

Calcula cu nr. reale

$$A = 4 \cdot \sqrt{48} - 6 \cdot \sqrt{12} + 3 \sqrt{147} - 2 \sqrt{192} + 5 \sqrt{27}$$

$$\begin{array}{l} 48 \left| \begin{array}{l} 2^2 \rightarrow 2 \\ 12 \left| \begin{array}{l} 2^2 \rightarrow 2 \\ 3 \left| 3 \\ 1 \end{array} \right. \end{array} \right. \\ 48 \left| \begin{array}{l} 2 \\ 24 \left| \begin{array}{l} 2 \\ 12 \left| \begin{array}{l} 2 \\ 6 \left| \begin{array}{l} 2 \\ 3 \end{array} \right. \end{array} \right. \end{array} \right. \\ 12 \left| \begin{array}{l} 2 \\ 6 \left| \begin{array}{l} 2 \\ 3 \end{array} \right. \end{array} \right. \\ 12 \left| \begin{array}{l} 2 \\ 6 \left| \begin{array}{l} 2 \\ 3 \end{array} \right. \end{array} \right. \end{array}$$

$$\begin{cases} \sqrt{147} = \sqrt{49 \cdot 3} = \sqrt{49} \cdot \sqrt{3} = 7\sqrt{3} \\ \sqrt{48} = \sqrt{16 \cdot 3} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3} \\ \sqrt{192} = \sqrt{64 \cdot 3} = \sqrt{64} \cdot \sqrt{3} = 8\sqrt{3} \end{cases}$$

$$A = 4 \cdot 4\sqrt{3} - 6 \cdot 2\sqrt{3} + 3 \cdot 7\sqrt{3} - 2 \cdot 8\sqrt{3} + 5 \cdot 3\sqrt{3} = 16\sqrt{3} - 12\sqrt{3} + 21\sqrt{3} - 16\sqrt{3} + 15\sqrt{3} = 9\sqrt{3}$$

$$B = (5\sqrt{432} - 2\sqrt{75}) : \sqrt{2^2 \cdot 5^4}$$

$$\begin{array}{l} 432 \left| \begin{array}{l} 2 \\ 216 \left| \begin{array}{l} 2 \\ 108 \left| \begin{array}{l} 2^2 \rightarrow 2 \\ 27 \left| \begin{array}{l} 3^2 \rightarrow 3 \\ 3 \left| 3 \\ 1 \end{array} \right. \end{array} \right. \end{array} \right. \\ 75 \left| \begin{array}{l} 3 \\ 25 \left| \begin{array}{l} 5^2 \rightarrow 5 \\ 1 \end{array} \right. \end{array} \right. \end{array}$$

$$B = (5 \cdot 12\sqrt{3} - 2 \cdot 5\sqrt{3}) : (2 \cdot 5^2)$$

$$B = (60\sqrt{3} - 10\sqrt{3}) : (2 \cdot 25)$$

$$B = 50\sqrt{3} : (50) = \frac{50\sqrt{3}}{50} = \sqrt{3}$$

ATENȚIE:
 $50 : (2 \cdot 5) = 50 : 10 = 5$
 $50 : 2 \cdot 5 = 25 \cdot 5 = 125$
 $50 : (2 \cdot 5) \neq 50 : 2 \cdot 5$

$$C = (\sqrt{216} - \sqrt{72}) : \sqrt{6} - (\sqrt{486} - \sqrt{294}) : \sqrt{3}$$

$$\begin{array}{l} 216 \left| \begin{array}{l} 3 \\ 72 \left| \begin{array}{l} 2^2 \rightarrow 2 \\ 18 \left| \begin{array}{l} 2 \\ 9 \left| \begin{array}{l} 3^2 \rightarrow 3 \\ 1 \end{array} \right. \end{array} \right. \end{array} \right. \\ 72 \left| \begin{array}{l} 2 \\ 36 \left| \begin{array}{l} 3 \\ 12 \left| \begin{array}{l} 11^2 \\ 1 \end{array} \right. \end{array} \right. \\ 486 \left| \begin{array}{l} 2 \\ 243 \left| \begin{array}{l} 3 \\ 81 \left| \begin{array}{l} 3^4 \rightarrow 3^2 \\ 3 \left| 3 \\ 1 \end{array} \right. \end{array} \right. \end{array} \right. \\ 294 \left| \begin{array}{l} 2 \\ 147 \left| \begin{array}{l} 3 \\ 49 \left| \begin{array}{l} 7^2 \rightarrow 7 \\ 1 \end{array} \right. \end{array} \right. \end{array}$$

