

3.1 Assignment

Simplify. Your answer should contain only positive exponents.

$$1) 4m^0 n^2 \cdot 4n^4 = 4(1)n^2 4n^4$$

$$= \boxed{16n^6}$$

$$2) 4y^0 \cdot y^{-3} = 4(1) \cdot y^{-3}$$

$$= \boxed{\frac{4}{y^3}}$$

$$3) (3x^2 y^0)^{-4} = (3x^2 \cdot 1)^{-4}$$

$$= 3^{-4} x^{-8}$$

$$= \frac{1}{3^4 x^8} = \boxed{\frac{1}{81x^8}}$$

$$4) (yx^{-1})^{-2} = y^{-2} x^2$$

$$= \boxed{\frac{x^2}{y^2}}$$

$$5) \frac{4m^{-4} n^{-4}}{m^4} = \frac{4}{m^4 n^4 m^4}$$

$$= \boxed{\frac{4}{m^8 n^4}}$$

$$6) \frac{3y}{2x^4 y^2} = \boxed{\frac{3}{2x^4 y}}$$

$$7) \frac{4yx^{-2}}{2x^3 y^{-3}} = \frac{2y^3}{1x^3 x^2}$$

$$= \boxed{\frac{2y^3}{x^5}}$$

$$8) \frac{4a^3 b^0}{a^{-4} b^3} = \frac{4a^3(1)a^4}{b^3}$$

$$= \boxed{\frac{4a^7}{b^3}}$$

$$9) \frac{2v^4}{(2u^{-1})^4 \cdot 2u^{-4}} = \frac{2v^4}{2^4 u^{-4} \cdot 2u^{-4}}$$

$$= \frac{2v^4 u^4 \cdot u^4}{2^5}$$

alphabetically

$$= \frac{v^4 u^8}{2^4} = \boxed{\frac{u^8 v^4}{16}}$$

$$10) \left(\frac{u^0 v^3}{2v^4 \cdot u^{-1} v^3} \right)^{-2} = \left(\frac{(1) \cdot \cancel{v^3} u^1}{2v^4 \cancel{v^3}} \right)^{-2}$$

$$= \left(\frac{u^1}{2v^4} \right)^{-2}$$

$$= \frac{u^{-2}}{2^2 v^{-8}} = \frac{2^2 v^8}{u^2} = \boxed{\frac{4v^8}{u^2}}$$

$$11) \frac{(nm^3)^2}{2n^2 \cdot m^{-2}n^4 \cdot 2n^2} = \frac{n^2 m^6 m^2}{4n^2 n^4 n^2}$$

$$= \frac{m^8 n^2}{4n^8}$$

$$= \frac{m^8}{4n^6}$$

$$13) (x^4)^{\frac{1}{2}}$$

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

$$12) \frac{2x^2y^{-3} \cdot 2x^3}{(yx^{-3})^4} = \frac{4x^2x^3}{y^3y^4x^{-12}} = \frac{4x^5x^{12}}{y^7}$$

$$= \frac{4x^{17}}{y^7}$$

$$14) (k^{-2})^{-2} = k^4$$

$$15) \frac{\left(\frac{7}{x^4}\right)^0}{xx^{\frac{2}{3}}} = \frac{x^{\frac{7}{4} \cdot 0}}{x^{1+\frac{2}{3}}} = \frac{x^0}{x^{\frac{3}{3}+\frac{2}{3}}} = \frac{1}{x^{\frac{5}{3}}}$$

$$16) \left(\frac{bb^{-2}}{b^{-\frac{2}{3}}}\right)^2 = \left(\frac{bb^{\frac{2}{3}}}{b^{\frac{5}{3}}}\right)^2 = \left(\frac{b^{\frac{10}{3}}}{b^{\frac{5}{3}}}\right)^2 = \frac{b^{\frac{10}{3}}}{b^4} = b^{\frac{10}{3}-4}$$

$$= b^{\frac{10}{3}-\frac{12}{3}} = b^{-\frac{2}{3}} = \frac{1}{b^{\frac{2}{3}}}$$

17) The weight of a newborn baby chicken weighs 3^{-2} pounds. If an adult chicken can weigh up to 3^4 times more than a newborn chicken, how much does an adult chicken weigh?

$$3^{-2} \cdot 3^4 = 3^2 = 9 \text{ lbs}$$

18) The population of the Vatican is 10^{-4} million, and the population of India is 10^3 million. How many times more is the population of India than the Vatican?

$$\frac{10^3}{10^{-4}} = 10^7 \text{ TIMES MORE}$$

19) When a caterpillar larvae hatches, it weighs only 10^{-2} grams. However, each day it is able to eat 10^4 times its initial body weight. How many grams of food can the larvae eat each day?

$$10^{-2} \cdot 10^4 = 10^2 = 100 \text{ grams}$$