- fracciones
- DEN. $\sqrt{\ }$

Semana: #09

RACIONALIZACION

DEN I → DEN Q

Prop: $\underbrace{I}_{DEN} \cdot \underbrace{I}_{F.R} = \underbrace{Q}_{D.R}$

- $\underbrace{\frac{1}{\sqrt{3}}}_{DEN} \cdot \underbrace{\frac{\sqrt{3}}{\sqrt{3}}}_{F.R} = \underbrace{\frac{\sqrt{3}}{3}}_{D.R}$
- $\underbrace{\frac{1}{\sqrt{7}+\sqrt{5}}}_{DEN} \cdot \underbrace{\frac{F.R}{FR}}_{F.R} = \underbrace{\frac{\sqrt{7}-\sqrt{5}}{2}}_{D.R}$

$(a+b)(a^2-ab+b^2)=a^3+b^3$

Prop $(a-b)(a^2+ab+b^2)=a^3-b^3$

$\boxed{DEN} \cdot \boxed{F.R} = \boxed{D.R}$

① $\sqrt[5]{A^{13}} \cdot \sqrt[5]{A^2} = A^3$

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

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

④ $\sqrt[3]{5}+\sqrt[3]{3} \cdot \sqrt[3]{25}-\sqrt[3]{15}+\sqrt[3]{9} = 5+3$

⑤ $\sqrt[3]{5}-\sqrt[3]{3} \cdot \sqrt[3]{25}+\sqrt[3]{15}+\sqrt[3]{9} = 5-3$

⑥ $\sqrt[2n]{A} \pm \sqrt[2n]{B} \cdot FR = A-B$

⑦ $\sqrt[2n+1]{A} \pm \sqrt[2n+1]{B} \cdot FR = A \pm B$

OJO

- $\sqrt[5]{8}+$ [illegible] → $DR = 8+3 = 11$
- $\frac{2}{\sqrt[8]{8}-\sqrt[8]{3}}$ → $DR = 8-3 = 5$
- $\frac{\cancel{3}^{1}}{\sqrt[11]{12}-\sqrt[11]{3}}$ → $DR = 3$

  $3\ \cancel{9}$
- $\frac{\cancel{4}^{2}}{\sqrt[100]{10}+\sqrt[100]{4}}$ → $DR = 3$

  $3\ \cancel{6}$
- $\frac{1}{\sqrt[3]{49}+\sqrt[3]{14}+\sqrt[3]{4}}$ → $DR = 5$

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RACIONALIZACIÓN

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- $\underbrace{\dfrac{1}{\sqrt{7}+\sqrt{5}}}_{DEN} \cdot \underbrace{\dfrac{F.R}{FR}}_{F.R} = \underbrace{\dfrac{\sqrt{7}-\sqrt{5}}{2}}_{D.R}$

Prop $(a+b)(a^2 - ab + b^2) = a^3+b^3$

$(a-b)(a^2+ab+b^2) = a^3-b^3$

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OJO

- $\dfrac{1}{\sqrt[5]{8}+\sqrt[5]{3}} \longrightarrow DR = 8+3 = 11$
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SBS
(TOSCANO)

OJO

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- $\dfrac{1}{\sqrt[3]{49}+\sqrt[3]{14}+\sqrt[3]{4}} \longrightarrow DR = 5$

01:

$$E = \frac{1}{\sqrt[4]{a^{25}\cdot b^{18}}}$$

$$E = \frac{1}{\sqrt[4]{a^{25}}}\cdot\frac{\sqrt[4]{a^3}}{\sqrt[4]{a^3}}\cdot\frac{1}{\sqrt[4]{b^{18}}}\cdot\frac{\sqrt[4]{b^2}}{\sqrt[4]{b^2}}$$

$$E = \frac{\sqrt[4]{a^3}}{a^7}\cdot\frac{\sqrt[4]{b^2}}{b^5}$$

$$E = \frac{\sqrt[4]{a^3\cdot b^2}}{a^7\cdot b^5}$$

02:

$$M = \frac{1}{\sqrt[4]{x^{26}\cdot y^{10}}}$$

$$M = \frac{1}{\sqrt[4]{x^{26}\cdot y^{10}}}\cdot\frac{\sqrt[4]{x^2\cdot y^2}}{\sqrt[4]{x^2\cdot y^2}}$$

$$M = \frac{\sqrt[4]{x^2\cdot y^2}}{\sqrt[4]{x^{\cancel{28}\,7}\cdot y^{\cancel{12}\,3}}} = \frac{\sqrt[4]{x^2 y^2}}{x^7\cdot y^3}$$

