

$$20. \left(\frac{2c^2}{d^3}\right)^{-2} = \frac{2^{-2}(c^2)^{-2}}{(d^3)^{-2}}$$

$$= \frac{2^{-2}c^{2(-2)}}{d^{3(-2)}} = \frac{2^{-2}c^{-4}}{d^{-6}}$$

$$= \frac{d^6}{2^2c^4}$$

$$21. \left(\frac{x^6y^{-3}}{x^{-2}y^5}\right)^{1/2} = (x^{6-(-2)}y^{-3-5})^{1/2}$$

$$= (x^8y^{-8})^{1/2}$$

$$= (x^8)^{1/2}(y^{-8})^{1/2}$$

$$= x^4y^{-4}$$

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

$$22. \left(\frac{a^{-7}b^{-1}}{b^{-4}a^2}\right)^{1/3} = (a^{-7-2}b^{-1-(-4)})^{1/3}$$

$$= (a^{-9}b^3)^{1/3}$$

$$= (a^{-9})^{1/3}(b^3)^{1/3}$$

$$= a^{-3}b^1$$

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

$$23. a^{-1} + b^{-1} = \frac{1}{a} + \frac{1}{b}$$

$$= \left(\frac{b}{b}\right)\left(\frac{1}{a}\right) + \left(\frac{a}{a}\right)\left(\frac{1}{b}\right)$$

$$= \frac{b}{ab} + \frac{a}{ab}$$

$$= \frac{b+a}{ab}$$

$$= \frac{a+b}{ab}$$

$$24. b^{-2} - a = \frac{1}{b^2} - a$$

$$= \frac{1}{b^2} - a\left(\frac{b^2}{b^2}\right)$$

$$= \frac{1}{b^2} - \frac{ab^2}{b^2}$$

$$= \frac{1 - ab^2}{b^2}$$

$$25. \frac{2n^{-1} - 2m^{-1}}{m + n^2} = \frac{\frac{2}{n} - \frac{2}{m}}{m + n^2}$$

$$= \frac{\frac{2}{n} \cdot \frac{m}{m} - \frac{2}{m} \cdot \frac{n}{n}}{mn(m + n^2)}$$

$$= \frac{2m - 2n}{mn(m + n^2)} \quad \text{or} \quad \frac{2(m - n)}{mn(m + n^2)}$$

$$26. \left(\frac{m}{3}\right)^{-1} + \left(\frac{n}{2}\right)^{-2} = \left(\frac{3}{m}\right)^1 + \left(\frac{2}{n}\right)^2$$

$$= \frac{3}{m} + \frac{4}{n^2}$$

$$= \left(\frac{3}{m}\right)\left(\frac{n^2}{n^2}\right) + \left(\frac{4}{n^2}\right)\left(\frac{m}{m}\right)$$

$$= \frac{3n^2}{mn^2} + \frac{4m}{mn^2}$$

$$= \frac{3n^2 + 4m}{mn^2}$$

$$27. (x^{-1} - y^{-1})^{-1} = \frac{1}{\frac{1}{x} - \frac{1}{y}}$$

$$= \frac{1}{\frac{1}{x} \cdot \frac{y}{y} - \frac{1}{y} \cdot \frac{x}{x}}$$

$$= \frac{1}{\frac{y}{xy} - \frac{x}{xy}}$$

$$= \frac{1}{\frac{y-x}{xy}}$$

$$= \frac{xy}{y-x}$$

$$28. (x^{-2} + y^{-2})^{-2} = \left(\frac{1}{x^2} + \frac{1}{y^2}\right)^{-2}$$

$$= \left[\left(\frac{1}{x^2}\right)\left(\frac{y^2}{y^2}\right) + \left(\frac{x^2}{x^2}\right)\left(\frac{1}{y^2}\right)\right]^{-2}$$

$$= \left(\frac{y^2}{x^2y^2} + \frac{x^2}{x^2y^2}\right)^{-2}$$

$$= \left(\frac{y^2 + x^2}{x^2y^2}\right)^{-2} = \left(\frac{x^2y^2}{y^2 + x^2}\right)^2$$

$$= \frac{(x^2)^2(y^2)^2}{(x^2 + y^2)^2} = \frac{x^4y^4}{(x^2 + y^2)^2}$$

$$29. 81^{1/2} = (9^2)^{1/2} = 9^{2(1/2)} = 9^1 = 9$$

$$30. 27^{1/3} = \sqrt[3]{27} = 3$$

$$31. 32^{2/5} = (32^{1/5})^2 = 2^2 = 4$$

$$32. -125^{2/3} = (125^{1/3})^2 = -5^2 = -25$$

$$33. \left(\frac{4}{9}\right)^{1/2} = \frac{4^{1/2}}{9^{1/2}} = \frac{2}{3}$$

$$34. \left(\frac{64}{27}\right)^{1/3} = \frac{64^{1/3}}{27^{1/3}} = \frac{4}{3}$$

$$35. 16^{-5/4} = (16^{1/4})^{-5} = 2^{-5}$$

$$= \frac{1}{2^5} \quad \text{or} \quad \frac{1}{32}$$