$$C = (6\sqrt{6} - 11\sqrt{6}) : \sqrt{6} - (9\sqrt{6} - 7\sqrt{6}) : \sqrt{3} = -5\sqrt{6} : \sqrt{6} - 2\sqrt{6} : \sqrt{3}$$

$$C = -\frac{5\sqrt{6}}{\sqrt{6}} - \frac{2\sqrt{6}}{\sqrt{3}} = -5 - \frac{2\sqrt{3} \cdot \sqrt{2}}{\sqrt{3}} = -5 - 2\sqrt{2} \quad \sqrt{6} = \sqrt{3 \cdot 2} = \sqrt{3} \cdot \sqrt{2}$$

$$D = 2\sqrt{3} \cdot 5\sqrt{2} = 2 \cdot 5 \cdot \sqrt{3} \cdot \sqrt{2} = 10 \cdot \sqrt{3 \cdot 2} = 10\sqrt{6} \quad E = -3\sqrt{5} \cdot 2\sqrt{7} = -6\sqrt{35}$$

Știm că: $a \cdot (b + c) = a \cdot b + a \cdot c$ $a \cdot (b - c) = a \cdot b - a \cdot c$

$$3\sqrt{2} \cdot (2\sqrt{3} - 3\sqrt{2}) = 6\sqrt{6} - 9 \cdot 2 = 6\sqrt{6} - 18 \quad \left\{ \begin{array}{l} 12 \left| \begin{array}{l} 2^2 \rightarrow 2 \\ 3 \left| 3 \\ 1 \end{array} \right. \\ 75 \left| \begin{array}{l} 3 \\ 25 \left| \begin{array}{l} 5^2 \rightarrow 5 \\ 1 \end{array} \right. \end{array} \right. \\ 50 \left| \begin{array}{l} 25 \\ 5 \left| \begin{array}{l} 5 \\ 1 \end{array} \right. \end{array} \right. \end{array}$$

$$5\sqrt{12} \cdot (3\sqrt{75} - 2\sqrt{2}) - 2\sqrt{3} \cdot (5\sqrt{50} + 3\sqrt{3}) =$$

$$= 5 \cdot 2\sqrt{3} \cdot (3 \cdot 5\sqrt{3} - 2\sqrt{2}) - 2\sqrt{3} \cdot (5 \cdot 5\sqrt{2} + 3\sqrt{3}) =$$

$$= 10\sqrt{3} \cdot (15\sqrt{3} - 2\sqrt{2}) - 2\sqrt{3} \cdot (25\sqrt{2} + 3\sqrt{3}) =$$

$$= 150 \cdot 3 - 20\sqrt{6} - 50\sqrt{6} - 6 \cdot 3 = 450 - 70\sqrt{6} - 18 = 432 - 70\sqrt{6}$$

Stim că: $(a+b) \cdot (x+y) = (a+b) \cdot x + (a+b) \cdot y = ax + bx + ay + by$

$$(\sqrt{3} + \sqrt{2}) \cdot (\sqrt{5} + \sqrt{7}) = \sqrt{15} + \sqrt{21} + \sqrt{10} + \sqrt{14}$$

$$(\sqrt{7} - \sqrt{3}) \cdot (\sqrt{7} + \sqrt{3}) = 7 + \cancel{\sqrt{21}} - \cancel{\sqrt{21}} - 3 = 4$$

$$(a+b) \cdot (a-b) = a^2 - \cancel{ab} + \cancel{ab} - b^2 = a^2 - b^2 \Rightarrow$$

