

Simplify. Leave your answer in simplest form.

$$1. \quad \left(\frac{2t^2}{t-1}\right)^{-1}$$

$$= \frac{2^{-1}t^{-2}}{t^{-1}} = \frac{1}{2t^3}$$

$$2. \quad \frac{3^{-2}x^2y^{-4}}{3^3x^{-2}y}$$

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

$$= 3^{-5} x^4 y^{-5}$$

$$= \frac{x^4}{243y^5}$$

$$3. \quad \frac{a^{-1} + b^{-2}}{ab^2} = \frac{1}{a} + \frac{1}{b^2}$$

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

$$4. \quad \left(\frac{1}{x^{-2}}\right)(y^2 + x^{-1} + 5x^{-2})$$

$$= (x^2)(y^2 + x^{-1} + 5x^{-2})$$

$$= x^2y^2 + x^{(2+(-1))} + 5x^{(-2+2)}$$

$$= x^2y^2 + x + 5$$

$$5. \quad 32^{-\frac{3}{5}}$$

$$\left(\frac{1}{\sqrt[5]{32}}\right)^3 = \frac{1}{8}$$

$$6. \quad \left(\frac{8}{125}\right)^{\frac{2}{3}}$$

$$= \frac{(\sqrt[3]{8})^2}{(\sqrt[3]{125})^2}$$

$$= \frac{4}{25}$$

$$7. \quad 5x\sqrt[3]{32x^8}$$

$$= 5x(32x^8)^{\frac{1}{3}}$$

$$= 5x(2^5x^8)^{\frac{1}{3}}$$

$$= 5 \cdot x \cdot 2^{\frac{5}{3}} \cdot x^{\frac{8}{3}}$$

$$= 5 \cdot 2^1 \cdot 2^{\frac{2}{3}} \cdot x^3 \cdot x^{\frac{2}{3}}$$

$$= 10x^3\sqrt[3]{4x^2}$$

$$8. \quad 81^{-1/4}$$

$$\frac{1}{\sqrt[4]{81}} = \frac{1}{3}$$

$$9. \quad \frac{(\sqrt[5]{x^3}-1)(\sqrt[5]{x^3}+1)}{(x^{\frac{3}{5}}-1)(x^{\frac{3}{5}}+1)}$$

$$= x^{\frac{6}{5}} - 1$$

$$= x \cdot x^{\frac{1}{5}} - 1 = x\sqrt[5]{x} - 1$$

$$10. \quad \sqrt[3]{64x^5y^{10}z^{21}}$$

$$= 4xy^3z^7\sqrt[3]{x^2y}$$

$$11. \quad (\sqrt[4]{a^3})(\sqrt[4]{a^3})$$

$$= \left(a^{\frac{3}{4}}\right)\left(a^{\frac{3}{4}}\right)$$

$$= a^{\frac{6}{4}} = \sqrt{a^3} = a\sqrt{a}$$

$$12. \quad \sqrt[4]{243x^9y}$$

$$= 3x^2\sqrt[4]{3xy}$$