

What type of relationship does the data in the table represent? Linear, Exponential, or neither?

If linear or exponential, write the equation.

	x	y	
+3 <	5	45	> +9
+2 <	8	54	> +6
+4 <	10	60	> +12
	14	72	

$$\frac{\Delta y}{\Delta x} = \frac{9}{3} = \frac{6}{2} = \frac{12}{4} = 3 \quad \text{constant slope} = 3$$

LINEAR

$$y = 3x + 6$$

$$\begin{array}{r} 45 = 3(5) + 6 \\ 45 = 15 + 6 \\ \hline 30 = 6 \end{array}$$

$$y = 3x + 30$$

Properties of Exponents

Monomial

one number

A single term that is made up of numbers and variables that are multiplied together.

xy $2x$ $5y^5$ $4y$ bab
 $25a^2b^5c^9$

Not a monomial:

$x+1$ binomial

$3x^5-2y$


2 terms

Monomial

one number

A monomial is one term, that can contain numbers and variables that are all multiplied by each other.

x^2

$2y$

$5x^2y^5$

$-7xy^{10}$

$4x^5$

$250a^5b^7c^8d^8$

ab

NOT a MONOMIAL

$2x + y$

two terms
not being multiplied

this is a
binomial

two

Vocab:

$$3^2 \cdot 3^3 = \underbrace{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}_{\substack{\text{expanded form} \\ \text{or} \\ \text{factored form}}} = 3^5$$

$$x^4 \cdot x^2 = \underbrace{x \cdot x \cdot x \cdot x \cdot x \cdot x}_{\substack{\text{expanded form} \\ \text{or} \\ \text{factored form}}} = x^6$$

factors - numbers and variables that are multiplied

factored form }
expanded form } show all the factors that
are being multiplied

base $\rightarrow 6$ base is the number that is not the exponent
exponent $\rightarrow 5$ tells us how many times to multiply the base

Original Form	Factored Form	Simplified Exponent Form
$5^2 \cdot 5^5$	$(5 \cdot 5) \cdot (5 \cdot 5 \cdot 5 \cdot 5 \cdot 5)$	5^7
$2^2 \cdot 2^4$		2^6
$3^7 \cdot 3^2$		3^9
$x^3 \cdot x^5$		x^8
$x^3 y^2 \cdot xy^2$	$x \cdot x \cdot x \cdot y \cdot y \cdot x \cdot y \cdot y$	$x^4 y^4$
$7^2 \cdot x^3 \cdot 7 \cdot x^2$	$7 \cdot 7 \cdot x \cdot x \cdot x \cdot 7 \cdot x \cdot x$	$7^3 \cdot x^5$
$2 \cdot x^4 \cdot 3 \cdot xy^2$	$2 \cdot x \cdot x \cdot x \cdot x \cdot 3 \cdot x \cdot y \cdot y$	$6x^5 y^2$

Things to keep in mind:

What part of the expression is being raised to a power?

What are the factors?

How can we rewrite the expression to have fewer terms?

1. Work with your group to compare the bases and exponents of the original form to the base and exponent of the simplified exponent form. **Write a statement to describe the relationship you see.**

2. Visualize how you would expand $20^{12} \cdot 20^8$ in your mind. What would this expression be in simplified exponent form? Describe your reasoning.

20^{20} We're multiplying 20, twenty times

3. A group of students rewrote the expression $10^3 \cdot 5^4$ as 50^7 . Is their simplification correct? Explain your reasoning.

$$10^3 \cdot 5^4 \stackrel{?}{=} 50^7$$
$$\underline{10} \cdot \underline{10} \cdot \underline{10} \cdot \underline{5} \cdot \underline{5} \cdot \underline{5} \cdot \underline{5} \stackrel{?}{=} 50 \cdot 50 \cdot 50 \cdot 50 \cdot 50 \cdot 50 \cdot 50$$
$$50 \cdot 50 \cdot 50 \cdot 5$$
$$5 \cdot 50^3$$

Not equal!

Let's apply the statements you made:

$$x^2 \cdot x^3 = x^5$$

$$7x^3 \cdot 3x^4 = 21 \cdot x^7 = 21x^7$$

$$2x^3y^2 \cdot 3xy^5 = 6x^4y^7$$

$$\underline{6}x^{\underline{5}}\underline{y}^{\underline{2}}\underline{z}^{\underline{3}} \cdot \underline{2}x\underline{y}^{\underline{3}} \cdot \underline{3}x^{\underline{2}}\underline{y}^{\underline{7}}\underline{z}^{\underline{4}}$$

$$36x^8y^{12}z^7$$

8-1 Study Guide and Intervention***Multiplying Monomials***

Multiply Monomials A **monomial** is a number, a variable, or a product of a number and one or more variables. An expression of the form x^n is called a **power** and represents the product you obtain when x is used as a factor n times. To multiply two powers that have the same base, add the exponents.

Product of Powers	For any number a and all integers m and n , $a^m \cdot a^n = a^{m+n}$.
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Example 1**Simplify $(3x^6)(5x^2)$.**

$$\begin{aligned} (3x^6)(5x^2) &= (3)(5)(x^6 \cdot x^2) && \text{Associative Property} \\ &= (3 \cdot 5)(x^6 + 2) && \text{Product of Powers} \\ &= 15x^8 && \text{Simplify.} \end{aligned}$$

The product is $15x^8$.**Example 2****Simplify $(-4a^3b)(3a^2b^5)$.**

$$\begin{aligned} (-4a^3b)(3a^2b^5) &= (-4)(3)(a^3 \cdot a^2)(b \cdot b^5) \\ &= -12(a^3 + 2)(b^1 + 5) \\ &= -12a^5b^6 \end{aligned}$$

The product is $-12a^5b^6$.**Exercises****Simplify.**

1. $y(y^5)$

2. $n^2 \cdot n^7$

3. $(-7x^2)(x^4)$

4. $x(x^2)(x^4)$

5. $m \cdot m^5$

6. $(-x^3)(-x^4)$

$$-1 \cdot x^3 \cdot -1 \cdot x^4$$

7. $(2a^2)(8a)$

8. $(rs)(rs^3)(s^2)$

9. $(x^2y)(4xy^3)$

10. $\frac{1}{3}(2a^3b)(6b^3)$

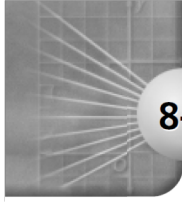
11. $(-4x^3)(-5x^7)$

12. $(-3j^2k^4)(2jk^6)$

13. $(5a^2bc^3)\left(\frac{1}{5}abc^4\right)$

14. $(-5xy)(4x^2)(y^4)$

15. $(10x^3yz^2)(-2xy^5z)$



NAME _____ DATE _____ PERIOD _____

8-1

Skills Practice

Multiplying Monomials

Simplify.

7. $a^2(a^3)(a^6)$

8. $x(x^2)(x^7)$

9. $(y^2z)(yz^2)$

10. $(\ell^2k^2)(\ell^3k)$

11. $(e^2f^4)(e^2f^2)$

12. $(cd^2)(c^3d^2)$

13. $(2x^2)(3x^5)$

14. $(5a^7)(4a^2)$

15. $(4xy^3)(3x^3y^5)$

16. $(7a^5b^2)(a^2b^3)$

17. $(-5m^3)(3m^8)$

18. $(-2c^4d)(-4cd)$

Homework

Finish Classwork