

Eseguire le seguenti moltiplicazioni e semplificare il più possibile i risultati

98. $\sqrt[3]{3} \cdot \sqrt[4]{27} \cdot \sqrt[6]{3} \cdot \sqrt{3};$ $\sqrt{1 + \frac{1}{3}} \cdot \sqrt[3]{2 - \frac{1}{2}} \cdot \sqrt[4]{3 + \frac{3}{8}} \cdot \sqrt[12]{\frac{2}{3}}.$ $[\sqrt[4]{3^7}; \sqrt{3}]$
99. $\sqrt[6]{2 \cdot 10^{-5}} \cdot \sqrt[4]{2 \cdot 10^3};$ $\sqrt[12]{12 \cdot 10^{-9}} \cdot \sqrt[4]{2 \cdot 10^{-3}} \cdot \sqrt{5 \cdot 10^2}.$ $[\sqrt[12]{\frac{16}{5}}; \sqrt[12]{\frac{3}{2}}]$
100. $\sqrt[3]{x^4} \cdot \sqrt[3]{x} \cdot \sqrt[3]{x^7};$ $\sqrt[5]{2x} \cdot \sqrt[10]{xy} \cdot \sqrt{xy^3}.$ $[x^4; \sqrt[5]{2x^4y^8}]$
101. $\sqrt[4]{\frac{3u}{v}} \cdot \sqrt{\frac{uv^2}{3}} \cdot \sqrt{\frac{2u^3}{v}};$ $\sqrt[5]{\frac{3x^2y}{z}} \cdot \sqrt[3]{\frac{xy^2}{3z}} \cdot \sqrt[6]{\frac{3z^5}{xy}}.$ $[\sqrt[4]{\frac{4u^9v}{3}}; \sqrt[30]{3x^{17}y^{21}z^9}]$
102. $\sqrt[9]{a^2} \cdot \sqrt{a} \cdot \sqrt[6]{a};$ $\sqrt{3a} \cdot \sqrt[4]{2a^3} \cdot \sqrt{a};$ $\sqrt[3]{2a^2b} \cdot \sqrt[6]{2a^2b}.$ $[\sqrt[9]{a^8}; \sqrt[4]{18a^7}; \sqrt{2a^2b}]$
103. $\sqrt[4]{\frac{a}{b}} \cdot \sqrt[3]{\frac{b}{c}} \cdot \sqrt[6]{\frac{c^2}{a}};$ $\sqrt[3]{\frac{a}{b}} \cdot \sqrt{\frac{b}{a}} \cdot \sqrt[6]{\frac{a}{b}}.$ $[\sqrt[12]{ab}; 1]$
104. $\sqrt[4]{\frac{5xy^3z^2}{2ab^3}} \cdot \sqrt[6]{\frac{2a^2b}{5xy^2}} \cdot \sqrt[8]{\frac{2x^2yz}{5a^3b}};$ $\sqrt[12]{\frac{4x^2y}{5ab^3}} \cdot \sqrt[8]{\frac{25a^3b}{2x^4y^2}} \cdot \sqrt[6]{\frac{4x^2y}{5ab}}.$ $[\sqrt[24]{\frac{2x^6y^{13}z^{15}}{5a^7b^{17}}}; \sqrt[24]{\frac{2^9a^3}{b^7}}]$
105. $\sqrt[9]{\frac{4}{15}m^2n^3} \cdot \sqrt[9]{6mn^2} \cdot \sqrt[9]{\frac{mn^2}{25}} \cdot \sqrt[9]{m^2n^2}.$ $[\sqrt[3]{\frac{2m^2n^3}{5}}]$
106. $\sqrt{\frac{x+y}{x-y}} \cdot \sqrt[3]{\frac{x-y}{x+y}};$ $\sqrt{\frac{a^2-b^2}{a^2}} \cdot \sqrt[3]{\frac{a^3}{a^2+b^2+2ab}}.$ $[\sqrt[6]{\frac{x+y}{x-y}}; \sqrt[6]{\frac{(a-b)^3}{a+b}}]$
107. $\sqrt[6]{\frac{a^3+a^2b}{a-b}} \cdot \sqrt[3]{\frac{a-b}{a^2+ab}};$ $\sqrt{\frac{m^2+mn}{mn-n^2}} \cdot \sqrt[4]{\frac{m^3-2m^2n+mn^2}{m^3+2m^2n+mn^2}}.$ $[\sqrt[6]{\frac{a-b}{a+b}}; \sqrt{\frac{m}{n}}]$
108. $\sqrt[5]{\frac{a-b}{b(a+b)^2}} \cdot \sqrt[10]{\frac{b^3(a+b)^6}{a(a^2-b^2)^2}};$ $\sqrt[4]{\frac{1}{p} + \frac{1}{q}} \cdot \sqrt[3]{\frac{pq}{q^2-p^2}}.$ $[\sqrt[10]{\frac{b}{a}}; \sqrt[12]{\frac{pq}{(q-p)^4(q+p)}}]$
109. $\sqrt{a+1} \cdot \sqrt{a-1} \cdot \sqrt{a^2-1};$ $\sqrt[3]{\frac{a+1}{a-1}} \cdot \sqrt{\frac{a-1}{a+1}} \cdot \sqrt[6]{\frac{a^2-1}{a^2}}.$ $[a^2-1; \sqrt[3]{\frac{a-1}{a}}]$
110. $\sqrt[6]{(a^2+2a+1)^2} \cdot \sqrt[3]{\frac{a^2}{(a^2-1)^2}} \cdot \sqrt[6]{(a^2-2a+1)^2}.$ $[\sqrt[3]{a^2}]$
111. $\sqrt[3]{\frac{x(x-a)}{a}} \cdot \sqrt[4]{\frac{a^2}{x(x-a)}} \cdot \sqrt[6]{\frac{x(x-a)}{a}};$ $\sqrt[12]{\frac{y(x-y)^2}{x(x+y)^2}} \cdot \sqrt[4]{\frac{y}{x}} \cdot \sqrt[6]{\frac{x-y}{x+y}} \cdot \sqrt[3]{\frac{x^2+xy}{xy-y^2}}.$ $[\sqrt[4]{x(x-a)}; 1]$
112. $\sqrt{\frac{a+b}{a-b}} \cdot \sqrt[4]{\frac{a-b}{(a+b)^2}} \cdot \sqrt[6]{a^3-3a^2b+3ab^2-b^3}.$ $[\sqrt[4]{a-b}]$
113. $\sqrt[3]{x^3-xy^2} \cdot \sqrt[6]{\frac{x-y}{y^4+xy^3}} \cdot \sqrt[4]{\frac{y^2}{x^3-2x^2y+xy^2}}.$ $[\sqrt[12]{x(x+y)^2}]$
114. $\sqrt{\frac{4ab}{a-b}} \cdot \sqrt[3]{\frac{(a+b)^2}{4ab}-1} \cdot \sqrt[6]{\frac{1}{4ab}};$ $\sqrt{\frac{m^2+2m+4}{m-3}} \cdot \sqrt{\frac{m-2}{m^3-8}} \cdot \sqrt{\frac{1}{m-3}}.$ $[\sqrt[6]{a-b}; \frac{1}{m-3}]$
115. $\sqrt{\frac{xy}{x^2+y^2}+1} \cdot \sqrt[6]{\frac{x^2+xy}{(x^3-y^3)^3}} \cdot \sqrt{\frac{x^4-y^4}{x}} \cdot \sqrt[3]{\frac{1}{(x+y)^2}}.$ $[\sqrt[3]{\frac{1}{|x}}]$
116. $\sqrt[12]{\frac{y(x-y)^2}{x(x+y)^2}} \cdot \sqrt[4]{\frac{y}{x}} \cdot \sqrt[6]{\frac{x-y}{x+y}} \cdot \sqrt[3]{\frac{x^2+xy}{xy-y^2}}.$ $[1]$
117. $\sqrt{\left(\frac{1}{a} + \frac{1}{b}\right) \cdot \frac{ab}{a^2-b^2}} \cdot \sqrt[4]{a^3-a^2b} \cdot \sqrt[4]{\frac{(a-b)^2}{a^2}}.$ $[\sqrt[4]{a-b}]$

