

Using the Distributive Property

Simplify each expression.

1) $-6(a + 8)$

2) $4(1 + 9x)$

3) $6(-5n + 7)$

4) $(9m + 10) \cdot 2$

5) $(-4 - 3n) \cdot -8$

6) $8(-b - 4)$

7) $(1 - 7n) \cdot 5$

8) $-6(x + 4)$

9) $5(3m - 6)$

10) $(-6p + 7) \cdot -4$

11) $5(b - 1)$

12) $(x + 9) \cdot 5$

$$13) -4(-8x - 8)$$

$$14) -6(7 + x)$$

$$15) -3(x - 5)$$

$$16) -5(10x + 1)$$

$$17) (1 + 2v) \cdot 5$$

$$18) -8(1 - 5x)$$

$$19) -7(5k - 4)$$

$$20) -5(7a - 6)$$

$$21) 5(n + 6)$$

$$22) 4(3r - 8)$$

$$23) 3(5 + 5x)$$

$$24) (1 + 9x) \cdot -10$$

Name: _____ Hour: _____

Guided Notes - Exponents

Learning Target: I know the parts of a power, how to expand them, and how to simplify them.

A few vocabulary terms...

Base: _____

Factor: _____

Exponent: _____

Power: _____

Examples of powers:

Squared:

Cubed:

What is the exponent and solution?

$$4 \times 4 \times 4 = 4 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = 2$$

$$21 - 3^2 = 21 - \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$

Example:

$$4^3 + 6 =$$

Example:

$$(-5)^2 =$$

Exponential Rules

Exponent Rule	Example	Your Turn
Zero Exponent Rule $a^0 = 1$	$3^0 = 1$	$6^0 =$
Power Rule (Powers to Powers) $(a^m)^n = a^{mn}$	$(2^3)^4 = 2^{3 \cdot 4}$ $= 2^{12}$	$(x^5)^4 =$
Negative Exponent Rule $a^{-n} = \frac{1}{a^n}$	$x^2 = \frac{1}{x^2}$	$x^{-5} =$
Product Rule $a^m \cdot a^n = a^{m+n}$	$3^2 \cdot 3^3 = 3^{2+3} = 3^5$	$y^4 \cdot y^9 =$
Quotient Rule $\frac{a^m}{a^n} = a^{m-n}$	$\frac{2^7}{2^3} = 2^{7-3} = 2^4$	$\frac{x^5}{x^3} =$

Try these on your own!

1) $(7z^5)^3$

3) $(3w^3 \cdot w)^2$

2) $(3hd^3)^3$

4) $(5h^3z^2)^4$

Name _____

Study the box below. Follow the directions and write the answer in the space provided.

<p>Rule: An exponent tells the number of times a base is multiplied by itself.</p> $9 \cdot 9 \cdot 9 \cdot 9 = 9^4$ <p style="text-align: center;"> ↑ exponent ↑ base </p>	<p>Examples:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">$4^3 = 4 \cdot 4 \cdot 4$</td> <td style="width: 50%;">Expanded form</td> </tr> <tr> <td>$2 \cdot 4 \cdot 2 \cdot 4 = 2^2 \cdot 4^2$</td> <td>Exponential form</td> </tr> <tr> <td>$5^2 = 25$</td> <td>Simplified</td> </tr> </table>	$4^3 = 4 \cdot 4 \cdot 4$	Expanded form	$2 \cdot 4 \cdot 2 \cdot 4 = 2^2 \cdot 4^2$	Exponential form	$5^2 = 25$	Simplified
$4^3 = 4 \cdot 4 \cdot 4$	Expanded form						
$2 \cdot 4 \cdot 2 \cdot 4 = 2^2 \cdot 4^2$	Exponential form						
$5^2 = 25$	Simplified						

Write each problem in expanded form.

- | | |
|------------------|--------------------|
| 1. 7^6 | 3. x^9 |
| 2. 4^5 | 4. $a^2 \cdot b^2$ |
| 5. $8^9 \cdot 9$ | 6. $2^2 \cdot 3^5$ |

Write each problem in exponential form.

- | | |
|---------------------------------|-----------------------------------------|
| 7. $5 \cdot 5$ | 10. $10 \cdot 9 \cdot 9 \cdot 10$ |
| 8. $11 \cdot 11 \cdot 11$ | 11. $2 \cdot 2 \cdot 4 \cdot 3 \cdot 3$ |
| 9. $6 \cdot 6 \cdot 6$ | 12. $3 \cdot 2 \cdot 3$ |
| 13. $m \cdot n \cdot m \cdot m$ | 14. $x \cdot y \cdot x \cdot y$ |
| 15. $a \cdot a \cdot a$ | |

Simplify each problem.

- | | |
|------------------|-------------------------------|
| 16. 7^2 | 18. $2^5 \cdot 3^2 \cdot 4^3$ |
| 17. $4^4 + 3$ | 19. $8^2 \cdot 3^2$ |
| 20. $12^2 + 9^2$ | 21. $4^2 \cdot 6^3 \cdot 8^0$ |

Total Problems:

Total Correct:

Score:

Study the box below. Simplify. Write the answers in exponent form in the space provided.

Rules:
 To multiply powers with like bases, add the exponents. Use the sum as the exponent with the base.
 To divide powers with like bases, subtract the exponents. Use the difference as the exponent with the base.

