B

1. Razionalizza i denominatori delle seguenti frazioni:

$$\frac{5}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \sqrt{5}$$

$$\frac{a-\sqrt{a}}{\sqrt{a}} \cdot \frac{\sqrt{a}}{\sqrt{a}} = \frac{a\sqrt{a}-a}{a} = \frac{a(\sqrt{a}-1)}{a} = \sqrt{a}-1$$

$$\frac{5}{\sqrt{11}+1} \cdot \frac{\sqrt{11}-1}{\sqrt{11}-1} = \frac{5(\sqrt{11}-1)}{11-1} = \frac{\sqrt{11}-1}{2}$$

$$\frac{22\sqrt{3}}{3\sqrt{3}+4} \cdot \frac{3\sqrt{3}-4}{3\sqrt{3}-4} = \frac{22(9-4\sqrt{3})}{27-16} = 18-8\sqrt{3}$$

2. Poni sotto forma di un unico radicale i seguenti radicali:

$$\sqrt{7\sqrt[3]{\frac{5}{98}}} = \sqrt{\sqrt[3]{7^3 \cdot \frac{5}{98}}} = \sqrt[6]{7^3 \cdot \frac{5}{2 \cdot 7^2}} = \sqrt[6]{\frac{35}{2}}$$

$$\sqrt[3]{\frac{1}{9}\sqrt{9\sqrt{3}}} = \sqrt[3]{\frac{1}{9}\sqrt{\sqrt{9^2 \cdot 3}}} = \sqrt[3]{\frac{1}{9}\sqrt[4]{3^4 \cdot 3}} = \sqrt[3]{\frac{1}{3^2}\sqrt[4]{3^5}} = \sqrt[3]{\sqrt[4]{\frac{1}{3^8} \cdot 3^5}} = \sqrt[12]{\frac{1}{3^3}} = \sqrt[4]{\frac{1}{3}}$$

3. Trasporta fuori dal segno di radice tutti i fattori possibili nei seguenti radicali:

$$\sqrt{a^8 b} = a^4\sqrt{b}$$

$$\sqrt[3]{8a^3 b} = \sqrt[3]{2^3 a^3 b} = 2a\sqrt[3]{b}$$

$$\sqrt[3]{125a^3 b^9 c^2} = \sqrt[3]{5^3 a^3 b^9 c^2} = 5ab^3\sqrt[3]{c^2}$$

$$\sqrt{16a^4 b} = \sqrt{2^4 a^4 b} = 2^2 a^2\sqrt{b}$$

4. Semplifica le seguenti espressioni:

a. $$\frac{1}{\sqrt{5}+2} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{5}} - \sqrt{7} =$$

$$= \frac{1}{\sqrt{5}+2} \cdot \frac{\sqrt{5}-2}{\sqrt{5}-2} + \frac{1}{\sqrt{7}+\sqrt{6}} \cdot \frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}-\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{5}} \cdot \frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}} - \sqrt{7} =$$

$$= \sqrt{5}-2+\sqrt{7}-\sqrt{6}+\sqrt{6}-\sqrt{5}-\sqrt{7} = -2$$

b. $(3+\sqrt{2})^2 - (1-2\sqrt{2})^2 - 2(5\sqrt{2}+2) =$

$= 9 + 2 + 6\sqrt{2} - (1 - 4\sqrt{2} + 8) - 10\sqrt{2} - 4 =$

$= 9 + 2 + 6\sqrt{2} - 1 + 4\sqrt{2} - 8 - 10\sqrt{2} - 4 = -2$

c. $(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3}) + (2-\sqrt{3})^2 + \sqrt{48} =$

$= 5 - 3 + 4 + 3 - 4\sqrt{3} + \sqrt{2^4 \cdot 3} =$

$= 9 - 4\sqrt{3} + 4\sqrt{3} = 9$

d. $\sqrt[5]{x^3\sqrt{\frac{1}{x^5}}} \cdot \sqrt{x\sqrt[7]{\frac{1}{x}}} \cdot \sqrt{\frac{1}{x}} =$

$= \sqrt[5]{\sqrt{x^6 \cdot \frac{1}{x^5}}} \cdot \sqrt{\sqrt[7]{x^7 \cdot \frac{1}{x}}} \cdot \sqrt{\frac{1}{x}} =$

$= \sqrt[10]{x} \cdot \sqrt[14]{x^6} \cdot \sqrt{\frac{1}{x}} = \sqrt[10]{x} \cdot \sqrt[7]{x^3} \cdot \sqrt{\frac{1}{x}} =$

$= \sqrt[70]{x^7 \cdot x^{30} \cdot \frac{1}{x^{35}}} = \sqrt[70]{x^2} = \sqrt[35]{x}$

e. $(\sqrt[8]{a})^4 \cdot (\sqrt[5]{a^2})^5 \cdot \sqrt{a} =$

$= \sqrt{a} \cdot a^2 \cdot \sqrt{a} = a \cdot a^2 = a^3$