Eeguire le seguenti somme algebriche e semplificare il più possibile i risultati

326. $\sqrt{75} + 2\sqrt{12} + \sqrt{27} - \sqrt{147};$ $3\sqrt[6]{4} - \sqrt[15]{32} + 3\sqrt[12]{16} + \sqrt[3]{250}.$ $[5\sqrt{3}; 10\sqrt[3]{2}]$

327. $6\sqrt{\frac{32}{27}} + \frac{1}{10}\sqrt{\frac{125}{8}} - \sqrt{\frac{128}{3}} + 3\sqrt{\frac{5}{32}} + \sqrt{\frac{125}{8}}.$ $\left[\frac{7}{2}\sqrt{\frac{5}{2}}\right]$

328. $\frac{2}{5}\sqrt{75} + 3\sqrt{12} - 7\sqrt{3} + \frac{8}{3}\sqrt{27} - \frac{5}{4}\sqrt{48} - \sqrt{48}.$ $[0]$

329. $\sqrt{98} - \frac{3}{4}\sqrt{32} + \frac{3}{2}\sqrt{50} + \frac{5}{3}\sqrt{18} - 4\sqrt{32}.$ $\left[\frac{\sqrt{2}}{2}\right]$

330. $\frac{1}{3}\sqrt{45} - \frac{2}{5}\sqrt{\frac{50}{9}} + \frac{1}{8}\sqrt{\frac{20}{9}} - \frac{13}{2}\sqrt{\frac{5}{36}} - \sqrt{\frac{2}{9}}.$ $[-\sqrt{2}]$

331. $x\sqrt{x+y} - \sqrt{x+y} + y\sqrt{x+y};$ $\sqrt{x^3y^5} - \sqrt{4x^3y^3} + \sqrt{x^3y},$ (con $x, y \geq 0$).
 $[(x-1+y)\sqrt{x+y}; x(y-1)^2\sqrt{xy}]$

332. $\sqrt[3]{a^8b} + \sqrt[3]{a^2b^7} - \sqrt[3]{8a^5b^4};$ $\sqrt[3]{x^6y} + \sqrt[3]{y^7} + \sqrt[3]{8x^3y^4}.$ $[(a-b)^2\sqrt[3]{a^2b}; (x+y)^2\sqrt[3]{y}]$

333. $\sqrt[4]{p^2} - \sqrt{4p} + \sqrt[6]{\frac{p^3}{64}} + \sqrt{\frac{10}{9}p-p};$ $\sqrt{405x^5} - \sqrt{180x^3} + \sqrt{5x}.$ $\left[-\frac{1}{6}\sqrt{p}; (3x-1)^2\sqrt{5x}\right]$

334. $\sqrt{192x^7y} - \sqrt{432x^5y} + \sqrt{108x^3y} - \sqrt{3xy},$ ($x, y \geq 0$); $\sqrt[3]{5a^6} + \sqrt[3]{40a^3} + \sqrt[3]{5}.$
 $[(2x-1)^3\sqrt{3xy}; (1+a)^2\sqrt[3]{5}]$

335. $\sqrt{9a^3} - \sqrt{4ab^2} - 2a\sqrt{a} + 3b\sqrt{a} - \sqrt{ab^2},$ ($b \geq 0$). $[a\sqrt{a}]$

336. $5\sqrt{x^5} + \sqrt{4x^3} - x\sqrt{4x^3} - \sqrt{x} - (2x-1)\sqrt{x}.$ $[3x^2\sqrt{x}]$

337. $\sqrt{625abx^5y^5} - \sqrt{400a^3bx^3y^3} + \sqrt{16a^5bxy},$ ($a, b > 0$). $[(5xy-2a)^2\sqrt{abxy}]$

338. $\sqrt[3]{0,054a} - 2\sqrt[3]{2a} + 4a\sqrt[3]{\frac{2}{a^2}} - \frac{3}{a}\sqrt[3]{2a^4} - 0,3\sqrt[3]{2a}.$ $[-\sqrt[3]{2a}]$

339. $\frac{2}{3}\sqrt{\frac{3a^3x^2}{2b}} + \sqrt{\frac{147a}{50b^3}} - 4\sqrt{\frac{27am^2}{32bx^2}} + \sqrt{\frac{12am^2}{2bx^2}},$ ($a, b, x, m > 0$). $\left[\left(\frac{2}{3}ax + \frac{7}{5b} - \frac{m}{x}\right)\sqrt{\frac{3a}{2b}}\right]$

340. $\sqrt[5]{\frac{b^6}{a^5}} + \sqrt[5]{32b} + \frac{1}{b}\sqrt[5]{a^5b};$ $\frac{1}{a}\sqrt[5]{b^6} - \sqrt[5]{32b} + \frac{1}{b}\sqrt[5]{a^5b}.$ $\left[\frac{(a+b)^2}{ab}\sqrt[5]{b}; \frac{(a-b)^2}{ab}\sqrt[5]{b}\right]$

341. $5\sqrt[3]{x} - 6\sqrt{x} - \sqrt[6]{x^2} + \sqrt[6]{x^3} - 4\sqrt[3]{x} + 7\sqrt{x}.$ $[2\sqrt{x}]$

342. $\sqrt[4]{a^3b} - 4\sqrt[3]{a^2b^2} + 3\sqrt[4]{a^3b} + 2\sqrt[3]{a^2b^2} - 4\sqrt[4]{a^3b}.$ $[-2\sqrt[3]{a^2b^2}]$

343. $3a\sqrt{x} + 5x\sqrt{x} - \sqrt{4a^2x} + 2\sqrt{x^3}.$ $[(7x+a)\sqrt{x} \text{ per } a \geq 0, (7x+5a)\sqrt{x} \text{ per } a < 0]$

344. $8\sqrt[4]{a^3} - 3\sqrt[3]{a} + 2\sqrt[4]{a^3} + \sqrt[3]{a} - 9\sqrt[4]{a^3} + 2\sqrt[3]{a}.$ $[\sqrt[4]{a^3}]$

345. $\sqrt{12x+8y} + \sqrt{75x+50y} - 2\sqrt{27x+18y}.$ $[\sqrt{3x+2y}]$

346. $\sqrt{75x-25} - \sqrt{12x-4} + \sqrt{3x^3-x^2}.$ $[(x+3)\sqrt{3x-1}]$

Eeguire le seguenti operazioni e semplificare il più possibile i risultati

Esercizi proposti

Eeguire le seguenti operazioni e semplificare i risultati.

