

I. Simplify each of the following using only positive exponents:

$$1. x^{-9} = \boxed{\frac{1}{x^9}}$$

$$2. \frac{1}{n^{-2}} = \boxed{n^2}$$

$$3. 4c^{-2}b = \boxed{\frac{4b}{c^2}}$$

$$4. \frac{2}{a^{-3}} = \boxed{2a^3}$$

II. Simplify each of the following by multiplying or dividing:

$$5. 5x^4 \cdot x^9 \cdot 3x = 5 \cdot 3 \cdot x^{4+9+1} = \boxed{15x^{14}}$$

$$6. -4c^3 \cdot 7d^2 \cdot 2c^{-2} = -4 \cdot 7 \cdot 2 \cdot c^{3-2} \cdot d^2 = \boxed{-56cd^2}$$

$$7. \frac{4x^8}{2x^3} = \frac{4}{2} \cdot x^{8-3} = \boxed{2x^5}$$

$$8. \frac{-9k^6j^2}{36kj^5} = \frac{-9}{36} \cdot k^{6-1} \cdot j^{2-5} = -\frac{1}{4} \cdot k^5 \cdot j^{-3} = \boxed{-\frac{k^5}{4j^3}}$$

$$9. \frac{5^{-2}a^{-3}b^7}{2a^5b^{-2}} = \frac{b^7 \cdot b^2}{2 \cdot 5^2 \cdot a^3 \cdot a^5} = \boxed{\frac{b^9}{50a^8}}$$

III. Simplify each of the following:

$$10. (x^{-2})^2(3xy^5)^4 = x^{-4} \cdot 3^4 \cdot x^4 \cdot y^{20} = 3^4 y^{20} = \boxed{81y^{20}}$$

$$11. (3c^5)^4(2c^2)^3 = 3^4 c^{20} \cdot 2^3 c^6 = 81 \cdot 8 \cdot c^{26} = \boxed{648c^{26}}$$

$$12. \left(\frac{4}{x^3}\right)^2 = \boxed{\frac{16}{x^6}}$$

$$13. \left(\frac{2x^8}{y^4}\right)^{-3} = \frac{2^{-3} \cdot x^{-24}}{y^{-3}} = \frac{y^3}{2^3 x^{24}} = \boxed{\frac{y^3}{8x^{24}}}$$

IV. Simplify each exponent in radical form or each radical as a fractional exponent

$$14. 27^{\frac{1}{3}} = \sqrt[3]{27^1} = \boxed{3}$$

$$15. 64^{\frac{1}{2}} = \sqrt{64^1} = \boxed{8}$$

$$16. 8^{\frac{2}{3}} = \sqrt[3]{8^2} = (\sqrt[3]{8})^2 = (2)^2 = \boxed{4}$$

$$17. (\sqrt[4]{b})^3 = \sqrt[4]{b^3} = \boxed{b^{3/4}}$$

$$18. \sqrt[3]{m} = \sqrt[3]{m^1} = \boxed{m^{1/3}}$$

$$19. \sqrt{16a^2b^4} = \sqrt[3]{16} \cdot \sqrt{a^2} \cdot \sqrt[3]{b^4} = 4 \cdot a^{1/2} \cdot b^{4/3} = \boxed{4a^{1/2}b^{4/3}}$$