41. $x^{2/3}x^{1/5}$

add x common den.

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

$= x^{\frac{10}{15}+\frac{3}{15}}$

$= x^{\frac{13}{15}}$

42. $(-2a^{3/4})(5a^{3/2})$

$-10a^{\frac{3}{4}+\frac{3}{2}}$

$-10a^{\frac{3}{4}+\frac{6}{4}}$

$-10a^{9/4}$

43. $(4b)^{1/2}(8b^{2/5})$

$(4^{\frac{1}{2}}b^{\frac{1}{2}})(8b^{2/5})$

$(2b^{1/2})(8b^{2/5})$

$16b^{\frac{1}{2}+\frac{2}{5}}$

$16b^{\frac{5}{10}+\frac{4}{10}}$

$16b^{\frac{9}{10}}$

44. $(8x^6)^{-2/3}$

$8^{-2/3}b^{-12/3}$

$\frac{1}{8^{2/3}b^{12/3}}$

$\frac{1}{4b^4}$

OR

$\frac{1}{(8b^6)^{2/3}}$

$\frac{1}{8^{2/3}b^{12/3}}$

$\frac{1}{4b^4}$

45. $(c^2d^3)^{-1/3}$

$c^{-2/3}d^{-3/3}$

$\frac{1}{c^{2/3}d^{3/3}}$

$\frac{1}{c^{2/3}d}$

46. $(4x^6y^8)^{3/2}$

$4^{3/2}x^{18/2}y^{24/2}$

$8x^9y^{12}$

47. $(y^{3/4})^{2/3}$

$y^{\frac{6}{12}}$ OR $y^{1/2}$

48. $(a^{2/5})^{-3/4}$

$a^{-6/20}$

$= \frac{1}{a^{6/20}}$ OR $\frac{1}{a^{3/10}}$

49. $(2x^4y^{-4/5})^3(8y^2)^{2/3}$

$(2^3x^{12}y^{-12/5})(8^{2/3}y^{4/3})$

$(8x^{12}y^{-12/5})(4y^{4/3})$

$32x^{12}y^{-12/5+4/3}$

$32x^{12}y^{-36/15+20/15}$ $\rightarrow$ $32x^{12}y^{-16/15}$

$= \frac{32x^{12}}{y^{16/15}}$

50. $(x^{-5}y^3z^{10})^{-3/5}$

$x^{15/5}\ y^{-9/5}\ z^{-30/5}$

$= x^3\ y^{-9/5}\ z^{-6}$

$= \frac{x^3}{y^{9/5}\ z^6}$

51. $\left(\frac{x^6y}{y^4}\right)^{5/2}$

$\left(\frac{x^6}{y^3}\right)^{5/2}$

$= \frac{x^{30/2}}{y^{15/2}}$

$= \frac{x^{15}}{y^{15/2}}$

52. $\left(\frac{-2x^{1/3}}{y^{1/2}z^{1/6}}\right)^4$

$= \frac{-2^4\ x^{4/3}}{y^{4/2}\ z^{4/6}}$

$= \frac{-16\ x^{4/3}}{y^2\ z^{2/3}}$

53. $\left(\dfrac{3a^{-2}}{4b^{-1/3}}\right)^{-1}$

$= \dfrac{3^{-1}\ a^{2}}{4^{-1}\ b^{-1/3}}$

$= \dfrac{4\ a^{2}}{3\ b^{1/3}}$

54. $\dfrac{(y^{10}z^{-5})^{1/5}}{(y^{-2}z^{3})^{1/3}}$

$= \dfrac{y^{\frac{10}{5}}\ z^{\frac{-5}{5}}}{y^{\frac{-2}{3}}\ z^{3/3}}$

$= \dfrac{y^{2}\ z^{-1}}{y^{-\frac{2}{3}}\ z^{1}}$

$= y^{2-\left(-\frac{2}{3}\right)}\ z^{-1-1}$

$= y^{\frac{6}{3}+\frac{2}{3}}\ z^{-2}$

$= \dfrac{y^{\frac{8}{3}}}{z^{2}}$

55. $\dfrac{(9st)^{3/2}}{(27s^{3}t^{-4})^{2/3}}$

$= \dfrac{9^{3/2}\ s^{3/2}\ t^{3/2}}{27^{2/3}\ s^{6/3}\ t^{-8/3}}$

$= \dfrac{27}{9}\ s^{\frac{3}{2}-\frac{2}{1}}\ t^{\frac{3}{2}-\left(-\frac{8}{3}\right)}$

$= 3\ s^{\frac{3}{2}-\frac{4}{2}}\ t^{\frac{9}{6}+\frac{16}{6}}$

$= 3\ s^{-1/2}\ t^{25/6}$

$= \dfrac{3t^{25/6}}{s^{1/2}}$

56. $\left(\dfrac{a^{2}b^{-3}}{x^{-1}y^{2}}\right)^{3}\left(\dfrac{x^{-2}b^{-1}}{a^{3/2}y^{1/3}}\right)$

$\dfrac{a^{6}\ b^{-9}}{x^{-3}\ y^{6}}\ \dfrac{x^{-2}\ b^{-1}}{a^{3/2}\ y}$

$= \dfrac{a^{6}\ b^{-10}\ x^{-2}}{a^{3/2}\ x^{-3}\ y^{7}}$

$\dfrac{a^{6-\frac{3}{2}}\ x^{-2-(-3)}}{b^{10}}$

$\dfrac{a^{\frac{12}{2}-\frac{3}{2}}\ x^{1}}{b^{10}\ y^{7}}$

$= \dfrac{a^{9/2}\ x}{b^{10}\ y^{7}}$