- 367.** $(\sqrt{8} - \sqrt{75})(\sqrt{12} - \sqrt{50}); \quad (\sqrt{20} - \sqrt{8})(\sqrt{45} + \sqrt{32}).$ [$29\sqrt{6} - 50; 2(\sqrt{10} + 7)$]
- 368.** $\sqrt{2}(\sqrt{6} - \sqrt{2}) - \sqrt{3}(2 - \sqrt{3}); \quad (2\sqrt{3} + 4\sqrt{6} - 6\sqrt{2})(\sqrt{2} + \sqrt{3}).$ [$1; 2(4\sqrt{3} + 6\sqrt{2} - 2\sqrt{6} - 3)$]
- 369.** $(2\sqrt{5} + \sqrt{6} - 4\sqrt{3})(\sqrt{5} - \sqrt{3}) + 3(2\sqrt{15} + \sqrt{2}).$ [$\sqrt{30} + 22$]
- 370.** $3\sqrt{6}(\sqrt{6} - \sqrt{3} + 2\sqrt{2}) - 6\sqrt{2}(\sqrt{6} + \sqrt{2}) + 9\sqrt{2}.$ [6]
- 371.** $2\sqrt{5}(\sqrt{10} + \sqrt{15} + \sqrt{3}) - \sqrt{3}(10 + 3\sqrt{6} + \sqrt{20}).$ [$\sqrt{2}$]
- 372.** $(\sqrt[4]{2} - \sqrt{2})^2 + \sqrt[4]{8}(\sqrt[4]{8} - \sqrt[4]{2}) - \sqrt{2}(3 - 2\sqrt[4]{2}).$ [0]
- 373.** $(2\sqrt{3} - \sqrt{2})^3 - 6\sqrt{2}(2\sqrt{2} + \sqrt{6}) + (3\sqrt{2})^3 - 24(\sqrt{3} - 1).$ [$16\sqrt{2}$]
- 374.** $(\sqrt{12} + \sqrt{6} - \sqrt{18})(2\sqrt{3} + \sqrt{6} + 3\sqrt{2}) - \sqrt{3}(\sqrt{8} + 1)(4\sqrt{3} - \sqrt{6}).$ [$-9\sqrt{2}$]
- 375.** $\left(\frac{\sqrt{18}}{4} + \sqrt{3}\right)^2 + \sqrt{6}\left(1 - \frac{3}{2}\sqrt{2}\right) + 3\sqrt{3} - \frac{33}{8}.$ [$\frac{5}{2}\sqrt{6}$]
- 376.** $\sqrt{2\sqrt{2} + 1} \cdot \sqrt{2\sqrt{2} - 1} + 3\sqrt{28} - \sqrt{63}.$ [$4\sqrt{7}$]
- 377.** $[\sqrt{2 - \sqrt{3}} \cdot \sqrt{2 + \sqrt{3}} + 2\sqrt{2}]^2.$ [$9 + 4\sqrt{2}$]
- 378.** $(\sqrt{ab} - 2\sqrt{a} + 3\sqrt{b})(\sqrt{a} + \sqrt{b}).$ [$\sqrt{ab} + a\sqrt{b} + b\sqrt{a} - 2a + 3b$]
- 379.** $(3\sqrt{ab} - 2\sqrt{a} + \sqrt{b})(2\sqrt{ab} + 3\sqrt{a} - 4\sqrt{b}).$ [$11\sqrt{ab} - 10b\sqrt{a} + 5a\sqrt{b} + 6ab - 6a - 4b$]
- 380.** $\left(\sqrt{\frac{a}{b}} \cdot \sqrt[4]{\frac{a^3}{b^3}} \cdot \sqrt[8]{\frac{a^7}{b^7}}\right) : \sqrt[8]{\frac{a}{b}}; \quad \sqrt[3]{a\sqrt{b^2}} \sqrt[3]{a\sqrt{b}} : \sqrt[6]{3a\sqrt{b}}.$ [$\left(\frac{a}{b}\right)^2; \sqrt[3]{ab}$]
- 381.** $(\sqrt{x} + 2\sqrt{y})(\sqrt{x} - 2\sqrt{y}) + 3(\sqrt{x} + \sqrt{y})^2.$ [$4x - y + 6\sqrt{xy}$]
- 382.** $\left(2\sqrt{a} + \frac{1}{3}\sqrt{b}\right)\left(3\sqrt{a} - \frac{1}{2}\sqrt{b}\right) + (2\sqrt{a} + \sqrt{b})^2 - 10\left(a + \frac{b}{12}\right).$ [$4\sqrt{ab}$]
- 383.** $(1 + x + \sqrt{2x})(1 + x - \sqrt{2x}) + (\sqrt{1-x} + x - 1)(\sqrt{1-x} - x + 1).$ [$1 + x$]
- 384.** $\left(\sqrt{16 - 16x^2} - \sqrt{4 - 4x^2} - (1 - x)\sqrt{\frac{1+x}{1-x}}\right) : \sqrt{1+x}.$ [$\sqrt{1-x}$]
- 385.** $\left(\sqrt{9x^2 - 81} - 4(x + 3)\sqrt{\frac{x-3}{x+3}} + \sqrt{4x^2 - 36}\right) : \sqrt{x-3}.$ [$\sqrt{x+3}$]
- 386.** $\sqrt{\frac{m^2 + 1}{m^2}} - \sqrt{\frac{(m^2 + 2mn + n^2)(m^2 + 1)}{m^2n^2}} + \sqrt{\frac{m^2 + 1}{n^2}}, \quad (m > 0, n > 0).$ [0]

Esercizi proposti

Razionalizzare il denominatore delle seguenti frazioni.

