

EJERCICIOS DE RAÍCES

RECORDAR:

- Definición de raíz n-ésima: $\sqrt[n]{a} = x \Leftrightarrow x^n = a$
- Equivalencia con una potencia de exponente fraccionario:

$$\sqrt[n]{x^m} = x^{m/n}$$
- Simplificación de radicales/índice común: $\sqrt[n]{x^m \cdot p} = \sqrt[n]{x^m}$
- Propiedades de las raíces:

$$\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$(\sqrt[n]{a})^m = \sqrt[n]{a^m}$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \cdot n]{a}$$
- Introducir/extraer factores: $x \cdot \sqrt[n]{a} = \sqrt[n]{x^n \cdot a}$

1. Calcular mentalmente, sin usar calculadora:

$\sqrt{9} =$	$\sqrt{25} =$	$\sqrt{49} =$	$\sqrt{100} =$	$\sqrt{1} =$
$\sqrt{0} =$	$\sqrt{\frac{1}{4}} =$	$\sqrt{\frac{1}{9}} =$	$\sqrt{\frac{4}{25}} =$	$\sqrt{\frac{16}{100}} =$
$\sqrt{0,25} =$	$\sqrt{0,09} =$	$\sqrt{0,0081} =$	$\sqrt{0,49} =$	$\sqrt{7^6} =$
$\sqrt{5^{24}} =$	$\sqrt{2^{10}} =$	$\sqrt{9 \cdot 10} =$		

2. Calcular mentalmente, sin usar calculadora:

$\sqrt[3]{8} =$	$\sqrt[3]{27} =$	$\sqrt[3]{64} =$	$\sqrt[3]{1000} =$	$\sqrt[3]{1331} =$
$\sqrt[3]{-1} =$	$\sqrt[3]{-8} =$	$\sqrt[3]{-27} =$	$\sqrt[3]{-1000} =$	
$\sqrt[3]{\frac{1}{8}} =$	$\sqrt[3]{\frac{1}{125}} =$	$\sqrt[3]{-\frac{64}{125}} =$	$\sqrt[3]{\frac{64}{1000}} =$	
$\sqrt[3]{0,125} =$	$\sqrt[3]{0,027} =$	$\sqrt[3]{0,001} =$	$\sqrt[3]{-0,216} =$	

3. Calcular, aplicando la definición de raíz (no vale con calculadora):

a) $\sqrt[3]{-8} = -2$ pq $(-2)^3 = -8$	b) $\sqrt{-8} =$	c) $\sqrt[6]{-1} =$	d) $\sqrt[5]{-32} =$
e) $\sqrt[4]{81} =$	f) $\sqrt{5^2} =$	g) $\sqrt[6]{2^6} =$	h) $\sqrt{\frac{625}{81}} =$
i) $\sqrt[3]{\frac{27}{64}} =$	j) $\sqrt[4]{-\frac{81}{16}} =$	k) $\sqrt[5]{3^{15}} =$	l) $\sqrt[3]{0,064} =$
m) $\sqrt{0,1} =$	n) $\sqrt{2,25} =$	o) $\sqrt{2,7} =$	

4. Hallar el valor de **k** en cada caso:

a) $\sqrt[3]{k} = 2$ (Soluc: $k=8$)

b) $\sqrt[k]{-243} = -3$ (Soluc: $k=5$)

c) $\sqrt[5]{k} = \frac{2}{3}$ (Soluc: $k=32/243$)

d) $\sqrt[k]{1,331} = 1,1$ (Soluc: $k=3$)

POTENCIAS DE EXPONENTE FRACCIONARIO:

5. Utilizar la calculadora para hallar, con tres cifras decimales bien aproximadas:

a) $\sqrt[4]{8} \approx 1,682$ b) $\sqrt[5]{9}$ c) $\sqrt[6]{25}$ d) $\sqrt[3]{10}$

e) $\sqrt[5]{-15}$ f) $\sqrt[6]{-40}$ g) $\sqrt[4]{2^3}$ h) $\sqrt[5]{3^2}$

i) $\sqrt[6]{5^2}$ j) $\sqrt[8]{256}$ k) $\sqrt[3]{64}$

6. Hallar $\sqrt[3]{3}$ con cuatro cifras decimales bien aproximadas, razonando el error cometido.

7. Pasar a forma de raíz las siguientes potencias, y a continuación calcular (**no vale utilizar la calculadora**):

a) $4^{1/2} = \sqrt{4} = 2$ b) $125^{1/3}$ c) $625^{1/4}$

d) $8^{2/3}$ e) $64^{5/6}$ f) $81^{3/4}$

g) $8^{-2/3}$ h) $27^{-1/3}$

RADICALES EQUIVALENTES. SIMPLIFICACIÓN DE RADICALES:

