

Homework Review - Sections 8.1 and 8.2

$$\textcircled{15} (15 \cdot 29)^3 = 15^3 \cdot 29^3$$

$$\textcircled{15} 7^9 \cdot \frac{1}{7^2} = \frac{7^9}{7^2} = 7^7$$

$$\downarrow$$
$$\frac{7^9}{1} \cdot \frac{1}{7^2} = \frac{7^9}{7^2} = 7^7$$

Negative and Zero exponents:

$$\underline{a^0 = 1} \quad (a \neq 0)$$

What is a zero exponent?

What does it mean?

$$\frac{x^4}{x^4} = x^{4-4} = x^0 = 1 \quad 40^0 = 1 \quad 71.2^0 = 1 \quad (2xy z^3)^0 = 1$$

$$0^0 \neq 1$$

$$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$$

What is a ~~negative~~ negative exponent?

What does it mean?

$$2^{-2} = \frac{1}{2^2} \quad (xy)^{-3} = \frac{1}{(xy)^3}$$

$$\frac{x^2}{x^5} = x^{2-5} = x^{-3}$$

$$\frac{\cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x} = \frac{1}{x^3}$$

Summary of Exponent Properties:

$$a^m \cdot a^n = a^{m+n}$$

Names don't really matter ...
Product of Powers Property

$$(a^m)^n = a^{m \cdot n}$$

Power of Powers Property

$$(ab)^m = a^m \cdot b^m$$

Power of a Product Property

$$\frac{a^m}{a^n} = a^{m-n}$$

Quotient of Powers Property

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

Power of a Quotient Property

$$a^0 = 1$$

Definition of Zero Exponents

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

Definition of Negative Exponents

$$13. x^{-7} = \frac{1}{x^7}$$

$$2xy^3$$

$$19. (4x^{-4}y^2)^{-3} = \frac{2(xy)^3}{(2xy)^3}$$

$$14. 6y^{-4}$$

$$6 \cdot y^{-4} = \frac{6}{y^4}$$

$$20. (8mn^3)^0 = 1$$

$$15. (2b)^{-5}$$

$$\frac{1}{(2b)^5} = \frac{1}{2^5 b^5} = \frac{1}{32b^5}$$

$$21. \frac{c^{-3}}{d^{-5}}$$

$$\frac{\frac{1}{c^3}}{\frac{1}{d^5}} = \frac{1}{c^3} \div \frac{1}{d^5} = \frac{1}{c^3} \cdot \frac{d^5}{1} = \frac{d^5}{c^3}$$

$$24. \frac{1}{3x^{-3}y^{-7}}$$

$$\frac{1}{3 \cdot x^{-3} \cdot y^{-7}} = \frac{x^3 y^7}{3}$$

$$22. \frac{x^2}{y^{-4}} = \frac{x^2}{\frac{1}{y^4}}$$

$$x^2 \div \frac{1}{y^4} =$$

$$\frac{x^2}{1} \div \frac{1}{y^4} =$$

$$x^2 \cdot y^4 = \boxed{x^2 y^4}$$

$$23. \frac{x^{-6}}{4y^5}$$

$$\frac{\frac{1}{x^6}}{4y^5} =$$

$$\frac{1}{x^6} \div 4y^5 =$$

$$\frac{1}{x^6} \div 4y^5 =$$

$$\frac{1}{x^6} \cdot \frac{1}{4y^5} = \frac{1}{4x^6 y^5}$$

Metric System The metric system has names for very small lengths.

- a.** One micrometer is 10^3 times the length of one nanometer. One nanometer is 10^{-9} meter. Write one micrometer in meters.
- b.** One femtometer is 10^3 times the length of one attometer. One attometer is 10^{-18} meter. Write one femtometer in meters.
- c.** One centimeter is 10^{10} times the length of one picometer. One picometer is 10^{-12} meter. Write one centimeter in meters.

Homework:

p. 506, 3-10, 28-43, 51, 53