443. $\frac{4}{\sqrt{5}}$; $\frac{6}{\sqrt{3}}$; $\frac{9}{\sqrt{15}}$; $\frac{9}{\sqrt{6}}$; $\frac{5}{\sqrt{10}}$; $\frac{3}{\sqrt{12}}$
 $[\frac{4\sqrt{5}}{5}; 2\sqrt{3}; \frac{3\sqrt{15}}{5}; \frac{3\sqrt{6}}{2}; \frac{\sqrt{10}}{2}; \frac{\sqrt{3}}{2}]$
444. $\frac{2}{\sqrt{2}}$; $\frac{3}{\sqrt{3}}$; $\frac{5}{\sqrt{2}}$; $\frac{1}{\sqrt{8}}$; $\frac{9}{\sqrt{12}}$; $\frac{15}{\sqrt{20}}$
 $[\sqrt{2}; \sqrt{3}; \frac{5\sqrt{2}}{2}; \frac{\sqrt{2}}{4}; \frac{3\sqrt{3}}{2}; \frac{3\sqrt{5}}{2}]$
445. $\frac{7\sqrt{3}}{\sqrt{2}}$; $\frac{5\sqrt{6}}{\sqrt{2}}$; $\frac{8\sqrt{8}}{\sqrt{2}}$; $\frac{2}{3\sqrt{2}}$; $\frac{5}{2\sqrt{3}}$; $\frac{1}{8\sqrt{8}}$
 $[\frac{7}{2}\sqrt{6}; 5\sqrt{3}; 16; \frac{\sqrt{2}}{3}; \frac{5}{6}\sqrt{3}; \frac{\sqrt{2}}{32}]$
446. $\frac{a}{\sqrt{a}}$; $\frac{3b^2}{\sqrt{3b}}$; $\frac{6ax}{\sqrt{2x}}$; $\frac{2x^2y}{\sqrt{2xy}}$
 $[\sqrt{a}; b\sqrt{3b}; 3a\sqrt{2x}; x\sqrt{2xy}]$
447. $\frac{2x^2\sqrt{y}}{\sqrt{2xy}}$; $\frac{3xy^2}{\sqrt{6xyz}}$; $\frac{6a}{\sqrt{12a}}$; $\frac{3xy}{2\sqrt{6xy}}$
 $[x\sqrt{2x}; \frac{y\sqrt{6xyz}}{2z}; \sqrt{3a}; \frac{\sqrt{6xy}}{4}]$
448. $\frac{8xy^2}{5\sqrt{x^3y}}$; $\frac{6ab}{\sqrt{2ab}}$; $\frac{x^2y}{\sqrt{xy^3}}$; $\frac{2}{3\sqrt{8a}}$
 $[\frac{8y\sqrt{xy}}{5|x|}; 3\sqrt{2ab}; \frac{x\sqrt{xy}}{|y|}; \frac{\sqrt{2a}}{6a}]$
449. $\frac{3x^2y}{\sqrt{81x^8y^5}}$; $\frac{3ab}{\sqrt{a^2b}}$; $\frac{5ab}{\sqrt{4ab^2}}$
 $[\frac{\sqrt{y}}{3x^2y^2}; \frac{3a\sqrt{b}}{|a|}; \frac{5b\sqrt{a}}{2|b|}]$
450. $\frac{x-2y}{3\sqrt{2x}}$; $\frac{x+y}{2\sqrt{2xy}}$; $\frac{x-y}{3\sqrt{xy^3}}$
 $[\frac{(x-2y)\sqrt{2x}}{6x}; \frac{(x+y)\sqrt{2xy}}{4xy}; \frac{(x-y)\sqrt{xy}}{3xy^2}]$
451. $\frac{a+1}{\sqrt{a+1}}$; $\frac{b^2-2b+1}{\sqrt{b-1}}$; $\frac{2+\sqrt{2x}}{\sqrt{2x}}$, $(x, y > 0)$. $[\sqrt{a+1}; (b-1)\sqrt{b-1}; \frac{\sqrt{2x+x}}{x}]$
452. $\frac{(a-1)\sqrt{a^2+a}}{\sqrt{a}\sqrt{a^2-1}}$; $\frac{(a+b)\sqrt{a}}{\sqrt{a^2+ab}}$; $\frac{x^2-y^2}{\sqrt{x-y}}$
 $[\sqrt{a-1}; \sqrt{a+b}; (x+y)\sqrt{x-y}]$
453. $\frac{b^4+b^2+1}{\sqrt{b^2+b+1}}$; $\frac{a^4+a^2+1}{\sqrt{a^2-a+1}}$
 $[(b^2-b+1)\sqrt{b^2+b+1}; (a^2+a+1)\sqrt{a^2-a+1}]$
454. $\frac{\sqrt{a}}{\sqrt{a^2-ab}}$; $\frac{\sqrt{b}}{\sqrt{b^2+ab}}$; $\frac{\sqrt{xy-y^2}}{\sqrt{x^2-xy}}$
 $[\frac{\sqrt{a-b}}{a-b}; \frac{\sqrt{a+b}}{a+b}; \frac{\sqrt{xy}}{|x|}]$
455. $\frac{2x-\sqrt{y}}{3x\sqrt{y}}$; $\frac{2a+b}{5\sqrt{4a^2-b^2}}$
 $[\frac{2x\sqrt{y}-y}{3xy}; \frac{\sqrt{4a^2-b^2}}{5(2a-b)}]$
456. $\frac{\sqrt{a^2+ab}}{\sqrt{a^2-b^2}}$; $\frac{b^2+y^2+2by-1}{\sqrt{b+y+1}}$
 $[\frac{\sqrt{a(a-b)}}{|a-b|}; (b+y-1)\sqrt{b+y+1}]$
457. $\frac{a^2-b^2+a-b}{(a-b)\sqrt{a+b+1}}$; $\frac{a\sqrt{2}-b\sqrt{3}}{a\sqrt{2b}}$
 $[\sqrt{a+b+1}; \frac{\sqrt{2b}(a\sqrt{2}-b\sqrt{3})}{2ab}]$
458. $\frac{(a+3b)^2}{\sqrt{2a+6b}}$; $\frac{4a+1}{\sqrt{16a^2-1}}$
 $[\frac{(a+3b)\sqrt{2a+6b}}{2}; \frac{\sqrt{16a^2-1}}{4a-1}]$
459. $\frac{(t+3)\sqrt{t-3}}{\sqrt{t^2-9}}$; $\frac{(4p^2-q^2)\sqrt{2p+q}}{\sqrt{2p-q}}$
 $[\sqrt{t+3}; (2p+q)\sqrt{4p^2-q^2}]$

Razionalizzare il denominatore delle seguenti frazioni e semplificare il più possibile il risultato

473. $\frac{6}{\sqrt{7}+\sqrt{5}}$; $\frac{14}{3+\sqrt{2}}$; $\frac{5}{4-\sqrt{6}}$. $[3(\sqrt{7}-\sqrt{5}); 2(3-\sqrt{2}); \frac{1}{2}(4+\sqrt{6})]$
474. $\frac{2}{\sqrt{5}-2}$; $\frac{4}{3-\sqrt{7}}$; $\frac{12}{\sqrt{10}-2}$. $[2(\sqrt{5}+2); 2(3+\sqrt{7}); 2(\sqrt{10}+2)]$
475. $\frac{\sqrt{5}+2}{\sqrt{5}-2}$; $\frac{\sqrt{3}-1}{\sqrt{3}+1}$; $\frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$. $[9+4\sqrt{5}; 2-\sqrt{3}; \frac{7+2\sqrt{10}}{3}]$
476. $\frac{\sqrt{2}-1}{\sqrt{2}+1}$; $\frac{\sqrt{2}+1}{2-\sqrt{2}}$; $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$. $[3-2\sqrt{2}; \frac{4+3\sqrt{2}}{2}; 5+2\sqrt{6}]$
477. $\frac{\sqrt{6}-\sqrt{2}}{\sqrt{3}+1}$; $\frac{\sqrt{10}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$; $\frac{6}{2\sqrt{5}-3\sqrt{2}}$. $[2\sqrt{2}-\sqrt{6}; \frac{5\sqrt{2}+2\sqrt{5}+\sqrt{10}+2}{3}; 3(2\sqrt{5}+3\sqrt{2})]$
478. $\frac{1}{\sqrt{a}-\sqrt{b}}$; $\frac{2b}{\sqrt{a+b}-\sqrt{a}}$. $[\frac{\sqrt{a}+\sqrt{b}}{a-b}; 2(\sqrt{a+b}+\sqrt{a})]$
479. $\frac{1}{a-\sqrt{b}}$; $\frac{b}{\sqrt{a}-\sqrt{a-b}}$. $[\frac{a+\sqrt{b}}{a^2-b}; \sqrt{a}+\sqrt{a-b}]$
480. $\frac{1}{\sqrt{a+1}+\sqrt{a}}$; $\frac{1}{\sqrt{a+1}-\sqrt{a}}$. $[\sqrt{a+1}-\sqrt{a}; \sqrt{a+1}+\sqrt{a}]$
481. $\frac{y}{\sqrt{x}+\sqrt{x-y}}$; $\frac{b}{\sqrt{a+b}-\sqrt{a}}$. $[\sqrt{x}-\sqrt{x-y}; \sqrt{a+b}+\sqrt{a}]$
482. $\frac{xy}{\sqrt{y^3}-\sqrt{xy^2}}$; $\frac{1}{\sqrt{y+1}+\sqrt{y-1}}$. $[\frac{x(\sqrt{x}+\sqrt{y})}{y-x}; \frac{\sqrt{y+1}-\sqrt{y-1}}{2}]$
483. $\frac{ab}{a\sqrt{b}+b\sqrt{a}}$; $\frac{2a}{2\sqrt{a}+\sqrt{2a}}$. $[\frac{a\sqrt{b}-b\sqrt{a}}{a-b}; 2\sqrt{a}-\sqrt{2a}]$
484. $\frac{a-\sqrt{b}}{a+\sqrt{b}}$; $\frac{\sqrt{1+a}+\sqrt{1-a}}{\sqrt{1+a}-\sqrt{1-a}}$. $[\frac{a^2+b-2a\sqrt{b}}{a^2-b}; \frac{1+\sqrt{1-a^2}}{a}]$
485. $\frac{\sqrt{a}-\sqrt{b}}{\sqrt{a}+\sqrt{b}}$; $\frac{a+\sqrt{a^2-1}}{a-\sqrt{a^2-1}}$. $[\frac{a+b-2\sqrt{ab}}{a-b}; 2a^2-1+2a\sqrt{a^2-1}]$
486. $\frac{b-2}{2\sqrt{b}-b\sqrt{2}}$; $\frac{a-1}{\sqrt{a}+1}$; $\frac{a-b}{a\sqrt{b}-b\sqrt{a}}$. $[-\frac{2\sqrt{b}+b\sqrt{2}}{2b}; \sqrt{a}-1; \frac{a\sqrt{b}+b\sqrt{a}}{ab}]$
487. $\frac{\sqrt{3ab}(3a-b)}{3a\sqrt{b}-b\sqrt{3a}}$; $\frac{b(a-\sqrt{ab})}{\sqrt{ab}-b}$; $\frac{(a\sqrt{b}-\sqrt{a})\sqrt{b}}{ab-\sqrt{ab}}$. $[\sqrt{3a}+\sqrt{b}; \sqrt{ab}; 1]$
488. $\frac{a-b}{a-\sqrt{ab}}$; $\frac{a-b}{\sqrt{ab}+b}$; $\frac{a-b}{a\sqrt{b}+b\sqrt{a}}$. $[1+\frac{\sqrt{ab}}{a}; \frac{\sqrt{ab}}{b}-1; \frac{a\sqrt{b}-b\sqrt{a}}{ab}]$
489. $\frac{b(a^2+\sqrt{b})}{a^2\sqrt{b}+b}$; $\frac{y(x^2+2\sqrt{y})}{x^2\sqrt{y}+2y}$; $\frac{(a-1)^2}{\sqrt{a^2+1}+\sqrt{2a}}$. $[\sqrt{b}; \sqrt{y}; \sqrt{a^2+1}-\sqrt{2a}]$
490. $\frac{x+y+\sqrt{(x+3y)(x-y)}}{\sqrt{x+3y}+\sqrt{x-y}}$. $[\frac{\sqrt{x+3y}+\sqrt{x-y}}{2}]$
491. $\frac{2x^2+xy-y^2}{\sqrt{3x}+\sqrt{x+y}}$; $\frac{(a-2)(a^2-a-2)}{\sqrt{a^2+1}-\sqrt{4a-3}}$. $[(x+y)(\sqrt{3x}-\sqrt{x+y}); (a+1)(\sqrt{a^2+1}+\sqrt{4a-3})]$