Examples:
 $4^4 \cdot 4^5 = 4^{4+5} = 4^9$
 $\frac{3^6}{3^2} = 3^{6-2} = 3^4$

1. $2^3 \cdot 2^5$	7. $4^2 \cdot 4^2$	13. $x^3 \cdot x^6$
2. $5^8 \cdot 5^2$	8. $9^2 \cdot 9 \cdot 9^3$	14. $m \cdot m^3 \cdot m^4$
3. $8^3 \cdot 8^4$	9. $3 \cdot 3^4 \cdot 3^3$	15. $c^5 \cdot c^2$
4. $\frac{10^3}{10}$	10. $\frac{5^4}{5^4}$	16. $\frac{y^6}{y^4}$
5. $\frac{7^5}{7^4}$	11. $\frac{11^8}{11^5}$	17. $\frac{8^7}{8^4}$
6. $\frac{6^4}{6^2}$	12. $\frac{4^3}{4^2}$	18. $\frac{b^5}{b^4}$

14

Total Problems:

Total Correct:

Score:

Exponents

Simplify.

1. $n^2 \bullet n^5$

2. $2^2 \bullet 2^3$

3. $(-2)^2(-2)^5$

4. $z^{10} \bullet z^3$

5. $\frac{r^4}{r^3}$

6. $\frac{m^5}{m^2}$

7. $\frac{15^4}{15}$

8. $\frac{x^7}{x^{15}}$

9. $(2^4)^3$

10. $(x^6)^5$

11. $(3z^2)^2$

12. $(-5x)^2$

13. $(-0.3)^0$

14. $(-7y)^0$

15. $-7y^0$

16. $\left(\frac{x^2}{t}\right)^3$

17. $\left(\frac{5m}{3z^3}\right)^2$

18. $\left(\frac{3c}{2y^2}\right)^4$

19. w^{-6}

20. $\frac{1}{2^{-3}}$

21. $(2m)^{-3}$

22. $(3a)^{-3}$

23. $\frac{a^{-2}b^4}{3a^{-3}}$

24. $\frac{28x^{-2}}{7y^{-3}}$

25. $\frac{m^3}{n^{-2}}$

26. $\frac{3x^{-4}}{15y}$

27. $(2x^2y)(5x^{-2}y^3)$

28. $(2r^{-4}s^2)^{-3}$

Properties of Exponents

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

2) $m^4 \cdot 2m^{-3}$

3) $4r^{-3} \cdot 2r^2$

4) $4n^4 \cdot 2n^{-3}$

5) $2k^4 \cdot 4k$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

7) $2y^2 \cdot 3x$

8) $4v^3 \cdot vw^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

10) $x^2y^{-4} \cdot x^3y^2$

11) $(x^2)^0$

12) $(2x^2)^{-4}$

13) $(4r^0)^4$

14) $(4a^3)^2$

15) $(3k^4)^4$

16) $(4xy)^{-1}$

$$17) (2b^4)^{-1}$$

$$18) (x^2y^{-1})^2$$

$$19) (2x^4y^{-3})^{-1}$$

$$20) (3m)^{-2}$$

$$21) \frac{r^2}{2r^3}$$

$$22) \frac{x^{-1}}{4x^4}$$

$$23) \frac{3m^4}{3m^3}$$

$$24) \frac{m^4}{2m^4}$$

$$25) \frac{3m^{-4}}{m^3}$$

$$26) \frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$$

$$27) \frac{4x^0y^{-2}z^3}{4x}$$

$$28) \frac{2h^3j^{-3}k^4}{3jk}$$

$$29) \frac{4m^4n^3p^3}{3m^2n^2p^4}$$

$$30) \frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

Name: _____

Algebra 1: 1.1 Distributive Property

Learning Target: I can use the distributive property.

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2) $4(1 + 9x)$

3) $6(-5n + 7)$

4) $(9m + 10) \cdot 2$

5) $(-4 - 3n) \cdot -8$

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Algebra 1: 1.1 Exponents

Learning Target: I know the parts of a power, how to expand them, and how to simplify them.

1) $(7z^6)^3$

3) $(3w^3 \cdot w)^2$

2) $(3hd^3)^3$

4) $(5h^3z^2)^4$

1) $r^5 \cdot r^9$

2) $n^{-2} \cdot n^6$

3) $v^7 \cdot v^{-5}$

7) $2y^2 \cdot 3x$

8) $4v^3 \cdot wu^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

10) $x^2y^{-4} \cdot x^3y^2$

11) $(x^2)^0$

12) $(2x^2)^{-4}$

23) $\frac{3m^4}{3m^3}$

24) $\frac{m^4}{2m^4}$

19) $(2x^4y^{-3})^{-1}$

20) $(3m)^{-2}$

Order of Operations

Evaluate each expression.

1) $(30 - 3) \div 3$

2) $(21 - 5) \div 8$

3) $1 + 7^2$

4) $5 \times 4 - 8$

5) $8 + 6 \times 9$

6) $3 + 17 \times 5$

7) $7 + 12 \times 11$

8) $15 + 40 \div 20$

9) $20 + 16 - 15$

10) $19 - 15 - 3$

11) $9 \times (3 + 3) \div 6$

12) $(9 + 18 - 3) \div 8$

$$13) 9 + 6 \div (8 - 2)$$

$$14) 4(4 \div 2 + 4)$$

$$15) 6 + (5 + 8) \times 4$$

$$16) 6 \times 6 - (7 + 5)$$

$$17) (9 \times 2) \div (2 + 1)$$

$$18) 2 - (4 + 3 - 6)$$

$$19) 7 \times 7 - (8 - 2)$$

$$20) 9 - 7 - 6 \div 6$$

$$21) (4 - 1 + 8 \div 8) \times 5$$

$$22) (10 \times 2) \div (1 + 1)$$

$$23) 7 \times 9 - 7 - 3 \times 5$$

$$24) 8 - 1 - (18 - 2) \div 8$$