$$(a+b) \cdot (a-b) = a^2 - b^2$$

$$a \geq 0 \Rightarrow$$

$$(\sqrt{a})^2 = \sqrt{a^2} = |a| = a$$

$$(\sqrt{7})^2 = 7$$

$$(\sqrt{131} + \sqrt{130}) \cdot (\sqrt{131} - \sqrt{130}) = (\sqrt{131})^2 - (\sqrt{130})^2 = 131 - 130 = 1$$

$$1997^2 - 1996^2 = (1997 + 1996) \cdot (1997 - 1996) =$$

$$= 3993 \cdot 1 = 3993$$

ATENȚIE: $a^2 + b^2 \neq (a+b)^2$
 $a^2 - b^2 \neq a^2 - b^2$
 $7 = 16 - 9 = 4^2 - 3^2 \neq (4-3)^2 = 1^2 = 1 \Rightarrow$
 $4^2 - 3^2 \neq (4-3)^2$

$$2001^2 - 2000^2 = (2001 + 2000) \cdot (2001 - 2000) = 4001 \cdot 1 = 4001$$

$$(3\sqrt{2} + 2\sqrt{3} - 5\sqrt{5}) \cdot (2\sqrt{3} - 3\sqrt{2}) = 6\sqrt{6} - 9 \cdot 2 + 4 \cdot 3 - 6\sqrt{6} - 10\sqrt{15} + 15\sqrt{10} =$$

$$= -18 + 12 - 10\sqrt{15} + 15\sqrt{10} = -6 - 10\sqrt{15} + 15\sqrt{10}$$

$$(2\sqrt{48} - 5\sqrt{162}) \cdot (\sqrt{175} - \sqrt{242} + \sqrt{6}) =$$

$$= (2 \cdot 4\sqrt{3} - 5 \cdot 9\sqrt{2}) \cdot (5\sqrt{7} - 11\sqrt{2} + \sqrt{6}) =$$

$$= (8\sqrt{3} - 45\sqrt{2}) \cdot (5\sqrt{7} - 11\sqrt{2} + \sqrt{6}) =$$

$$= 40\sqrt{21} - 88 \cdot \sqrt{6} + 8\sqrt{18} - 225\sqrt{14} + 495 \cdot 2 - 45 \cdot \sqrt{12} =$$

$$\begin{array}{r} 48 \mid 2^2 \rightarrow 2 \\ 12 \mid 2^2 \rightarrow 2 \\ 3 \mid 3 \\ 1 \end{array} \quad \begin{array}{r} 162 \mid 2 \\ 81 \mid 3^2 \rightarrow 3 \\ 1 \end{array} \quad \begin{array}{r} 175 \mid 5 \\ 35 \mid 5 \\ 7 \mid 7 \\ 1 \end{array}$$

$$\begin{array}{r} 242 \mid 2 \\ 121 \mid 11^2 \rightarrow 11 \\ 1 \end{array}$$

$$= 40\sqrt{1} - 88\sqrt{6} + 8 \cdot 3\sqrt{2} - 225\sqrt{14} + 990 - 45 \cdot 2\sqrt{3} =$$

$$= 40\sqrt{1} - 88\sqrt{6} + 24\sqrt{2} - 225\sqrt{14} + 990 - 90\sqrt{3}$$

$$18\sqrt{3} : (2\sqrt{3}) = \frac{18\sqrt{3}^1}{2\sqrt{3}} = 9$$

$$180 \cdot 4 : (9 \cdot 2) = \frac{180 \cdot 4}{9 \cdot 2} = 40$$

$$18\sqrt{3} : 2\sqrt{3} = \frac{18\sqrt{3}^9}{2\sqrt{3}^1} \cdot \sqrt{3} = 9 \cdot 3 = 27$$

$$180 \cdot 4 : 9 \cdot 2 = \frac{720}{20} : 9 \cdot 2 = 80 : 2 = 160$$

$$180 \cdot 4 : 9 \cdot 2 = \frac{180 \cdot 4}{9} \cdot 2 = 20 \cdot 4 \cdot 2 = 160$$

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