Razionalizzare il denominatore delle seguenti frazioni, supponendo positivi tutti i fattori letterali.

460. $\frac{4}{\sqrt[3]{4}}$; $\frac{6}{\sqrt[3]{3}}$; $\frac{3}{\sqrt[3]{6}}$; $\frac{2}{\sqrt[3]{2}}$. $[2\sqrt[3]{2}; 2\sqrt[3]{9}; \frac{\sqrt[3]{36}}{2}; \sqrt[3]{4}]$
461. $\frac{1}{\sqrt[4]{3}}$; $\frac{6}{\sqrt[4]{2}}$; $\frac{5}{\sqrt[4]{5}}$; $\frac{3}{\sqrt[5]{81}}$. $[\frac{\sqrt[4]{27}}{3}; 3\sqrt[4]{8}; \sqrt[4]{125}; \frac{\sqrt[3]{9}}{3}]$
462. $\frac{5}{\sqrt[3]{5}}$; $\frac{6}{\sqrt[4]{8}}$; $\frac{2}{\sqrt[5]{16}}$; $\frac{3}{\sqrt[5]{81}}$. $[\sqrt[3]{25}; 3\sqrt[4]{2}; \sqrt[5]{2}; \sqrt[5]{3}]$
463. $\frac{4}{\sqrt[4]{32}}$; $\frac{\sqrt{2}}{\sqrt[3]{2}}$; $\frac{2\sqrt[3]{2}}{\sqrt[3]{4}}$; $\frac{5}{\sqrt[4]{5^3}}$. $[\sqrt[4]{8}; \sqrt[5]{2}; \sqrt[3]{4}; \sqrt[4]{5}]$
464. $\frac{a}{\sqrt[3]{a}}$; $\frac{b}{\sqrt[5]{b}}$; $\frac{c}{\sqrt[4]{c}}$; $\frac{a}{\sqrt[5]{a^2}}$. $[\sqrt[3]{a^2}; \sqrt[5]{b^4}; \sqrt[4]{c^3}; \sqrt[5]{a^3}]$
465. $\frac{a}{\sqrt[6]{a^5}}$; $\frac{1}{\sqrt[3]{x^2}}$; $\frac{2a}{\sqrt[4]{128a}}$; $\frac{3x^2y}{\sqrt[3]{81x^8y^5}}$. $[\sqrt[6]{a}; \frac{\sqrt[3]{x}}{x}; \frac{\sqrt[4]{2a^3}}{2}; \frac{\sqrt[3]{9xy}}{3xy}]$
466. $\frac{a}{\sqrt[7]{a^3}}$; $\frac{a}{\sqrt[8]{a^3b^2}}$; $\frac{x}{\sqrt[4]{8x^3}}$; $\frac{a}{\sqrt[5]{27a^2}}$. $[\sqrt[7]{a^4}; \frac{\sqrt[8]{a^5b^6}}{b}; \frac{\sqrt[4]{2x}}{2}; \frac{\sqrt[5]{9a^3}}{3}]$
467. $\frac{a}{x\sqrt[3]{a^2}}$; $\frac{b}{y\sqrt[4]{b^3}}$; $\frac{a}{x\sqrt[5]{a^4}}$; $\frac{2mn}{\sqrt[3]{16m^4n^2}}$. $[\frac{\sqrt[3]{a}}{x}; \frac{\sqrt[4]{b}}{y}; \frac{\sqrt[5]{a}}{x}; \frac{\sqrt[3]{4m^2n}}{2m}]$
468. $\frac{ac}{\sqrt[5]{a^3bc^4}}$; $\frac{4xy}{\sqrt{2xy}}$; $\frac{5x^2y}{2\sqrt{5xy}}$; $\frac{27a^2}{\sqrt[3]{9a^2}}$. $[\frac{\sqrt[5]{a^2b^4c}}{b}; 2\sqrt{2xy}; \frac{1}{2}x\sqrt{5xy}; 9a\sqrt[3]{3a}]$

RADICALI DOPPI

Trasformare i seguenti radicali doppi in somme di radicali semplici.

