = 4 \ c = \underline{\quad} c$$

A variable or constant written without an exponent has an understood exponent of .

$$2^1 = \quad \quad a^1 = \quad \quad x^1 =$$

What happens to your calculator when you try 2^{100} ?

When multiplying expressions with the same base you can the exponents.