1. Semplifica, <u>se possibile</u>, i seguenti radicali, supponendo non negativi tutti i fattori che eventualmente compaiono (anche nei risultati):

$\sqrt[6]{216}$	$\sqrt[6]{6^3} = \sqrt{6}$	$\sqrt[12]{16}$	$\sqrt[12]{2^4} = \sqrt[3]{2}$
$\sqrt[10]{36}$	$\sqrt[10]{6^2} = \sqrt[5]{6}$	$\sqrt[6]{5^3 + 3^3}$	Non semplificabile
$\sqrt[4]{169}$	$\sqrt[4]{13^2} = \sqrt{13}$	$\sqrt[8]{81}$	$\sqrt[8]{3^4} = \sqrt{3}$
$\sqrt[6]{125\,a^6 b^9}$	$\sqrt[6]{(5\,a^2 b^3)^3} = \sqrt{5a^2 b^3}$	$\sqrt[15]{32\,a^{10} b^5}$	$\sqrt[15]{(2\,a^2 b)^5} = \sqrt[3]{2a^2 b}$
$\sqrt{16b^6}$	$\sqrt{(4b^3)^2} = 4b^3$	$\sqrt[4]{a^{12} b^{16}}$	$\sqrt[4]{(a^3 b^4)^4} = a^3 b^4$

2. Esegui le seguenti operazioni tra radicali e semplifica i risultati:

$\sqrt{80} \cdot \sqrt{5}$	$\sqrt{2^4 \cdot 5} \cdot \sqrt{5} = \sqrt{2^4 \cdot 5^2} = \sqrt{(2^2 \cdot 5)^2} = 2^2 \cdot 5 = 20$
$\sqrt[3]{5} \cdot \sqrt[3]{25}$	$\sqrt[3]{5} \cdot \sqrt[3]{5^2} = \sqrt[3]{5 \cdot 5^2} = \sqrt[3]{5^3} = 5$
$\sqrt{12} \cdot \sqrt{27}$	$\sqrt{2^2 \cdot 3} \cdot \sqrt{3^3} = \sqrt{2^2 \cdot 3^4} = \sqrt{(2 \cdot 3^2)^2} = 2 \cdot 3^2 = 18$
$\sqrt[5]{20} \cdot \sqrt[5]{100} \cdot \sqrt[5]{50}$	$\sqrt[5]{2^2 \cdot 5} \cdot \sqrt[5]{2^2 \cdot 5^2} \cdot \sqrt[5]{5^2 \cdot 2} = \sqrt[5]{2^5 \cdot 5^5} = \sqrt[5]{10^5} = 10$
$\sqrt[3]{\frac{6}{25}} \cdot \sqrt[3]{\frac{42}{35}} \cdot \sqrt[3]{\frac{1}{36}}$	$\sqrt[3]{\frac{2 \cdot 3}{5^2}} \cdot \sqrt[3]{\frac{2 \cdot 3 \cdot 7}{5 \cdot 7}} \cdot \sqrt[3]{\frac{1}{2^2 \cdot 3^2}} = \sqrt[3]{\frac{1}{5^3}} = \frac{1}{5}$
$\sqrt{\frac{4}{3}} \cdot \sqrt{\frac{27}{8}} \cdot \sqrt{4}$	$\sqrt{\frac{2^2}{3}} \cdot \sqrt{\frac{3^3}{2^3}} \cdot \sqrt{2^2} = \sqrt{2 \cdot 3^2} = \sqrt{18}$
$\sqrt[7]{\frac{x^9 y}{3}} \cdot \sqrt[7]{\frac{9}{x}} \cdot \sqrt[7]{\frac{1}{3xy^8}}$	$\sqrt[7]{\frac{x^9 y}{3} \cdot \frac{3^2}{x} \cdot \frac{1}{3xy^8}} = \sqrt[7]{\frac{x^7}{y^7}} = \frac{x}{y}$
$\sqrt[12]{a^4} \cdot \sqrt{a^3} : \sqrt[3]{a}$	$\sqrt[3]{a} \cdot \sqrt{a^3} : \sqrt[3]{a} = \sqrt{a^3}$
$\sqrt[5]{\frac{9b}{2a}} \cdot \sqrt[10]{\frac{4a^2}{81b^7}} \cdot \sqrt{\frac{3a}{2b^2}}$	$\sqrt[10]{\frac{3^4 b^2}{2^2 a^2} \cdot \frac{2^2 a^2}{3^4 b^7} \cdot \frac{3^5 a^5}{2^5 b^{10}}} = \sqrt[10]{\frac{3^5 a^5}{2^5 b^{15}}} = \sqrt[10]{\left(\frac{3a}{2b^3}\right)^5} = \sqrt{\frac{3a}{2b^3}}$
$\sqrt[4]{5} : \sqrt[12]{\frac{125}{27}}$	$\sqrt[4]{5} : \sqrt[12]{\frac{5^3}{3^3}} = \sqrt[4]{5} : \sqrt[12]{\left(\frac{5}{3}\right)^3} = \sqrt[4]{5} \cdot \sqrt[4]{\frac{3}{5}} = \sqrt[4]{3}$
$\sqrt{\frac{24}{7}} : \sqrt[4]{\frac{9}{49}}$	$\sqrt{\frac{2^3 \cdot 3}{7}} \cdot \sqrt[4]{\frac{7^2}{3^2}} = \sqrt{\frac{2^3 \cdot 3}{7}} \cdot \sqrt{\frac{7}{3}} = \sqrt{\frac{2^3 \cdot 3}{7} \cdot \frac{7}{3}} = \sqrt{2^3} = \sqrt{8}$
$\sqrt{1 - \frac{3}{5}} : \sqrt{\frac{8}{5}}$	$\sqrt{\frac{2}{5}} \cdot \sqrt{\frac{5}{8}} = \sqrt{\frac{2}{5} \cdot \frac{5}{2^3}} = \sqrt{\frac{1}{2^2}} = \frac{1}{2}$
$\sqrt{x} : \sqrt[4]{\frac{x^6}{y^4}}$	$\sqrt{x} \cdot \sqrt[4]{\frac{y^4}{x^6}} = \sqrt{x} \cdot \sqrt[4]{\left(\frac{y^2}{x^3}\right)^2} = \sqrt{x} \cdot \sqrt{\frac{y^2}{x^3}} = \sqrt{\frac{y^2}{x^2}} = \frac{y}{x}$
$\sqrt[3]{a} : \sqrt[21]{\frac{a^4}{b^3}}$	$\sqrt[21]{a^7 \cdot \frac{b^3}{a^4}} = \sqrt[21]{(ab)^3} = \sqrt[7]{ab}$
$\sqrt{9} : \sqrt[4]{27}$	$\sqrt{3^2} : \sqrt[4]{3^3} = \sqrt[4]{3^4 : 3^3} = \sqrt[4]{3}$