537. $\sqrt{3+\sqrt{8}}$; $\sqrt{5+\sqrt{24}}$; $\sqrt{4-\sqrt{12}}$. $[\sqrt{2}+1; \sqrt{3}+\sqrt{2}; \sqrt{3}-1]$
538. $\sqrt{8+\sqrt{39}}$; $\sqrt{7-\sqrt{13}}$; $\sqrt{9+\sqrt{17}}$. $[\sqrt{\frac{13}{2}}+\sqrt{\frac{3}{2}}; \sqrt{\frac{13}{2}}-\sqrt{\frac{1}{2}}; \sqrt{\frac{17}{2}}+\sqrt{\frac{1}{2}}]$
539. $\sqrt{6+\sqrt{32}}$; $\sqrt{5-\sqrt{24}}$; $\sqrt{3+\sqrt{5}}$. $[2+\sqrt{2}; \sqrt{3}-\sqrt{2}; \sqrt{\frac{5}{2}}+\sqrt{\frac{1}{2}}]$
540. $\sqrt{7+4\sqrt{3}}$; $\sqrt{4+2\sqrt{3}}$; $\sqrt{8+4\sqrt{3}}$. $[2+\sqrt{3}; \sqrt{3}+1; \sqrt{6}+\sqrt{2}]$
541. $\sqrt{9-4\sqrt{2}}$; $\sqrt{13+4\sqrt{3}}$; $\sqrt{16-8\sqrt{3}}$. $[2\sqrt{2}-1; 2\sqrt{3}+1; 2\sqrt{3}-2]$
542. $\sqrt{29+12\sqrt{3}}$; $\sqrt{23-6\sqrt{10}}$; $\sqrt{8+2\sqrt{15}}$. $[\sqrt{29+12\sqrt{3}}; 3\sqrt{2}-\sqrt{5}; \sqrt{5}+\sqrt{3}]$
543. $\sqrt{21+4\sqrt{5}}$; $\sqrt{43-30\sqrt{2}}$; $\sqrt{15-6\sqrt{6}}$. $[2\sqrt{5}+1; 5-3\sqrt{2}; 3-\sqrt{6}]$
544. $\sqrt{41+12\sqrt{5}}$; $\sqrt{8-2\sqrt{7}}$; $\sqrt{9+4\sqrt{2}}$. $[6+\sqrt{5}; \sqrt{7}-1; 2\sqrt{2}+1]$
545. $\sqrt{\frac{7}{2}+2\sqrt{3}}$; $\sqrt{\frac{17}{12}-\sqrt{2}}$; $\sqrt{\frac{19}{15}-2\sqrt{\frac{2}{5}}}$. $[\sqrt{2}+\sqrt{\frac{3}{2}}; \frac{\sqrt{3}}{2}-\frac{\sqrt{6}}{3}; \sqrt{\frac{2}{3}}-\sqrt{\frac{3}{5}}]$
546. $\sqrt{\frac{13}{4}+\sqrt{3}}$; $\sqrt{\frac{31}{9}+4\frac{\sqrt{3}}{3}}$; $\sqrt{\frac{49}{10}-4\sqrt{\frac{3}{2}}}$. $[\frac{1}{2}+\sqrt{3}; \frac{2}{3}+\sqrt{3}; \frac{1}{2}\sqrt{10}-\frac{2}{5}\sqrt{15}]$
547. $\sqrt{\frac{91}{4}+10\sqrt{3}}$; $\sqrt{\frac{41}{36}+\frac{2\sqrt{2}}{3}}$; $\sqrt{\frac{11}{4}-\frac{3\sqrt{2}}{2}}$. $[2+\frac{5\sqrt{3}}{2}; \frac{1}{2}+\frac{2\sqrt{2}}{3}; \frac{3}{2}-\frac{\sqrt{2}}{2}]$

Calcolare il valore delle seguenti espressioni numeriche

310 Esercizi

$$585. \frac{\sqrt[3]{9} + \sqrt[3]{3}}{\sqrt[3]{3}} - \sqrt[3]{5} \cdot \frac{\sqrt[3]{15} + \sqrt[3]{3}}{\sqrt[3]{25} + \sqrt[3]{5}}. \quad [1]$$

$$586. \left(\frac{\sqrt{3}}{\sqrt{6}-2} - \frac{1}{\sqrt{2}+\sqrt{5}} + \frac{\sqrt{5}}{\sqrt{10}+5} \right) (3\sqrt{2} - 2\sqrt{3}) \cdot \frac{\sqrt{3}-\sqrt{2}}{3(\sqrt{3}+\sqrt{2})}. \quad [5 - 2\sqrt{6}]$$

$$587. \left[\frac{(1+\sqrt{2})^2}{\sqrt{2}(2+\sqrt{2})} + (1+\sqrt{2}) \left(\frac{1}{2\sqrt{2}} + \frac{1}{4+2\sqrt{2}} \right) \right] (\sqrt{2}-1). \quad [1]$$

$$588. \frac{(\sqrt{3}-1)^2}{4\sqrt{3}} + (\sqrt{3}-1) \left(1 - \frac{1}{\sqrt{3}} \right) \frac{1}{4} - \frac{2}{\sqrt{3}}. \quad [-1]$$

$$589. \frac{2}{3+2\sqrt{6}} - \frac{\sqrt{2}}{2\sqrt{3}} + \frac{\sqrt{2}}{2(2\sqrt{2}+\sqrt{3})} + \frac{1}{\sqrt{3}} - \frac{\sqrt{3}+1}{4\sqrt{3}} + \frac{\sqrt{3}+1}{4}. \quad \left[\frac{\sqrt{3}}{2} \right]$$

$$590. \left[\left(\frac{\sqrt{2}}{\sqrt{3}} + \frac{\sqrt{3}}{\sqrt{2}} \right) : \left(\frac{\sqrt{2}}{\sqrt{3}} - \frac{\sqrt{3}}{\sqrt{2}} \right) \right] \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \cdot \frac{1}{5+2\sqrt{6}}. \quad [-5]$$

$$591. \left(1 - \frac{2\sqrt{2}}{3\sqrt{3}} \right) \left(\sqrt{3} - \frac{\sqrt{6}(\sqrt{2}+\sqrt{3})}{5+\sqrt{6}} \right) \left(1 - \frac{\sqrt{3}}{\sqrt{2}-\sqrt{3}} \right) \left(\sqrt{3} + \frac{1}{\sqrt{2}} \right). \quad [5]$$

$$592. \left(\frac{\sqrt{3}+1}{\sqrt{3}-1} + \frac{\sqrt{3}-1}{\sqrt{3}+1} - 2 \right) \left(1 - \frac{2}{\sqrt{3}+1} \right) \cdot \frac{2-\sqrt{3}}{4+2\sqrt{3}}. \quad [(2-\sqrt{3})^3]$$

$$593. \left(\frac{1}{\sqrt{6}+1} - \frac{2\sqrt{6}}{6-\sqrt{6}} + \frac{\sqrt{6}+2}{5} \right) \cdot \frac{15}{\sqrt{6}}. \quad \left[-\frac{\sqrt{6}}{2} \right]$$

$$594. \frac{9\sqrt{3}-11\sqrt{2}}{11\sqrt{2}} \left[\left(\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} \right)^3 - \frac{27}{27-11\sqrt{6}} \right]. \quad [1]$$

Calcolare il valore delle seguenti espressioni numeriche contenenti radicali doppi.

$$595. \sqrt{7+\sqrt{13}} \cdot \sqrt{7-\sqrt{13}}; \quad \sqrt{13+4\sqrt{3}} \cdot \sqrt{13-4\sqrt{3}}. \quad [6; 11]$$

$$596. \sqrt[3]{3\sqrt{5}+\sqrt{18}} \cdot \sqrt[3]{3\sqrt{5}-\sqrt{18}}; \quad [3-2(2-\sqrt{3})\sqrt{7+4\sqrt{3}}]^2. \quad [3; 1]$$

$$597. \left[\sqrt[3]{1+\sqrt{2}} + \sqrt[3]{-1+\sqrt{2}} \right]^3 - 3 \left[\sqrt[3]{1+\sqrt{2}} + \sqrt[3]{-1+\sqrt{2}} \right]. \quad [2\sqrt{2}]$$

$$598. \sqrt[4]{\sqrt{27}+\sqrt{11}} \cdot \sqrt[4]{\sqrt{27}-\sqrt{11}} + \sqrt[3]{\sqrt{31}+2} \cdot \sqrt[3]{\sqrt{31}-2}. \quad [5]$$

$$599. \sqrt{6+2\sqrt{5}} \cdot \sqrt{6-2\sqrt{5}} - \sqrt[6]{3+2\sqrt{2}} \cdot \sqrt[6]{3-2\sqrt{2}}. \quad [3]$$

$$600. \sqrt{9-4\sqrt{5}} \cdot \sqrt{7-4\sqrt{3}} \cdot \sqrt{9+4\sqrt{5}} \cdot \sqrt{7+4\sqrt{3}} + \sqrt{3-\sqrt{2}} \cdot \sqrt{3-\sqrt{2}} + (\sqrt[4]{2}-\sqrt{3})(\sqrt{3}+\sqrt[4]{2}). \quad [1]$$

$$601. \frac{1}{2\sqrt{2}} \sqrt{\sqrt{28}-\sqrt{12}} \cdot \left(\sqrt{\sqrt{112}+8} + \sqrt{\sqrt{112}-8} \right). \quad [2\sqrt{2}]$$

$$602. \left(\sqrt{\frac{3\sqrt{5}+5}{2\sqrt{5}}} + \sqrt{\frac{2\sqrt{3}+3}{2\sqrt{3}}} - \sqrt{\frac{3-\sqrt{5}}{2}} + \sqrt{1-\frac{\sqrt{3}}{2}} \right) (\sqrt{3}-1). \quad [2]$$