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

$$= 5 + \sqrt{24}$$

$\cdot\dfrac{\sqrt[4]{b^2}}{\sqrt[4]{b^2}}$

02.

$$M = \frac{1}{\sqrt[4]{x^{26}\cdot y^{10}}}$$

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$$M = \frac{\sqrt[4]{x^2\cdot y^2}}{\sqrt[4]{x^{\cancel{28}\,7}\cdot y^{\cancel{12}\,3}}} = \frac{\sqrt[4]{x^2 y^2}}{x^7\cdot y^3}$$

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

$$= 5 + \sqrt{24}$$

03:

$$\frac{2c}{\sqrt[5]{a^3}\cdot\sqrt[3]{b^2}\cdot\sqrt[7]{c^4}}$$

$$\frac{\cancel{2c}\,\sqrt[5]{a^2}\cdot\sqrt[3]{b}\cdot\sqrt[7]{c^3}}{\underbrace{\sqrt[5]{a^3}\cdot\sqrt[5]{a^2}}_{a}\cdot\underbrace{\sqrt[3]{b^2}\cdot\sqrt[3]{b^1}}_{b}\cdot\underbrace{\sqrt[7]{c^4}\cdot\sqrt[7]{c^3}}_{\cancel{c}}}$$

$$\frac{2\ \text{FR}}{ab}$$ Rpta

04:

$$M = \frac{\sqrt{2}-\sqrt{5}}{\sqrt{4}-\sqrt{10}}$$

$$M = \frac{\cancel{\sqrt{2}-\sqrt{5}}}{\sqrt{2}\,\cancel{(\sqrt{2}-\sqrt{5})}}$$

$$M = \frac{1}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$ Rpta

05: $\sqrt{3}+$

$N = \frac{5-\sqrt{2}}{\sqrt{}}$

$N = \frac{(\sqrt{25}-\sqrt{2}}{}$

$N = (\sqrt{25}-\sqrt{2}$

$N = (\sqrt{25}-\sqrt{2}$

$N = 1$

$a^3 \cdot \sqrt[3]{b^2} \cdot \sqrt[7]{c^4}$

$$\frac{2\cancel{c}\ \sqrt[5]{a^2} \cdot \sqrt[3]{b} \cdot \sqrt[7]{c^3}}{\sqrt[5]{a^2} \cdot \underbrace{\sqrt[3]{b^2} \cdot \sqrt[3]{b^1}}_{b} \cdot \underbrace{\sqrt[7]{c^4} \cdot \sqrt[7]{c^3}}_{\cancel{c}}}$$

2 FR

ab rpta.

04:

$$M = \frac{\sqrt{2} - \sqrt{5}}{\sqrt{4} - \sqrt{10}}$$

$$M = \frac{\cancel{\sqrt{2} - \sqrt{5}}}{\sqrt{2}\left(\cancel{\sqrt{2} - \sqrt{5}}\right)}$$

$$M = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$ rpta.

05: $(\sqrt{3} + \sqrt{2})^2 = 5 + \sqrt{24}$

$$N = \frac{(5 - \sqrt{24})(\sqrt{75} + \sqrt{50})}{\sqrt{75} - \sqrt{50}}$$

$$N = \frac{(\sqrt{25} - \sqrt{24})\cancel{\sqrt{25}}(\sqrt{3} + \sqrt{2})}{\cancel{\sqrt{25}}\underbrace{(\sqrt{3} - \sqrt{2})\ \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}}_{1}}$$ FR

$$N = (\sqrt{25} - \sqrt{24})\underbrace{(\sqrt{3} + \sqrt{2})^2}$$

$$N = (\sqrt{25} - \sqrt{24})(\sqrt{25} + \sqrt{24})$$

$$N = 1$$ //

09:

$$\frac{1}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$$

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

$$\frac{\sqrt{2}+\sqrt{3}-\sqrt{5}}{\cancel{5}+2\sqrt{6}-\cancel{5}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$$

$$\frac{\sqrt{12}+\sqrt{18}-\sqrt{30}}{12}$$

Rpta

10:

$$\frac{1}{\sqrt{4}-\sqrt{7}+\sqrt{3}}$$

$$\frac{1}{\sqrt{7+2\sqrt{12}}-\sqrt{7}}\cdot\frac{\sqrt{7+2\sqrt{12}}+\sqrt{7}}{FR}$$

$$\frac{\sqrt{4}+\sqrt{3}+\sqrt{7}}{\cancel{7}+2\sqrt{12}-\cancel{7}}$$

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

$$\frac{2+\sqrt{3}+\sqrt{7}}{4\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{2\sqrt{3}+3+\sqrt{21}}{12}$$

Rpta.

