Recordatori

$$a^{-n} = \frac{1}{a^n} \qquad x^{-3} = \frac{1}{x^3}$$

$$(a \cdot b)^m = a^m \cdot b^m$$

$$(a \cdot b \cdot c)^m = a^m \cdot b^m \cdot c^m$$

Ex. $5^{-2} = \frac{1}{5^2}$, $2^{-3} = \frac{1}{2^3}$ FALS

$$\frac{x^2}{2x^5} = \frac{1}{2} x^{-3} = \frac{1}{2} \cdot \frac{1}{x^3} = \frac{1}{2x^3}$$

① Simplifica :

ⓐ $$\frac{(2x^2 y^3)^3}{3xy} = \frac{2^3 \cdot (x^2)^3 \cdot (y^3)^3}{3xy} = \frac{8x^6 y^9}{3xy} = \frac{8}{3} x^5 y^8$$

ⓑ $$\frac{(3x^3 z)^4}{(2xyz)^2} = \frac{3^4 \cdot (x^3)^4 \cdot z^4}{2^2 \cdot x^2 y^2 z^2} = \frac{81 \cdot x^{12} \cdot z^4}{4 \cdot x^2 y^2 z^2} = \frac{81}{4} \frac{x^{10} z^2}{y^2}$$

$$= \frac{81}{4} x^{10} y^{-2} z^2$$

② Expressa en forma de potència: $a^{-n} = \dfrac{1}{a^n}$

$$\sqrt{2^3} \qquad \sqrt[5]{x^2} \qquad \sqrt[5]{\left(\dfrac{3}{5}\right)^{-2}} \qquad \sqrt[3]{\dfrac{1}{2^4}}$$

$$2^{\frac{3}{2}} \qquad\qquad x^{\frac{2}{5}} \qquad\qquad \left(\dfrac{3}{5}\right)^{-\frac{2}{5}} \qquad\qquad \parallel$$

$$\left(\dfrac{1}{2}\right)^{4/3}$$

$a^{-n} = \dfrac{1}{a^n}$

$$\dfrac{1}{\left(\dfrac{3}{5}\right)^{\frac{2}{5}}}$$

EX TRUC

$$\left(\dfrac{4}{\pi}\right)^{-\frac{5}{4}} = \left(\dfrac{\pi}{4}\right)^{\frac{5}{4}} \qquad \parallel$$

$$\left(\dfrac{5}{3}\right)^{\frac{2}{5}}$$

③ Expressa com a radicals:

$2^{\frac{1}{4}}$ $3^{\frac{2}{3}}$ $\left(\frac{1}{3}\right)^{-\frac{3}{2}}$ $\left(xy^3\right)^{\frac{3}{7}}$

$\sqrt[4]{2}$ $\sqrt[3]{3^2}$ $\sqrt{\left(\frac{1}{3}\right)^{-3}}$ $\sqrt[7]{\left(xy^3\right)^3}$

$\sqrt{3^3}$ $\sqrt[7]{x^3 y^9}$

$\begin{array}{r|l}48 & 2 \\ 24 & 2 \\ 12 & 2 \\ 6 & 2 \\ 3 & 3 \\ 1 & \end{array}$ $48 = 2^4 \cdot 3$

FACTORS dins d'un RADICAL

EXEMPLES ⓐ $\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$

$$\sqrt[m]{a \cdot b \cdot c} = \sqrt[m]{a} \cdot \sqrt[m]{b} \cdot \sqrt[m]{c}$$

ⓑ $\sqrt{48} = \sqrt{16 \cdot 3} = 4\sqrt{3}$

(c) $\sqrt{32x^2 y^4} = \sqrt{16\cdot2}\ x\cdot y^2 = 4\sqrt{2}\cdot x\cdot y^2$

(d) $\sqrt[3]{8x^6 y^3} = 2x^2 y$

(e) $\sqrt[4]{16x^5 y^9} = 2\sqrt[4]{x^5\cdot y^9} = 2\sqrt[4]{x^4\cdot x\cdot y^8\cdot y} =$

$= 2xy^2 \sqrt[4]{xy}$

(f) $3a^3 b^2 \sqrt[5]{a^5 b} = \sqrt{}$

$= \sqrt{9\ a^{11}\cdot b^5}$

(g) $\sqrt[5]{14a^{16} b^9 c^{51}} = \sqrt[5]{14a^{15} a b^5 b^4 c^{50} c}$

$= a^3 b c^{10} \sqrt[5]{14 a b^4 c}$

(h) $\sqrt{32x^6y^5} = \sqrt{16 \cdot 2} \cdot \sqrt{x^6 y^5} = 4\sqrt{2} \cdot x^3 \cdot \sqrt{y^4 \cdot y} =$

