Exercice 2 Simplifier + conditions:

a) $\sqrt{x\sqrt{x}}$

b) $\sqrt{z^3\sqrt{z^2\sqrt{z}}}$

c) $\sqrt[3]{k^2\sqrt{k}}$

d) $\sqrt[4]{m}\cdot\sqrt[4]{m^3}$

e) $\sqrt{y\sqrt[3]{\frac{1}{y}\sqrt[4]{y}}}$

f) $\frac{\sqrt[3]{a\sqrt{a^3}}}{\sqrt{a^3\sqrt{a^2}}}$

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a) $\sqrt{x\sqrt{x}} = \sqrt{x\cdot x^{\frac{1}{2}}} = \sqrt{x^{\frac{1}{1}+\frac{1}{2}}} = \sqrt{x^{\frac{2+1}{2}}} = \sqrt{x^{\frac{3}{2}}} = \sqrt{\sqrt{x^3}} = \underline{\sqrt[4]{x^3}}$

$x \geq 0$

b) $\sqrt{x^3\sqrt{x^2\sqrt{x}}} = \sqrt{x^3\sqrt{x^2\cdot x^{\frac{1}{2}}}} = \sqrt{x^3\sqrt{x^{\frac{2}{1}+\frac{1}{2}}}} = \sqrt{x^3\sqrt{x^{\frac{5}{2}}}} = \sqrt{x^3\sqrt{\sqrt{x^5}}} =$

$= \sqrt{x^3\sqrt[4]{x^5}} = \sqrt{x^3\cdot x^{\frac{5}{4}}} = \sqrt{x^{\frac{17}{4}}} = \sqrt{\sqrt[4]{x^{17}}} = \sqrt[8]{x^{17}} =$

$= \sqrt[8]{x^8\cdot x^8\cdot x} = \underline{x^2\cdot\sqrt[8]{x}}$ $\quad x \geq 0$

c) $\sqrt[3]{k^2\sqrt{k}} = \sqrt[3]{k^2\cdot k^{\frac{1}{2}}} = \sqrt[3]{k^{\frac{4}{2}+\frac{1}{2}}} = \sqrt[3]{k^{\frac{5}{2}}} = \sqrt[3]{\sqrt{k^5}} = \underline{\sqrt[6]{k^5}}$ $\quad k \geq 0$

d) $\sqrt[4]{m}\cdot\sqrt[4]{m^3} = \sqrt[4]{m\cdot m^3} = \sqrt[4]{m^4} = \underline{m}$ $\quad m \geq 0$

e) $\sqrt{y\sqrt[3]{\frac{1}{y}\sqrt[4]{y}}} = \sqrt{y\sqrt[3]{y^{-1}\cdot y^{\frac{1}{4}}}} = \sqrt{y\sqrt[3]{y^{-\frac{4}{4}+\frac{1}{4}}}} = \sqrt{y\sqrt[3]{y^{-\frac{3}{4}}}} = \sqrt{y\sqrt[3]{\sqrt[4]{y^{-3}}}} =$

$= \sqrt{y\sqrt[12]{y^{-3}}} = \sqrt{y^1\cdot y^{-\frac{3}{12}}} = \sqrt{y^1\cdot y^{-\frac{1}{4}}} = \sqrt{y^{\frac{3}{4}}} = \sqrt{\sqrt[4]{y^3}} = \underline{\sqrt[8]{y^3}}$

$y > 0$

f) $\frac{\sqrt[3]{a\sqrt{a^3}}}{\sqrt{a^3\sqrt{a^2}}} = \frac{\sqrt[3]{a\cdot a^{\frac{3}{2}}}}{\sqrt{a\cdot a^{\frac{2}{3}}}} = \frac{\sqrt[3]{a^{\frac{5}{2}}}}{\sqrt{a^{\frac{5}{3}}}} = \frac{\sqrt[3]{\sqrt{a^5}}}{\sqrt[2]{\sqrt[3]{a^5}}} = \frac{\sqrt[6]{a^5}}{\sqrt[6]{a^5}} = \underline{1}$ $\quad a > 0$

Exercice 3 Simplifier:

a) $\frac{x^{\frac{1}{2}}\cdot x^{\frac{3}{4}}}{x^2} = \frac{x^{\frac{1}{2}+\frac{3}{4}}}{x^2} = \frac{x^{\frac{5}{4}}}{x^2} = x^{\frac{5}{4}-\frac{2}{1}} = x^{\frac{5}{4}-\frac{8}{4}} = \underline{x^{-\frac{3}{4}}}$

b) $\frac{y^2}{(y^{\frac{1}{6}})^2} = \frac{y^2}{y^{\frac{2}{6}}} = \frac{y^2}{y^{\frac{1}{3}}} = y^{\frac{2}{1}-\frac{1}{3}} = y^{\frac{6-1}{3}} = \underline{y^{\frac{5}{3}}}$

c) $\frac{(x^{\frac{2}{3}})^{\frac{1}{4}}\cdot(x^{\frac{1}{6}})^{\frac{9}{4}}}{(x^{\frac{7}{2}})^{\frac{5}{6}}} = \frac{x^{\frac{2}{12}}\cdot x^{\frac{9}{24}}}{x^{\frac{35}{12}}} = \frac{x^{\frac{2}{12}+\frac{9}{24}}}{x^{\frac{35}{12}}} = \frac{x^{\frac{13}{24}}}{x^{\frac{35}{12}}} = x^{\frac{13}{24}-\frac{35}{12}} = x^{\frac{13-70}{24}} = x^{\frac{-57}{24}} = \underline{x^{-\frac{19}{8}}}$

d) $\frac{(y^{\frac{1}{2}})^3\cdot(y^2)^{\frac{1}{3}}}{y\cdot y^{\frac{2}{3}}} = \frac{y^{\frac{3}{2}}\cdot y^{\frac{2}{3}}}{y^{\frac{5}{3}}} = \frac{y^{\frac{9+4}{6}}}{y^{\frac{5}{3}}} = \frac{y^{\frac{13}{6}}}{y^{\frac{5}{3}}} = y^{\frac{13}{6}-\frac{5}{3}} = y^{\frac{13}{6}-\frac{10}{6}} = y^{\frac{3}{6}} = \underline{y^{\frac{1}{2}}}$