Calcolare il valore delle seguenti espressioni letterali

312 Esercizi

620. $a + \sqrt{1-a^2} - \frac{2a\sqrt{1-a^2}}{a + \sqrt{1-a^2}} + \frac{1}{a - \sqrt{1-a^2}}$. [$\frac{2a}{2a^2-1}$]

621. $\frac{a^2\sqrt{a} - 2\sqrt{a^3b^2} + \sqrt{ab^4}}{(a-b)(\sqrt{a}-\sqrt{b})} + \frac{a\sqrt{b} - b\sqrt{a}}{\sqrt{a} + \sqrt{b}} - 2\sqrt{ab}$. [$a-b$]

622. $\frac{4a}{b^2} \sqrt{\frac{b^4c + 5b^4}{a^3}} + \sqrt{\frac{16c + 80}{a}}$. [$8\sqrt{\frac{c+5}{a}}$ per $a > 0$, 0 per $a < 0$]

623. $\frac{x + \sqrt{x^2 - 3y^2}}{x - \sqrt{x^2 - 3y^2}} - \frac{x - \sqrt{x^2 - 3y^2}}{x + \sqrt{x^2 - 3y^2}} - \frac{4x\sqrt{x^2 - 3y^2}}{3y^2}$. [0]

624. $\frac{\sqrt[3]{4y^2} - 5\sqrt[3]{2y} + 25}{\sqrt[3]{2y} - 5} + \frac{\sqrt[3]{4y^2} + 5\sqrt[3]{2y} + 25}{\sqrt[3]{2y} + 5} - \frac{4y}{\sqrt[3]{4y^2} - 25}$. [0]

625. $\frac{(a-b)\sqrt{a^2-b^2}}{(a+b)\sqrt{a^3-3a^2b+3ab^2-b^3}} - \frac{1}{\sqrt{a+b}}$. [0]

626. $\frac{m + \sqrt{m^2-1}}{m - \sqrt{m^2-1}} - \frac{m - \sqrt{m^2-1}}{m + \sqrt{m^2-1}}$. [$4m\sqrt{m^2-1}$]

627. $\frac{(\sqrt{x+2} + \sqrt{x-2})^2 - 2x}{2\sqrt{x-2}}$. [$\sqrt{x+2}$]

628. $\frac{a^2 - b^2}{a - 2\sqrt{ab} + b} \cdot \frac{\sqrt{a} - \sqrt{b}}{a + \sqrt{ab}} \cdot \frac{a}{a + b}$. [\sqrt{a}]

629. $\sqrt{a+1} \left(\sqrt{\frac{a+1}{a-1}} - \sqrt{\frac{1}{a^2-1}} \right) - \sqrt{\frac{a}{a^2-1}} \cdot \sqrt{a^2+a}$. [0]

630. $\left(\sqrt{2+5x^2} + \frac{1}{\sqrt{2-5x^2}} \right) : \left(1 + \frac{1}{\sqrt{4-25x^4}} \right)$. [$\sqrt{2+5x^2}$]

631. $\left(\frac{1}{\sqrt[4]{a} - \sqrt[4]{b}} + \frac{1}{\sqrt[4]{a} + \sqrt[4]{b}} \right) : \frac{\sqrt[4]{ab}}{\sqrt{a} - \sqrt{b}}$. [$\frac{2}{\sqrt[4]{b}}$]

632. $\frac{\left[(a+b)\sqrt{\frac{a-b}{a+b}} + (a-b)\sqrt{\frac{a+b}{a-b}} \right]^2}{a-b}$. [$4(a+b)$]

633. $\left(\frac{2\sqrt[3]{ab}}{\sqrt[3]{a^2} - \sqrt[3]{ab} + \sqrt[3]{b^2}} + 1 \right) : \left[\frac{a-b}{a+b} \cdot \left(\frac{2\sqrt[3]{b}}{\sqrt[3]{a} - \sqrt[3]{b}} + 1 \right) \right]$. [1]

634. $\frac{\sqrt{x+1} - \frac{1}{\sqrt{x-1}}}{1 - \frac{1}{\sqrt{x^2-1}}} : \sqrt{x+1} + \frac{\sqrt{x+1} + \sqrt{x-1}}{\sqrt{x+1} - \sqrt{x-1}} - \sqrt{x^2-1}$. [$x+1$]

673. $\frac{x-2}{\sqrt{3}-1} + \frac{2x}{\sqrt{3}+1} = 3;$ $\frac{x-1}{\sqrt{2}} - \frac{x-1}{2-\sqrt{2}} = \frac{x}{\sqrt{2}-1}.$ $\left[\sqrt{3}+1; 1 - \frac{\sqrt{2}}{2} \right]$
674. $\sqrt{6}(\sqrt{2} + \sqrt{3})^2 x - 6(\sqrt{2} + \sqrt{3}) = (\sqrt{2} + \sqrt{3})x - \sqrt{6}.$ $\left[\frac{\sqrt{6}}{\sqrt{2} + \sqrt{3}} \right]$
675. $1 - \frac{2 + \sqrt{2} - x}{2 + \sqrt{2}} = \frac{x - 2 + \sqrt{2}}{2 - \sqrt{2}}.$ $\left[\frac{\sqrt{2}}{2} \right]$
676. $\frac{3(x - \sqrt{3} - \sqrt{2})}{1 - \sqrt{3}} - \frac{2(x - 1 + \sqrt{3})}{\sqrt{2} + \sqrt{3}} = 1.$ $[\sqrt{2} + 1]$
677. $\frac{x + \sqrt{6}}{\sqrt{6} - \sqrt{3}} + \frac{x - \sqrt{6}}{\sqrt{6} + \sqrt{3}} = \frac{x + \sqrt{3}}{\sqrt{6} + \sqrt{3}} + \frac{2(x - \sqrt{3})}{\sqrt{6} - \sqrt{3}}.$ $[3\sqrt{3}]$
678. $\frac{(2\sqrt{3} + \sqrt{2})x}{2\sqrt{3} - \sqrt{2}} - \frac{(2\sqrt{3} - \sqrt{2})x}{2\sqrt{3} + \sqrt{2}} = \frac{2\sqrt{6}}{7 - 2\sqrt{6}} + \frac{2x\sqrt{6}}{5}.$ $\left[\frac{7 + 2\sqrt{6}}{5} \right]$
679. $\frac{x}{\frac{2}{\sqrt{11}} + \frac{\sqrt{11}}{2}} + \frac{x}{\frac{2}{\sqrt{11}} - \frac{\sqrt{11}}{2}} = -\frac{8}{105}.$ $\left[\frac{\sqrt{11}}{22} \right]$
680. $\frac{x - \sqrt{3}}{x - \sqrt{5}} - \frac{x - \sqrt{5}}{x - \sqrt{3}} = \frac{\sqrt{5} - 2\sqrt{3} - 2}{x^2 - x(\sqrt{5} + \sqrt{3}) + \sqrt{15}}.$ $\left[-\frac{1}{4}(\sqrt{15} + 1) \right]$
681. $\frac{\sqrt{2}x - 2}{x - \sqrt{2} - \sqrt{3}} = \frac{\sqrt{2}x + \sqrt{6}}{x + \sqrt{2} + \sqrt{3}}.$ $[\sqrt{2} - \sqrt{3}]$
682. $\frac{\sqrt{3} + x\sqrt{2}}{x + 2\sqrt{3}} - \frac{(\sqrt{3} + \sqrt{2})(x^2 + 1)}{x^2 - 12} = \frac{\sqrt{2} - x\sqrt{3}}{x - 2\sqrt{3}}.$ $[5 + 2\sqrt{6}]$
683. $1 + \frac{1}{x - \sqrt{3}} = \frac{x^2}{x^2 + x\sqrt{3} + 3} + \frac{x^2(1 + \sqrt{3})}{x^3 - (\sqrt{3})^3}.$ $[3 - \sqrt{3}]$
684. $\frac{2x + \sqrt{a}}{\sqrt{b}} - \frac{x - \sqrt{b}}{\sqrt{a}} = \frac{3x\sqrt{a} + (\sqrt{a} - \sqrt{b})^2}{\sqrt{ab}}.$ $\left[2 \frac{a\sqrt{b} - b\sqrt{a}}{a - b} \right]$
685. $\frac{a-1}{2\sqrt{a}} \left[\frac{1}{x} - \frac{1}{(\sqrt{a}-1)^2} \right] = \frac{\sqrt{a}+1}{x} - \frac{1}{\sqrt{a}-1}.$ $[(\sqrt{a}+1)^2]$
686. $\frac{3\sqrt{b}}{x - \sqrt{b}} - \frac{x}{x + \sqrt{b}} = \frac{11b - x^2}{x^2 - b}.$ $[2\sqrt{b}]$
687. $\frac{1}{x^3 - \sqrt{a}x^2 + ax} - \frac{\sqrt{a}(2\sqrt{a} + x^2)}{x^4 + a\sqrt{a}x} + \frac{1}{x} = \frac{1}{x + \sqrt{a}}.$ $\left[\frac{a - \sqrt{a}}{\sqrt{a} + 1} \right]$
688. $x\sqrt{\frac{a}{b}} + x\sqrt{\frac{b}{a}} = \sqrt{\frac{a}{b^3}} - \sqrt{\frac{b}{a^3}};$ $\frac{x}{\sqrt{a}} + \frac{x}{\sqrt{b}} = 2(\sqrt{a} + \sqrt{b}).$ $\left[\frac{a-b}{ab}; 2\sqrt{ab} \right]$
689. $(x - \sqrt{a})^2 - \left(2x + \frac{\sqrt{a}}{2} \right)^2 = a - 3x^2.$ $\left[-\frac{\sqrt{a}}{16} \right]$

