



Topic/Objective: AGS 2 Module 3.2

Name: *Key*

Negative Exponents

Period:

Date:

**Essential Question:** How do we change a negative exponent to a positive exponent?

Questions:

**Exploring Exponents:**

$$5^3 = 5 \cdot 5 \cdot 5 = 125$$

$$5^2 = 5 \cdot 5 = 25$$

$$5^1 = 5 = 5$$

$$5^0 = 1$$

$$5^{-1} = \frac{1}{5}$$

$$0.04 = \frac{1}{25} = \frac{1}{5 \cdot 5} = \frac{1}{5^2}$$

**Rule:**  $x^{-a} = \frac{1}{x^a}$  Do **not** leave negative exponents in your solutions! ☺

Negative exponents create fractions.

**Simplify. Leave answers in exponential form with only positive exponents.**

$$1. \frac{2^{-5}}{1} = \frac{1}{2^5}$$

$$2. \frac{m^{-5}}{1} = \frac{1}{m^5}$$

$$3. \frac{2^{-5}}{1} \cdot 2^8 = 2^{-5+8} = 2^3$$

$$4. 2^{-5} \cdot 2^4 = 2^{-5+4} = \frac{2^{-1}}{1}$$

$$\frac{2^8}{2^5} = \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2}} = 2^3$$

$$\frac{1}{2^1}$$

$$5. \frac{x^{-b}}{1} = \frac{1}{x^b}$$

$$6. \frac{m^4 \cdot 2m^{-3}}{1} = \frac{2m^4}{m^3} = 2m$$

$$7. 4a^3b^2 \cdot 3a^{-4}b^{-3} =$$

$$= 12 \cdot a^{3-4} b^{2-3}$$

$$= \frac{12a^{-1}b^{-1}}{1} = \frac{12}{ab}$$

$$9. 2(x^2)^{-4} =$$

$$= 2x^{2 \cdot -4}$$

$$= \frac{2x^{-8}}{1} = \frac{2}{x^8}$$

$$11. (n^3)^3 \cdot 2n^{-1} =$$

$$n^9 \cdot 2n^{-1} = 2n^8$$

$$13. \frac{n^3}{n^8} = n^{-5} = \frac{1}{n^5}$$

$$15. \frac{2h^3j^{-3}k^4}{3jk} = \frac{2h^3k^4}{3j^4k}$$

$$= \frac{2h^3k^3}{3j^4}$$

$$17. \frac{3^{-2} \cdot 3^5}{3^7} = \frac{3^5}{3^2 \cdot 3^7} = \frac{3^5}{3^9}$$

$$= \frac{1}{3^4}$$

$$19. 2k^4 \cdot 6k^{-5} =$$

$$\frac{12}{k}$$

$$8. (2x^0y^2)^{-3} =$$

$$= \frac{2^{-3}y^{-6}}{1} = \frac{1}{2^3y^6}$$

$$10. (x^2y^{-1})^3 =$$

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

$$= \frac{x^6 y^{-3}}{1} = \frac{x^6}{y^3}$$

$$12. x^4y^{-3}(2y^2)^0 =$$

$$\frac{x^4}{y^3}$$

$$14. \frac{n^{-3}}{n^8} = n^{-11} = \frac{1}{n^{11}}$$

$$16. \frac{(2m^2)^{-1}}{m^2} = \frac{1}{m^2 \cdot 2m^2}$$

$$= \frac{1}{2m^4}$$

$$18. (3x^2y)^{-1} =$$

$$\frac{1}{3x^2y}$$

$$20. (2k)^4 \cdot (6k)^{-5} =$$

$$\frac{2^4k^4}{6^5k^5} = \frac{2^4}{6^5k}$$

**Summary:** Explain how to change a negative exponent to a positive exponent.