3. Semplifica le seguenti espressioni contenenti moltiplicazioni e divisioni fra radicali:

$\left(\sqrt{12}+\sqrt{75}-\sqrt{27}\right)\cdot\sqrt{3}$

$\left(\sqrt{2^2\cdot 3}+\sqrt{5^2\cdot 3}-\sqrt{3^3}\right)\cdot\sqrt{3}=\sqrt{2^2\cdot 3^2}+\sqrt{5^2\cdot 3^2}-\sqrt{3^4}=$

$=\sqrt{6^2}+\sqrt{15^2}-\sqrt{3^4}=6+15-9=12$

$(\sqrt{8}+\sqrt{72}):(\sqrt{24}:\sqrt{12})$

$(\sqrt{2^3}+\sqrt{2^3\cdot 3^2}):\sqrt{2^3\cdot 3:(2^2\cdot 3)}=$

$(\sqrt{2^3}+\sqrt{2^3\cdot 3^2}):\sqrt{2}=\sqrt{2^2}+\sqrt{2^2\cdot 3^2}=2+\sqrt{6^2}=8$

$\sqrt{\frac{x}{y}}:\sqrt[3]{\frac{x^2}{z}}\cdot\sqrt{\frac{y}{x}}$

$\sqrt{\frac{x}{y}}\cdot\sqrt{\frac{y}{x}}\cdot\sqrt[3]{\frac{z}{x^2}}=\sqrt[3]{\frac{z}{x^2}}$

$\left(\sqrt{\frac{3ab^2}{c}}:\sqrt{\frac{9b^2}{c}}\right)\cdot\left(\sqrt{\frac{a^2}{27}}:\sqrt{\frac{a}{9}}\right)$

$\sqrt{\frac{3ab^2}{c}\cdot\frac{c}{3^2b^2}}\cdot\sqrt{\frac{a^2}{3^3}\cdot\frac{3^2}{a}}=\sqrt{\frac{a}{3}}\cdot\sqrt{\frac{a}{3}}=\frac{a}{3}$

$\sqrt{\frac{x^2-4x+5}{x^2-2x+1}}\cdot\sqrt{\frac{x-1}{x}}:\sqrt{\frac{x^2-16}{x^3}}\cdot\sqrt{x+4}$

$\sqrt{\frac{(x-1)(x-4)}{(x-1)^2}\cdot\frac{x-1}{x}\cdot\frac{x^3}{(x-4)(x+4)}\cdot(x+4)}=\sqrt{x^2}=x$