8. Simplificar los siguientes radicales, y comprobar el resultado con la calculadora cuando proceda:

a) $\sqrt[4]{3^2} = \sqrt[4]{2}{3^{2/2}} = \sqrt{3}$ b) $\sqrt[8]{5^4}$ c) $\sqrt[9]{27}$ d) $\sqrt[5]{1024}$

e) $\sqrt[6]{8}$ f) $\sqrt[9]{64}$ g) $\sqrt[8]{81}$ h) $\sqrt[12]{x^9}$

i) $\sqrt[12]{x^8}$ j) $\sqrt[5]{x^{10}}$ k) $\sqrt[6]{a^2b^4}$ l) $\sqrt[10]{a^4b^6}$

m) $\sqrt[6]{5^3}$ n) $\sqrt[15]{2^{12}}$ o) $\sqrt[10]{a^8}$ p) $\sqrt[12]{x^4y^8z^4}$

q) $\sqrt[8]{(x^2y^2)^2}$

9. Decir si los siguientes radicales son equivalentes (y comprobar después con la calculadora):

a) $\sqrt{5}$, $\sqrt[4]{25}$, $\sqrt[6]{125}$, $\sqrt[8]{625}$

(Soluc: NO)

b) $\sqrt{9}$, $\sqrt[3]{27}$, $\sqrt[4]{81}$, $\sqrt[5]{243}$

(Soluc: Sí)

c) $\sqrt{2}$, $\sqrt[4]{4}$, $\sqrt[6]{8}$, $\sqrt[8]{16}$

10. Reducir los siguientes radicales a índice común y ordenarlos de menor a mayor (y comprobar el resultado con la calculadora):

a) $\sqrt{5}$, $\sqrt[5]{2^3}$, $\sqrt[15]{7^2}$

d) $\sqrt{2}$, $\sqrt[3]{32}$, $\sqrt[5]{27}$

b) $\sqrt[3]{5}$, $\sqrt[5]{7^3}$, $\sqrt[15]{3^2}$

e) $\sqrt{2}$, $\sqrt[3]{3}$, $\sqrt[4]{4}$, $\sqrt[5]{5}$, $\sqrt[6]{6}$

c) $\sqrt[4]{3}$, $\sqrt[6]{16}$, $\sqrt[15]{9}$

f) $\sqrt[3]{16}$, $\sqrt[4]{125}$, $\sqrt[6]{243}$

g) $\sqrt[4]{31}$ y $\sqrt[3]{13}$

i) $\sqrt[3]{-10}$ y $\sqrt[4]{8}$

h) $\sqrt[3]{51}$ y $\sqrt[9]{132650}$

OPERACIONES CON RADICALES:

11. Multiplicar los siguientes radicales de igual índice, y simplificar cuando sea posible:

a) $\sqrt{2} \sqrt{32} = \sqrt{64} = \boxed{8}$

b) $\sqrt{2} \sqrt{15}$

c) $\sqrt[3]{3} \sqrt[3]{9}$

d) $\sqrt{2} \sqrt{8}$

e) $\sqrt{3} \sqrt{4}$

f) $\sqrt[3]{2} \sqrt[3]{5}$

g) $\sqrt{12} \sqrt{6} \sqrt{50}$

h) $\sqrt{21} \sqrt{7}$

i) $4\sqrt{3} \cdot 2\sqrt{27}$
(Sol : 72)

