

1.3

MCR-30P

Exponential Expressions Practice

Srigan. S

$$3 a) (3^{\frac{1}{3}} \times 5^{-\frac{1}{2}})^6$$

$$= (3^2 \times 5^{-3})$$

$$= (9 \times \frac{1}{125})$$

$$= \frac{9}{125}$$

$$c) (5^{\frac{1}{4}} \div 5^{-\frac{3}{4}})^{-\frac{1}{2}}$$

$$= (5^{\frac{1}{4}} \div 5^{\frac{3}{4}})$$

$$= \frac{5^{\frac{1}{4}}}{5^{\frac{3}{4}}}$$

$$= 5^{-\frac{2}{4}}$$

$$= 5^{-\frac{1}{2}}$$

$$e) (\sqrt[3]{27})^{-\frac{1}{2}}$$

$$= (13^{\frac{1}{3}})^{-\frac{1}{2}}$$

$$= \frac{1}{3}$$

$$5. c) \frac{(xy^{\frac{3}{4}})^6}{(x^{\frac{1}{2}}y^{\frac{1}{4}})^8}$$

$$= \frac{(x^6y^{\frac{9}{2}})}{(x^4y^2)}$$

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

$$d) (9a^4b^{-2} \times 4a^2b^{-6})^{\frac{1}{2}}$$

$$= (3a^2b^{-1} \times 2ab^{-3})$$

$$= (6a^3b^{-4})$$

$$e) \frac{12x^{-\frac{3}{4}}y^{-2}}{4x^{\frac{1}{4}}y^{-2}}$$

$$= 3x^{-\frac{3}{4}}$$

$$= 3x^{-\frac{3}{4}}$$

$$f) 8m^{\frac{1}{2}}n^{-\frac{5}{2}}(-2m^{-\frac{3}{2}}n^{\frac{1}{2}})^{-4}$$

$$= 8m^{\frac{1}{2}}n^{-\frac{5}{2}}(16m^{\frac{6}{2}}n^{-\frac{4}{2}})$$

$$= 128m^{\frac{13}{2}}n^{\frac{20}{2}}$$

$$6. a) 2^5 \times 2^{-6}$$

$$= 2^{-1}$$

$$= \frac{1}{2}$$

$$e) (2^3)^{-\frac{5}{2}} \times (2^2)^{\frac{5}{2}}$$

$$= 2^{-5} \times 2^{10}$$

$$= 2^5$$

$$f) \frac{9^{\frac{5}{2}}}{9^{\frac{1}{2}}}$$

$$= 9^2$$

$$7. d) \frac{(5^{\frac{1}{2}})^{-\frac{3}{2}}}{5^{\frac{1}{2}}}$$

$$= \frac{5^{-\frac{3}{4}}}{5^{\frac{1}{2}}}$$

$$= 5^{-\frac{5}{4}}$$

$$e) (3^3)^{-\frac{1}{2}} \times (3^2)^{\frac{3}{4}}$$

$$= 3^{-\frac{3}{2}} \times 3^{\frac{3}{2}}$$

$$= 3$$

$$f) \frac{(2^4)^{\frac{3}{4}}}{(2^2)^{\frac{1}{4}}}$$

$$= \frac{2^{\frac{18}{4}}}{2^{\frac{2}{4}}}$$

$$= 2^{\frac{16}{4}}$$

$$= 2^4$$

$$8. c) \sqrt{\frac{50x^2y^4}{5x^0y^2}}$$

$$= \sqrt{10x^2y^2}$$

$$= 5\sqrt{2}xy$$

$$e) \frac{25x^{\frac{2}{3}}}{25x^{\frac{1}{3}}}$$

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

$$f) \frac{(x^2y)^{-\frac{5}{2}}}{(x^3y^{-3})^{\frac{1}{6}}}$$

$$= \frac{x^{-5}y^{-\frac{5}{2}}}{x^{\frac{1}{2}}y^{-\frac{1}{2}}}$$

$$= x^{-\frac{11}{2}}y^{-2}$$

$$9. c) \sqrt{\frac{32x^{-5}y^2 \times 18x^2y}{4xy^{-3}}}$$

$$= \sqrt{576x^{-3}y^3}$$

$$= \sqrt{\frac{4xy^3}{144y^6}}$$

$$= \frac{12y^3}{x^2}$$

$$10. e) \frac{(x^a)^2 (x^b)^2}{(x^{a+b})(x^{a-b})}$$