11:

$$\frac{3+4\sqrt{3}}{\sqrt{6}+\sqrt{2}-\sqrt{5}}$$

$$\frac{3+4\sqrt{3}}{\sqrt{8+2\sqrt{12}}-\sqrt{5}}\cdot$$

$$\frac{\cancel{(3+4\sqrt{3})}(\sqrt{6}+}{\cancel{8+4\sqrt{3}-5}}$$

$\sqrt{6}+\sqrt{5}+\sqrt{}$

$$= \frac{6}{\sqrt{10}-\sqrt{6}+\sqrt{5}-\sqrt{3}}$$

$$\frac{6}{\sqrt{2}(\sqrt{5}-\sqrt{3})+(\sqrt{5}-\sqrt{3})}$$

$$\frac{6}{(\sqrt{5}-\sqrt{3})(\sqrt{2}+1)}\cdot\frac{\sqrt{5}+\sqrt{3}}{FR_1}\cdot\frac{\sqrt{2}-1}{FR_2}$$

$$\frac{\cancel{6}^{3}\,FR_1\cdot FR_2}{\cancel{2}\cdot\cancel{1}} = \frac{3\,FR}{1}$$

1 ~~Rpta~~

15:

$$(a^2+ab+b^2)(a-b)=a^3-b^3$$

$$\frac{1}{\sqrt[3]{4}+\sqrt[3]{2}+1}+\frac{3}{\sqrt[3]{4}-\sqrt[3]{2}+1}$$

$$\underbrace{\frac{\cancel{1}}{\sqrt[3]{4}+\sqrt[3]{2}+1}\cdot\frac{\sqrt[3]{2}-\cancel{1}}{\sqrt[3]{2}-1}}_{\cancel{1}}+\underbrace{\frac{\cancel{3}}{\sqrt[3]{4}-\sqrt[3]{2}+1}\cdot\frac{\sqrt[3]{2}+\cancel{1}}{\sqrt[3]{2}+1}}_{\cancel{3}}$$

$$2\cdot\sqrt[3]{2}$$

17:

$$\frac{34}{\sqrt[3]{49}+2\sqrt[3]{7}-3}$$

$\sqrt[3]{7}$ $+3$

$\sqrt[3]{7}$ -1

$$\frac{\cancel{34}}{\underbrace{(\sqrt[3]{7}+\sqrt[3]{27})}_{\cancel{34}}\underbrace{(\sqrt[3]{7}-1)}_{6}}$$

6 ''

11:

$$\frac{3+4\sqrt{3}}{\sqrt{6}+\sqrt{2}-\sqrt{5}}$$

$$\frac{3+4\sqrt{3}}{\sqrt{8+2\sqrt{12}}-\sqrt{5}}\cdot\frac{\sqrt{8+2\sqrt{12}}+\sqrt{5}}{FR}$$

$$\frac{\cancel{(3+4\sqrt{3})}(\sqrt{6}+\sqrt{2}+\sqrt{5})}{\cancel{8+4\sqrt{3}-5}}$$

$$\sqrt{6}+\sqrt{5}+\sqrt{2} \;//$$

12:

$$C=\frac{6}{\sqrt{10}-\sqrt{6}+\sqrt{5}-\sqrt{3}}$$

$$C=\frac{6}{\sqrt{2}(\sqrt{5}-\sqrt{3})+(\sqrt{5}-\sqrt{3})}$$

$$C=\frac{6}{(\sqrt{5}-\sqrt{3})(\sqrt{2}+1)}\cdot\frac{\sqrt{5}+\sqrt{3}}{FR_1}\cdot\frac{\sqrt{2}-1}{FR_2}$$

$$C=\frac{\overset{3}{\cancel{6}}\,FR_1\cdot FR_2}{\cancel{2}\cdot 1}=\frac{3\,FR}{1}$$

Rpta

15:

$$\frac{1}{\sqrt[3]{4}+\sqrt[3]{\ }}$$

$$\frac{\cancel{1}}{\sqrt[3]{4}+\sqrt[3]{2}}$$

22:

$$\frac{\sqrt[6]{a}-\sqrt[6]{b}}{(\sqrt[6]{a}+\sqrt[6]{b})(\sqrt[3]{a}+\sqrt[3]{b})}$$