Risolvere le seguenti equazioni a coefficienti irrazionali:

655. $\sqrt{5}(x-1) = -\sqrt{3};$ $(\sqrt{7}-\sqrt{5})x - \sqrt{7} + \sqrt{5} = 0.$ $\left[\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}}; 1\right]$

656. $x\sqrt{2} + 2\sqrt{3} = x\sqrt{3};$ $x\sqrt{2} + 4 = 3x\sqrt{2} - 4x.$ $[2(3+\sqrt{6}); -2-\sqrt{2}]$

657. $x\sqrt{3} - 1 = x + \sqrt{3};$ $x\sqrt{5} = 5 + \sqrt{5}.$ $[2 + \sqrt{3}; \sqrt{5} + 1]$

658. $x\sqrt{2} = x + 2\sqrt{2};$ $\sqrt{7}(x - \sqrt{7} + 3) = x + 2.$ $[4 + 2\sqrt{2}; \sqrt{7} - 2]$

659. $\sqrt{5}(x - \sqrt{5}) - \sqrt{2}(\sqrt{2} - x) = 2\sqrt{10}.$ $[\sqrt{2} + \sqrt{5}]$

670. $\frac{x-1}{2\sqrt{2}-2} + \frac{x}{\sqrt{2}+1} = 1;$ $\frac{x}{\sqrt{2}+3} - \frac{x}{3-\sqrt{2}} + \frac{8}{7} = 0.$ $\left[\frac{10\sqrt{2}+9}{17}; 2\sqrt{2}\right]$

671. $\frac{x+\sqrt{3}}{\sqrt{3}+1} - \frac{x-2\sqrt{3}}{\sqrt{3}-1} + 2\sqrt{3} = 0;$ $\frac{1-x}{2} - \frac{x}{\sqrt{2}-2} = \frac{\sqrt{2}x}{\sqrt{2}-1}.$ $\left[\frac{5\sqrt{3}+9}{2}; \frac{3-\sqrt{2}}{7}\right]$

672. $\frac{x}{3+\sqrt{3}} + 2 - \frac{x}{3-\sqrt{3}} = 0;$ $\frac{x-1}{\sqrt{2}-1} - \frac{x+1}{\sqrt{2}+1} + x = \frac{\sqrt{2}+2}{1+\sqrt{2}}.$ $[2\sqrt{3}; \sqrt{2}]$

Risolvere i seguenti sistemi a coefficienti irrazionali:

696. $\begin{cases} x + \sqrt{2}y = 3\sqrt{2} \\ 2x - 3\sqrt{2}y = \sqrt{2} \end{cases};$ $\begin{cases} x + 5y = 2\sqrt{5} \\ \sqrt{5}(x-y) = 4. \end{cases}$ $[(2\sqrt{2}, 1); (\sqrt{5}, \frac{\sqrt{5}}{5})]$

697. $\begin{cases} x + y = (\sqrt{2} + 1)^2 \\ x - \sqrt{2}y = -1; \end{cases}$ $\begin{cases} x + y = \sqrt{5} + 1 \\ 3x + y = 3(\sqrt{5} - 1). \end{cases}$ $[(3, 2\sqrt{2}); (\sqrt{5} - 2, 3)]$

698. $\begin{cases} \sqrt{3}x - y = 3 - \sqrt{2} \\ \sqrt{2}x - y = \sqrt{6} - \sqrt{2}; \end{cases}$ $\begin{cases} x + y = 2 \\ x - y = 2(\sqrt{3} - 1). \end{cases}$ $[(\sqrt{3}, \sqrt{2}); (\sqrt{3}, 2 - \sqrt{3})]$

699. $\begin{cases} \sqrt{3}x - \sqrt{2}y = 2 \\ \sqrt{2}x - \sqrt{3}y = \sqrt{6} - 1; \end{cases}$ $\begin{cases} (\sqrt{3}-1)x + (\sqrt{3}+1)y = 4 \\ \sqrt{2}x + \sqrt{6}y = 4\sqrt{2}. \end{cases}$ $[(\sqrt{2}, \sqrt{3}-\sqrt{2}); (\sqrt{3}+1, \sqrt{3}-1)]$

700. $\begin{cases} \sqrt{2}x + \sqrt{3}y = 2 \\ 2x - 3y = \sqrt{2} - \sqrt{3}; \end{cases}$ $\begin{cases} x - \sqrt{5}y = \sqrt{5}(\sqrt{5}-1) \\ \sqrt{5}x - y = 5\sqrt{5}-1. \end{cases}$ $\left[\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{3}}{3}\right); (5, 1)\right]$

701. $\begin{cases} x + 2\sqrt{2}y = 4 \\ \sqrt{2}(x+y) = 2\sqrt{2} + 1; \end{cases}$ $\begin{cases} (\sqrt{3}-1)x + (\sqrt{3}+1)y = 3 \\ 2x + y = 2\sqrt{3}. \end{cases}$ $\left[\left(2, \frac{\sqrt{2}}{2}\right); \left(\frac{\sqrt{3}+1}{2}, \sqrt{3}-1\right)\right]$