

DO NOW

Simplify:

$$1. \frac{x^3(x^5)}{x^8}$$

$$2. \frac{(y^4)^2}{y^8}$$

$$3. \frac{x^2}{x^6}$$

$$x^{-4}$$

1.6 Zero and Negative Exponents

$$\frac{x^5}{x^5} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = 1$$

$$\frac{x^5}{x^5} = x^{5-5} = x^0$$

$$x^0 = 1$$

★ Anything to the zero power is 1.

Examples:

$$1. y^0$$

$$1$$

$$2. (xy)^0$$

$$1$$

$$3. xy^0$$

$$x(1)$$

$$x$$

$$4. 50^0$$

$$1$$

$$5. (6x)^0$$

$$1$$

$$6. 6x^0$$

$$6$$

$$7. 7xy^0$$

$$7x$$

$$8. 7(xy)^0$$

$$7$$

$$9. (7xy)^0$$

$$1$$

$$10. 35x^3y^0z^5$$

$$35x^3z^5$$

Consider: $\frac{x^2}{x^6} = x^{2-6} = x^{-4}$

$$\frac{x^2}{x^6} = \frac{\cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = \frac{1}{x^4}$$

So... $x^{-4} = \frac{1}{x^4}$

$$x^{-a} = \frac{1}{x^a}$$

★ A negative exponent is like an "elevator" button.

★ Only "relocate" items that actually have a negative exponent.

Examples:

$$1. y^{-5}$$

$$\frac{1}{y^5}$$

$$2. m^{-6}$$

$$\frac{1}{m^6}$$

$$3. 3y^{-5}$$

$$\frac{3}{y^5}$$

$$4. 5b^{-2}$$

$$\frac{5}{b^2}$$

$$5. x^2y^{-3}$$

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

$$6. c^3d^{-2}$$

$$\frac{c^3}{d^2}$$

$$7. m^{-4}n^5$$

$$\frac{n^5}{m^4}$$

$$8. -3y^{-4}$$

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

$$9. (2x)^{-5}$$

$$\frac{1}{(2x)^5}$$

$$10. 2x^{-5}$$

$$\frac{2}{x^5}$$

$$11. (2ab)^{-4}$$

$$\frac{1}{(2ab)^4}$$

$$12. 2ab^{-4}$$

$$\frac{2a}{b^4}$$

$$13. \frac{10}{a^{-3}}$$

$$10a^3$$

$$14. \frac{m^{-3}}{n^{-6}}$$

$$\frac{n^6}{m^3}$$

$$15. \frac{3a^{-2}}{c^{-5}}$$

$$\frac{3c^5}{a^2}$$

***Operations and negative exponents:

Operate as usual BEFORE eliminating negative exponents.
(EXCEPT if there are a "bunch" of negative exponents in a fraction)

★ NEVER leave negative exponents in the answer

$$16. (x^5)(x^{-2})$$

$$x^3$$

$$17. \frac{x^{-6}}{x^{-9}} \quad \text{option 1} \quad \text{option 2}$$

$$x^3 \quad \frac{x^9}{x^6} \quad x^{-6} - -9$$

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

$$x^{-6}$$

$$\frac{1}{x^6}$$

$$19. 5^{-6}(5^{-4})$$

$$5^{-10}$$

$$\frac{1}{5^{10}}$$

$$20. (8^{-2})^{-5}$$

$$8^{10}$$

$$21. 5^0 + 4^{-2}$$

$$1 + \frac{1}{4^2}$$

$$1 + \frac{1}{16}$$

$$1 \frac{1}{16}$$

HOMEWORK

Worksheet HW 1.6 Exponents - Day 2