DR = (a - b)(a + b)

DR = $a^2 - b^2$

$$\sqrt[3]{\sqrt[6]{7^{\cancel{8}}}}$$

30:

$$\frac{1}{2+\sqrt[6]{7}-\sqrt[3]{7}}$$

$$\frac{-1}{\sqrt[6]{49}-\sqrt[6]{7}-2}$$

$\sqrt[6]{7}$ $\quad -2$

$\sqrt[6]{7}$ $\quad +1$

$$\frac{-1}{(\sqrt[6]{7}-\sqrt[6]{64})(\sqrt[6]{7}+1)} = \frac{1}{(\sqrt[6]{64}-\sqrt[6]{7})(\sqrt[6]{7}+1)}$$

DR = 57 · 6

DR = 342

19:

$$\sqrt[16]{5} = A$$

$$\frac{4}{\sqrt[16]{5^{15}}-\sqrt[16]{5^{14}}+\sqrt[16]{5^{13}}-\dots+\sqrt[16]{5}-1}$$

CN

$$\frac{4}{A^{15}-A^{14}+A^{13}-\dots+A-1}$$

$$\frac{4}{\frac{A^{16}-1}{A+1}}$$

$$\frac{\cancel{4}(\sqrt[16]{5}+1)}{5-1} = \frac{\sqrt[16]{5}+1}{1}$$

Rpta.

10:

$$\frac{1}{\sqrt{4}-\sqrt{7}+\sqrt{3}}$$

$$\frac{1}{\sqrt{7+2\sqrt{12}}-\sqrt{7}} \cdot \frac{\sqrt{7+2\sqrt{12}}+\sqrt{7}}{FR}$$

$$\frac{\sqrt{4}+\sqrt{3}+\sqrt{7}}{\cancel{7}+2\sqrt{12}-\cancel{7}}$$

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

$$\frac{2+\sqrt{3}+\sqrt{7}}{4\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{2\sqrt{3}+3+\sqrt{21}}{12}$$

Rpta.

$$M = \frac{1}{\sqrt[4]{x^{26} \cdot y^{10}}}$$

$$M = \frac{1}{\sqrt[4]{x^{26} \cdot y^{10}}} \cdot \frac{\sqrt[4]{x^{2} \cdot y^{2}}}{\sqrt[4]{x^{2} \cdot y^{2}}}$$

$$M = \frac{\sqrt[4]{x^{2} \cdot y^{2}}}{\cancel{\sqrt[4]{}}\, x^{\cancel{28}\,7} \cdot y^{\cancel{12}\,3}} = \frac{\sqrt[4]{x^{2} y^{2}}}{x^{7} y^{3}}$$

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

$$= 5 + \sqrt{24}$$

03:

$$\frac{2c}{\sqrt[5]{a^3} \cdot \sqrt[3]{b^2} \cdot \sqrt[7]{c^4}}$$

$$\frac{2\cancel{c}\, \sqrt[5]{a^2} \cdot \sqrt[3]{b} \cdot \sqrt[7]{c^3}}{\underbrace{\sqrt[5]{a^3} \cdot \sqrt[5]{a^2}}_{a} \cdot \underbrace{\sqrt[3]{b^2} \cdot \sqrt[3]{b^1}}_{b} \cdot \underbrace{\sqrt[7]{c^4} \cdot \sqrt[7]{c^3}}_{\cancel{c}}}$$

$$\frac{2\ \text{FR}}{ab}$$ Rpta.

04:

M

M

M

07:

$$T=\left(\frac{1}{\sqrt{6}+\sqrt{5}}+\frac{1}{\sqrt{7}+\sqrt{6}}+\dots+\frac{1}{\sqrt{25}+\sqrt{24}}\right)^{-1}$$

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

$$T=\left(\cancel{\sqrt{6}}-\sqrt{5}+\cancel{\sqrt{7}}-\cancel{\sqrt{6}}+\cancel{\sqrt{8}}-\cancel{\sqrt{7}}+\dots+\sqrt{25}-\cancel{\sqrt{24}}\right)^{-1}$$

$$T=\left(\sqrt{25}-\sqrt{5}\right)^{-1}=\frac{1}{\underbrace{\sqrt{25}-\sqrt{5}}}\cdot\frac{\sqrt{25}+\sqrt{5}}{FR}$$

