Name: _____

Simplifying Monomial Exponents (Part 1)

A **positive exponent** tells you **how many times you multiply** the 1 that is always there by the base number (or variable, or group). So, $x^3 = 1 \cdot x \cdot x \cdot x$, just like $x^2 = 1 \cdot x \cdot x$ and $x^1 = 1 \cdot x$. If the exponent is 0, that means that you are not multiplying 1 by anything (but that does not make the answer 0). $x^0 = 1 \cdot no\ x's = \boxed{1}$.

Expand each exponent.

Monomial Expansion
1. $x^5 = 1 \cdot$
2. $3^4 = 1 \cdot$
3. $(-2)^6 =$
4. $(ab)^3 =$
5. $(-5b)^5 =$

For each product, expand the monomial using the exponent, then rewrite it as a monomial with only 1 base.

Monomial Expansion	Simplified Equation
6. $x^5x^3 = 1 \cdot$	$x^5x^3 = x^{\square}$
7. $3^43^6 = 1 \cdot$	$3^43^6 = 3^{\square}$
8. $(-2)^6(-2)^3 =$	$(-2)^6(-2)^3 = (-2)^{\square}$
9. $(ab)^3(ab)^4 =$	$(ab)^3(ab)^4 = a^{\square}b^{\square}$
10. $(-5b)^5(-5b)^2 =$	$(-5b)^5(-5b)^2 = (-5)^{\square}b^{\square}$

What happens to the exponent when you multiply two monomials with the same base?

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Rule: $x^ax^b = x$———

Use the rule you discovered to simplify each monomial.

11. 7^17^4	12. m^6m^7	13. x^4x^5
14. $(-4)^8(-4)^5$	15. x^7x^0	16. $(2a)^3(2a)^5$
17. $(gh)^2(gh)^3$	18. $(4x)^6(4x)^8$	19. b^4b^8
20. $(-5)^5(-5)^4$	21. $(-x)^6(-x)^2$	22. r^7r^5

A **negative exponent** tells you **how many times you DIVIDE** the 1 that is always there by the base number (or variable, or group). So, $x^{-3} = \frac{1}{x \cdot x \cdot x}$, just like $x^2 = \frac{1}{x \cdot x}$ and $x^1 = \frac{1}{x}$. If the exponent is 0, that means that you are not dividing 1 by anything except another 1 (but that does not make the answer 0). $x^0 = \frac{1}{1 \cdot no\ x's} = \frac{1}{1} = \boxed{1}$.

Expand each exponent.

Monomial	Expansion
23. $x^{-5} =$	$\frac{1}{\qquad\qquad}$
24. $3^{-4} =$	$\frac{1}{\qquad\qquad}$
25. $(-2)^{-6} =$	
26. $(ab)^{-3} =$	
27. $(-5b)^{-5} =$	

For each product, expand the monomial using the exponent, then rewrite it as a monomial with only 1 base or as a fraction.

Monomial	Expansion	Simplified Equation
28. $x^5x^{-3} =$	$1 \cdot \frac{\qquad\qquad}{\qquad\qquad}$	$x^5x^3 =$
29. $3^{-4}3^6 =$	$1 \cdot \frac{\qquad\qquad}{\qquad\qquad}$	$3^43^6 =$
30. $(-2)^{-6}(-2)^3 =$		$(-2)^{-6}(-2)^3 =$
31. $(ab)^{-3}(ab)^{-4} =$		$(ab)^3(ab)^4 =$
32. $(-5b)^{-5}(-5b)^{-2} =$		$(-5b)^5(-5b)^2 =$

What happens to the exponent when you multiply two monomials with the same base **when one of the exponents is negative**?

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Rule: $x^ax^{-b} = x$_____

Use the rule you discovered to simplify each monomial.

33. $7^{-1}7^4$	34. m^6m^{-7}	35. $x^{-4}x^5$	36. $(-4)^{-8}(-4)^5$
37. $x^{-7}x^0$	38. $(2a)^{-3}(2a)^5$	39. $(gh)^2(gh)^{-3}$	40. $(4x)^{-6}(4x)^8$