12. Multiplicar los siguientes radicales de distinto índice, reduciendo previamente a índice común, y simplificar:

a) $\sqrt{2} \sqrt[3]{32} = \sqrt{2} \sqrt[3]{2^5} = \sqrt[6]{2^3} \sqrt[6]{2^{10}} = \boxed{\sqrt[6]{2^{13}}}$

b) $\sqrt[3]{2} \sqrt[4]{8}$ (Sol : $\sqrt[12]{2^{13}}$)

c) $\sqrt[3]{2} \sqrt[5]{2}$ (Sol : $\sqrt[15]{2^8}$)

d) $\sqrt[3]{9} \sqrt[6]{3}$ (Sol : $\sqrt[6]{3^5}$)

e) $\sqrt[3]{2^2} \sqrt[4]{2}$ (Sol : $\sqrt[12]{2^{11}}$)

f) $\sqrt[4]{a^3} \sqrt[6]{a^5}$ (Sol : $\sqrt[12]{a^{19}}$)

g) $\sqrt[3]{2} \sqrt{3} \sqrt[4]{8}$ (Sol : $\sqrt[12]{2^{13} 3^6}$)

h) $\sqrt[4]{8} \sqrt[3]{4} \sqrt{a^3}$ (Sol : $\sqrt[12]{2^{17} a^{18}}$)

13. Simplificar, aplicando convenientemente las propiedades de las raíces:

a) $\frac{\sqrt{32}}{\sqrt{2}} = \sqrt{\frac{32}{2}} = \sqrt{16} = 4$

b) $\frac{\sqrt{8}}{\sqrt{2}}$

c) $\frac{\sqrt[3]{81}}{\sqrt[3]{9}}$

d) $\frac{\sqrt{15}}{\sqrt{3}}$

e) $\frac{\sqrt{3}}{\sqrt{4}}$

f) $\frac{\sqrt[3]{16}}{\sqrt[3]{2}}$

g) $\sqrt{\frac{256}{729}}$

h) $\frac{\sqrt{21}}{2\sqrt{7}}$

(Sol : 16/27)

(Sol : $\sqrt{3}/2$)

i) $\frac{\sqrt{33}}{\sqrt{3}}$

(Sol : $\sqrt{11}$)

j) $\sqrt[3]{\frac{125}{512}}$

k) $\sqrt[4]{\frac{16}{625}}$

l) $\frac{\sqrt{2} \cdot \sqrt{8}}{\sqrt{32}}$

(Sol : $1/\sqrt{2}$)

m) $\sqrt{\frac{154}{9} + 23} - \sqrt[4]{4 \frac{144}{9}}$

(Sol : -5/3)

n) $\sqrt{\left(-\frac{3}{2}\right)^2 + \left(\frac{3\sqrt{3}}{2}\right)^2}$

(Sol : 3)

14. ¿Cómo podríamos comprobar rápidamente que $\frac{2\sqrt{6}}{6\sqrt{2}} = \frac{\sqrt{3}}{3}$? (no vale calculadora)

(Sol: multiplicando en cruz)

15. Operar los siguientes radicales de distinto índice, reduciendo previamente a índice común:

a) $\frac{\sqrt{8}}{\sqrt[4]{2}} = \frac{\sqrt{2^3}}{\sqrt[4]{2}} = \frac{\sqrt[4]{2^6}}{\sqrt[4]{2}} = \sqrt[4]{2^5}$

b) $\frac{\sqrt[3]{9}}{\sqrt[6]{3}}$

(Sol : $\sqrt{3}$)

c) $\frac{\sqrt{2}}{\sqrt[3]{32}}$

(Sol : $\frac{1}{\sqrt[6]{2^7}}$)

d) $\frac{\sqrt[4]{4}}{\sqrt[6]{8}}$

(Sol : 1)

e) $\frac{\sqrt[3]{7^2}}{\sqrt{7}}$

(Sol : $\sqrt[6]{7}$)

$$\text{f)} \quad \frac{\sqrt{9}}{\sqrt[3]{3}} \quad (\text{Sol} : \sqrt[3]{9})$$

$$\text{g)} \quad \frac{\sqrt[5]{16}}{\sqrt{2}} \quad (\text{Sol} : \sqrt[10]{8})$$

$$\text{h)} \quad \frac{\sqrt{ab}}{\sqrt[3]{ab}} \quad (\text{Sol} : \sqrt[6]{ab})$$

$$\text{i)} \quad \frac{\sqrt[4]{a^3 b^5 c}}{\sqrt{ab^3 c^3}} \quad \left(\text{Sol} : \sqrt[4]{\frac{a}{bc^5}} \right)$$

$$\text{j)} \quad \frac{\sqrt[6]{a^3}}{\sqrt[3]{a^2}} \quad (\text{Sol} : 1/\sqrt[6]{a})$$