20

06:

$$\frac{3}{\sqrt{9+2\sqrt{\frac{72}{4}}}}-\frac{5}{\sqrt{7+2\sqrt{\frac{24}{4}}}}-\frac{1}{\sqrt{7+2\sqrt{\frac{48}{4}}}}$$

$$\frac{3}{\sqrt{9+2\sqrt{18}}}-\frac{5}{\sqrt{7+2\sqrt{6}}}-\frac{1}{\sqrt{7+2\sqrt{12}}}$$

$6+3 \qquad 6+1 \qquad 4+3$

$$\frac{\cancel{3}}{\cancel{\sqrt{6}+\sqrt{3}}}\cdot\frac{\sqrt{6}-\sqrt{3}}{\cancel{\sqrt{6}-\sqrt{3}}}=\sqrt{6}-\sqrt{3}$$

$$\frac{\cancel{5}}{\cancel{\sqrt{6}+1}}\cdot\frac{\sqrt{6}-1}{\cancel{FR}}=\sqrt{6}-1$$

$$\frac{\cancel{1}}{\cancel{\sqrt{4}+\sqrt{3}}}\cdot\frac{\sqrt{4}-\sqrt{3}}{\cancel{FR}}=\sqrt{4}-\sqrt{3}$$

$$\therefore\ \cancel{\sqrt{6}}-\cancel{\sqrt{3}}-\cancel{\sqrt{6}}+1-\sqrt{4}+\cancel{\sqrt{3}}=-1$$

09:

$\sqrt{2}+ \dots \sqrt{5}$

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

$$\frac{\sqrt{2}+\sqrt{3}-\sqrt{5}}{\cancel{5}+2\sqrt{6}-\cancel{5}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$$

$$\frac{\sqrt{12}+\sqrt{18}-\sqrt{30}}{12}$$

Rpta

$$\ldots + \frac{1}{\sqrt{6}+\sqrt{7}} + \cdots + \frac{1}{\sqrt{24}+\sqrt{25}}\Big)^{-1}$$

$$\cdot\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}} = \sqrt{6}-\sqrt{5}$$

$$\ldots+\cancel{\sqrt{7}}-\cancel{\sqrt{6}}+\cancel{\sqrt{8}}-\cancel{\sqrt{7}}+\ldots+\sqrt{25}-\ldots)$$

$$(\sqrt{25}-\sqrt{5})^{-1} = \frac{1}{\underbrace{\sqrt{25}-\sqrt{5}}_{20}}\cdot\frac{\sqrt{25}+\sqrt{5}}{FR}$$

$DR = 20$

08: $\sqrt{5+2\sqrt{6}} = \sqrt{3}+\sqrt{2}$

$3+2$

$$\left(\frac{-1}{\underbrace{\sqrt{2}+\sqrt{3}}} - \frac{1}{\sqrt{3}+\sqrt{4}} - \frac{1}{\sqrt{4}+\sqrt{5}} - \cdots - \frac{1}{\sqrt{16}+\sqrt{17}}\right)^{-1}$$

$$(\sqrt{2}-\cancel{\sqrt{3}}+\cancel{\sqrt{3}}-\cancel{\sqrt{4}}+\cancel{\sqrt{4}}-\cancel{\sqrt{5}}+\ldots+\ldots-\sqrt{17})^{-1}$$

$$(\sqrt{2}-\sqrt{17})^{-1} = \frac{-1}{\underbrace{\sqrt{17}-\sqrt{2}}_{15}} \times \frac{\sqrt{17}+\sqrt{2}}{FR}$$

$A > B$

Forma: $\dfrac{-(\sqrt{A}+\sqrt{B})}{C} = \dfrac{-(\sqrt{17}+\sqrt{2})}{15}$

$A = 17$

$B = 2$

$C = 15$

$\therefore A - B + C = 30$

09:

$$\frac{1}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$$

$$\underbrace{\frac{1}{\sqrt{5+2\sqrt{6}}+\sqrt{5}}\cdot\frac{\sqrt{5+2\sqrt{6}}-\sqrt{5}}{FR}}$$

$$\frac{\sqrt{5+2\sqrt{6}}-\sqrt{5}}{\cancel{5}+2\sqrt{6}-\cancel{5}}$$

$$\frac{\sqrt{3}+\sqrt{2}-\sqrt{5}}{2\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$$

$$\frac{\sqrt{18}+\sqrt{12}-\sqrt{30}}{12}$$