

$$1. \frac{1a^4b^3 \times 12ab^{-3}}{(2a^{-2}b^3)^2}$$

$$= \frac{12a^5b^0}{4a^{-4}b^6} \quad \begin{matrix} 5-4=9 \\ 0-6=-6 \end{matrix}$$

$$= 3a^9b^{-6}$$

$$= \frac{3a^9}{b^6}$$

$$2. \left(\frac{4m^5n^{-2} \times 2m^{-3}}{2m^2} \right)^2$$

$$= \left(\frac{8m^2n^{-2}}{2m^2} \right)^2 \quad 2-2=0$$

$$= (4m^0n^{-2})^2$$

$$= 16m^0n^{-4}$$

$$= 16(1)n^{-4}$$

$$= 16n^{-4}$$

$$= \frac{16}{n^4}$$

$$3 + \frac{2}{5} = \frac{17}{5}$$

$$3. \left(\frac{x^3y^4 \times x^{-7}}{x^5(y^{-2})^3} \right)^3$$

$$\left(\frac{x^{-4}y^4}{x^5y^{-6}} \right)^3 \quad \begin{matrix} -4-5=-9 \\ 4+6=10 \end{matrix}$$

$$= (x^{-9}y^{10})^3$$

$$= x^{-27}y^{30}$$

$$= \frac{y^{30}}{x^{27}}$$

$$= \frac{15m^7}{n^1}$$

$$4. 5m^2n^{-3} \times \frac{9m^3n^2}{3m^{-2}}$$

$$5m^2n^{-3} \times 3m^5n^2$$

$$= 15m^7n^{-1}$$

$$= 15m^7(1)$$

$$= 15m^7$$

$$5. (a^5b^{-2})^3 \times 3b^4$$

$$6. \frac{8a^2b^0}{a^{-3}b^5} \quad \begin{matrix} 2+3 \\ =5 \\ 0-5 \end{matrix}$$

$$= (x^{-27})y^{30}$$

$$= \frac{y^{30}}{x^{27}}$$

$$= 15m^7(1)$$

$$= 15m^7$$

5. $(a^5b^{-2})^3 \times 3b^4$

$$| a^{15}b^{-6} \times 3b^4$$

$$3a^{15}b^{-2}$$

$$= \frac{3a^{15}}{b^2}$$

6.

$$\frac{8a^2b^0}{| a^{-3}b^5}$$

$$8a^5b^{-5}$$

$$= \frac{8a^5}{b^5}$$

$$\begin{array}{r} 2+3 \\ =5 \\ 0-5 \\ =- \end{array}$$

$$7. \frac{(10a^2b^{-3})^2 \times (2a^{-1}b^2)^2}{10^2 a^4 b^{-2}}$$

$$= \frac{100 a^4 b^{-6} \times 4 a^{-2} b^4}{100 a^4 b^{-2}}$$

$$= \frac{400 a^0 b^{-2}}{100 a^4 b^{-2}} \quad \begin{array}{l} 0 - 4 = -4 \\ -2 + 2 = 0 \end{array}$$

$$= 4 a^{-4} b^0$$

$$= 4 a^{-4} (1)$$

$$= 4 a^{-4}$$

$$= \frac{4}{a^4}$$

$$\begin{array}{l} 2 + 3 = \\ -3 - 2 = \end{array}$$

$$8. \frac{(x^4 y^4)^2}{(x^{-3})^2 y^5}$$

$$= \frac{x^8 y^8}{x^{-6} y^5}$$

$$= x^{14} y^3$$

$$\begin{aligned} 8 + 6 &= 14 \\ 8 - 5 &= 3 \end{aligned}$$

$$9. \left(\frac{10a^2 b^{-3}}{2a^{-3} b^2} \right)^2$$

$$= (5a^5 b^{-5})^2$$

$$= 25 a^{10} b^{-10}$$

$$= \frac{25 a^{10}}{b^{10}}$$

$$10. \frac{4^2 u^{-1} v^4}{(2u^3 v)^3}$$

$$= \frac{16 u^{-1} v^4}{8 u^9 v^3}$$

$$\begin{aligned} -1 - 9 &= -10 \\ 4 - 3 &= 1 \end{aligned}$$

$$= 2 u^{-10} v^1$$

$$= \frac{2 v^1}{u^{10}}$$

$$11. \quad \frac{4b^{-5} \times 2a^7}{2^2 b^{-3} a^5}$$

$$\frac{1-5=2}{-5+3=-2} = \frac{8a^7 b^{-5}}{4a^5 b^{-3}}$$

$$= 2a^2 (b^{-2})$$

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

$$\text{OR} \quad \frac{8b^{-5} a^7}{4b^{-3} a^5}$$

$$= 2(b^{-2}) a^2$$

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

12.

$$\left(\frac{3x^2 y^3}{x^2} \right)^3 \quad 2-2=0$$

$$= (3x^0 y^3)^3$$

$$= 27 x^0 y^9$$

$$13. \quad x^{\frac{1}{2}} y^3 \times x^{\frac{2}{3}} y^{\frac{2}{3}}$$

$$= x^{\frac{7}{6}} y^{\frac{10}{3}}$$

$$\frac{1^{\frac{1}{2}} + 2^{\frac{2}{3}}}{2^{\frac{1}{2}} 3^{\frac{2}{3}}}$$

$$\frac{3+4}{6}$$

$$\frac{7}{6}$$

$$\begin{aligned}
 12. \quad & \left(\frac{3x^2y^3}{x^2} \right)^3 \quad 2-2=0 \\
 & = (3x^0y^3)^3 \\
 & = 27x^0y^9 \\
 & = 27(1)y^9 \\
 & = 27y^9
 \end{aligned}$$

$$13. \quad x^{\frac{1}{2}}y^3 \times x^{\frac{2}{3}}y^{\frac{1}{3}} = x^{\frac{7}{6}}y^{\frac{10}{3}}$$

$$\begin{aligned}
 & \frac{1 \times 2 + 2 \times 2}{2 \times 3 + 3 \times 2} \\
 & \frac{3 + 4}{6} \\
 & \frac{7}{6}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{3 \times 3 + 1}{1 \times 3 + 3} \\
 & \frac{9 + 1}{3 + 3} \\
 & \frac{10}{6} \\
 & \frac{5}{3}
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & \frac{a^{\frac{1}{4}}b^2}{a^{\frac{1}{3}}b^{\frac{1}{2}}} \\
 & = a^{-\frac{1}{12}}b^{\frac{3}{2}} \\
 & = \frac{b^{\frac{3}{2}}}{a^{\frac{1}{12}}}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{1 \times 3 - 1 \times 4}{4 \times 3 - 3 \times 4} \\
 & \frac{3 - 4}{12 - 12} \\
 & = \frac{-1}{0}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{2 \times 2 - 1}{1 \times 2 - 2} \\
 & \frac{4 - 1}{2 - 2} \\
 & = \frac{3}{0}
 \end{aligned}$$