$$= \frac{2x^{2a+b}}{x^a + x^b + x^a - x^b}$$

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

$$= x^{2b}$$

$$11. e) \frac{36^{a-2b} \times 6^{a+b}}{216^{2a-3b}}$$

$$= \frac{(6^2)^{a-2b} \times 6^{a+b}}{(6^3)^{2a-3b}}$$

$$= \frac{6^{2a-2b} \times 6^{a+b}}{6^{6a-9b}}$$

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

$$= \frac{8b}{3a}$$

$$= \sqrt{576x^{-3}y^3}$$

$$= \sqrt{\frac{4xy^3}{144y^6}}$$

$$= \frac{12y^3}{x^2}$$

12F, 13eF, 14ac, 15de

$$\begin{aligned}
 12f) & \left(\frac{(a^{-2})^{\frac{3}{4}}}{(a^{-\frac{2}{3}})^{-\frac{1}{2}}} \right)^3 \\
 &= \left(\frac{a^{-\frac{3}{2}}}{a^{-\frac{1}{3}}} \right)^3 \\
 &= \left(a^{-\frac{9}{6} + \frac{2}{6}} \right)^3 \\
 &= \left(a^{-\frac{7}{6}} \right)^3 \\
 &= a^{-\frac{21}{6}}
 \end{aligned}$$

$$\begin{aligned}
 13)c) & 4 \times \frac{2}{3} (7 \times 6 + 3 \times \frac{4}{3}) \\
 &= 4 \times \frac{2}{3} (42 + 4) \\
 &= 4 \times \frac{2}{3} \times 46 \\
 &= 28 \times 4 + 12 \times \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 f) & a^{\frac{2}{3}} (a^{\frac{1}{6}} - a^{-\frac{7}{6}}) \\
 &= a^{\frac{2}{3}} - a^{-\frac{10}{6}} \\
 &= (3^2)^{\frac{2}{3}} - (3^2)^{-\frac{5}{3}} \\
 &= 3^{\frac{4}{3}} - 3^{-\frac{10}{3}} \\
 &= \frac{3^{\frac{4}{3}} - 3^{-\frac{10}{3}}}{1} \\
 &= \frac{3^{\frac{4}{3}} - 3^{-\frac{10}{3}}}{1}
 \end{aligned}$$

$$\begin{aligned}
 14)a) & (5^{\frac{1}{2}} + 2^{\frac{1}{2}})(5^{\frac{1}{2}} - 2^{\frac{1}{2}}) \\
 &= 5 - 2 \\
 &= 3
 \end{aligned}$$

$$\begin{aligned}
 c) & (\sqrt[4]{m} + \sqrt[4]{m})(\sqrt[4]{m} - \sqrt[4]{m}) \\
 &= (m^{\frac{1}{4}} + m^{\frac{1}{4}})(m^{\frac{1}{4}} - m^{\frac{1}{4}}) \\
 &= m - m^{\frac{1}{2}} + m^{\frac{1}{2}} - m^{\frac{1}{2}} \\
 &= -m^{\frac{1}{2}} + m^{\frac{1}{2}}
 \end{aligned}$$

$$\begin{aligned}
 15)d) & 3 \sqrt{\frac{m^{\frac{1}{2}} \sqrt{mn}}{jn}} \\
 &= 3 \sqrt{\frac{m^{\frac{1}{2}} \times m^{\frac{1}{2}} n^{\frac{1}{2}}}{jn}} \\
 &= 3 \sqrt{\frac{m n^{\frac{1}{2}}}{jn}}
 \end{aligned}$$

$$\begin{aligned}
 e) & \left(\frac{\sqrt[4]{a^{2n-1}} \times \sqrt[4]{a}}{\sqrt[4]{a}} \right)^2 \\
 &= \left(\frac{(a^{2n-1})^{\frac{1}{4}} \times a^{\frac{1}{4}}}{a^{\frac{1}{4}}} \right)^2 \\
 &= \left(\frac{a^{\frac{1}{2}n + \frac{1}{4}}}{a^{\frac{1}{4}}} \right)^2 \\
 &= n^2
 \end{aligned}$$