$\sqrt[3]{200xy^6} = y^2 \sqrt[3]{200x} = 2y^2 \sqrt[3]{25x}$ $\begin{array}{c} = 4x^3 y^2 \sqrt{2y} \\ \hline 4\sqrt{2}\, x^3 y^2 \sqrt{y} \end{array}$

Simplifica:

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

$= 7\sqrt{x}$

(b) $2\sqrt{75} + 7\sqrt{27} - \sqrt{48} = 2 \cdot \sqrt{25 \cdot 3} + 7 \cdot \sqrt{9 \cdot 3} - \sqrt{16 \cdot 3} =$

$= 10\sqrt{3} + 21\sqrt{3} - 4\sqrt{3} = 27\sqrt{3}$

1. $7\sqrt{2}+\sqrt{2}-3\sqrt{2} =$

2. $\sqrt{32}+\sqrt{18}-\sqrt{200}$

3. $3\sqrt{5} + 5\sqrt{20} + \sqrt{125}$

Exercicis: Realitza les operacions següents:

a) $5\sqrt{5}-10\sqrt{5}-2\sqrt{2} =$

b) $2\sqrt{27}+\sqrt{48}+\sqrt{147}-5\sqrt{20}$

c) $3\sqrt{12}-2\sqrt{45}-5\sqrt{75} =$

Simplifica:

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

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

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

$$\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

RACIONALITZACIÓ

(a) $\dfrac{2}{\sqrt{3}} = \dfrac{2}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{2\sqrt{3}}{3}$

(b) $\dfrac{4}{\sqrt{5}} = \dfrac{4}{\sqrt{5}} \cdot \dfrac{\sqrt{5}}{\sqrt{5}} = \dfrac{4\sqrt{5}}{5}$

(c) $\dfrac{\sqrt{2}}{\sqrt{6}} = \dfrac{\sqrt{2}}{\sqrt{6}} \cdot \dfrac{\sqrt{6}}{\sqrt{6}} = \dfrac{\sqrt{12}}{6}$

$$= \dfrac{\sqrt{4 \cdot 3}}{6} = \dfrac{2\sqrt{3}}{2 \cdot 3} = \dfrac{\sqrt{3}}{3}$$

(d) $\dfrac{1}{3+\sqrt{2}} =$

$$= \dfrac{1}{\left(3+\sqrt{2}\right)} \cdot \dfrac{\left(3-\sqrt{2}\right)}{\left(3-\sqrt{2}\right)} = \dfrac{3-\sqrt{2}}{3^2-\left(\sqrt{2}\right)^2} =$$

$\underset{a}{\uparrow} \quad \underset{b}{\uparrow}$

$$= \dfrac{3-\sqrt{2}}{9-2} = \dfrac{3-\sqrt{2}}{7}$$

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

EX $(4-3)\cdot(4+3)=4^2-3^2$

$= 16-9$

$= 7$

(e) $\dfrac{1}{4+\sqrt{3}} \cdot \dfrac{\left(4-\sqrt{3}\right)}{\left(4-\sqrt{3}\right)} = \dfrac{4-\sqrt{3}}{16-3} = \dfrac{4-\sqrt{3}}{13}$

$$\frac{3}{4+\sqrt{10}} = \frac{3\left(4-\sqrt{10}\right)}{\left(4+\sqrt{10}\right)\left(4-\sqrt{10}\right)} = \frac{3\left(4-\sqrt{10}\right)}{4^2-\left(\sqrt{10}\right)^2} = \frac{3\left(4-\sqrt{10}\right)}{6} = \boxed{\frac{4-\sqrt{10}}{2}}$$

$$\frac{3}{2\sqrt{3}}$$

$$\frac{5}{\sqrt{2}+1} =$$

$$\frac{2}{\sqrt{3}-\sqrt{7}} =$$

Simplifica:

$$12\sqrt{3} - 5\sqrt{2^2 \cdot 3} = 12\sqrt{3} - 5 \cdot 2\sqrt{3} =$$

$$= 12\sqrt{3} - 10\sqrt{3} = 2\sqrt{3}$$

$$\sqrt{18} - \sqrt{50} + \sqrt{8} = \sqrt{9 \cdot 2} - \sqrt{25 \cdot 2} + \sqrt{4 \cdot 2} =$$

$$= 3\sqrt{2} - 5\sqrt{2} + 2\sqrt{2} =$$

$$= 0\sqrt{2} = 0$$