$$\text{k)} \quad \frac{\sqrt[3]{-2000}}{3\sqrt{2}} \quad (\text{Sol} : -10)$$

$$\text{l)} \quad \frac{\sqrt[3]{4} \cdot \sqrt{3}}{\sqrt[6]{12}} \quad (\text{Sol} : \sqrt[3]{6})$$

$$\text{m)} \quad \frac{\sqrt[8]{8}}{\sqrt[4]{4} \cdot \sqrt{2}} \quad \left(\text{Sol} : \sqrt[8]{\frac{1}{2^5}} \right)$$

$$\text{n)} \quad \frac{\sqrt[3]{5} \cdot \sqrt{125}}{\sqrt[4]{25}} = \quad (\text{Sol} : \sqrt[3]{625})$$

$$\text{o)} \quad \frac{\sqrt[3]{2} \cdot \sqrt{3} \cdot \sqrt[12]{2}}{\sqrt[12]{18}} = \quad (\text{Sol} : \sqrt[3]{6})$$

$$\text{p)} \quad \frac{\sqrt[3]{4} \cdot \sqrt{3} \cdot \sqrt[12]{2}}{\sqrt[4]{2}} = \quad (\text{Sol} : \sqrt{6})$$

$$\text{q)} \quad \frac{\sqrt[6]{54} \cdot \sqrt[12]{27}}{\sqrt[12]{4} \cdot \sqrt[4]{12}} = \quad (\text{Sol} : \sqrt{3/2})$$

$$\text{r)} \quad \frac{\sqrt[4]{abc^2} \cdot \sqrt[12]{a^3 b^5 c^2}}{\sqrt[6]{a^2 b^2 c}} = \quad (\text{Sol} : \sqrt[6]{ab^2 c^3})$$

16. Simplificar:

a) $\left(\sqrt[3]{a^2}\right)^6 = \sqrt[3]{a^{12}} = a^{12/3} = \boxed{a^4}$

b) $\left(\sqrt[6]{ab^2}\right)^2 =$ (Sol : $\sqrt[3]{ab^2}$)

c) $(\sqrt{x})^3 \cdot \sqrt[3]{x} =$ (Sol : $\sqrt[6]{x^{11}}$)

d) $\frac{(\sqrt[3]{2})^4}{(\sqrt[4]{2})^2} =$ (Sol : $\sqrt[6]{2^5}$)

e) $\frac{\sqrt{2} (\sqrt[3]{2})^4}{(\sqrt[4]{2})^3} =$ (Sol : $\sqrt[12]{2^{13}}$)

f) $\sqrt{2} (\sqrt[4]{2})^3 (\sqrt[3]{2})^2 =$ (Sol : $\sqrt[12]{2^{23}}$)

g) $\frac{(\sqrt[4]{3})^5}{(\sqrt{3})^2 (\sqrt[3]{3})^4} =$ (Sol : $\frac{1}{\sqrt[12]{3^{13}}}$)

h) $\sqrt{2} (\sqrt[4]{2\sqrt[3]{4}})^3 =$ (Sol : $\sqrt[4]{2^{13}}$)

i) $\sqrt{\sqrt{2^6}} =$ (Sol : $\sqrt{8}$)

j) $\sqrt{\sqrt{12}} =$ (Sol : $\sqrt[4]{12}$)

k) $\left(\sqrt{\sqrt{\sqrt{2}}}\right)^8 =$ (Sol : 2)

l) $\sqrt[3]{\sqrt[4]{x^5 x^7}} =$ (Sol : x)

m) $\sqrt[3]{\sqrt[4]{x^{15}}} =$ (Sol : $\sqrt[4]{x^5}$)

n) $\left(\sqrt[3]{\sqrt[7]{\sqrt{8x^3}}}\right)^7 =$ (Sol : $\sqrt{2x}$)

o) $\left(\sqrt{\sqrt[3]{5}}\right)^5 (\sqrt[4]{5})^3 =$ (Sol : $\sqrt[12]{5^{19}}$)

p) $\frac{(\sqrt{x})^3}{\left(\sqrt[3]{\sqrt[4]{x}}\right)^6} =$ (Sol : x)

q) $\frac{(\sqrt[3]{2})^4 \cdot (\sqrt[4]{8})^3}{\sqrt{(\sqrt[3]{4})^2}} =$ (Sol : $\sqrt[12]{2^{35}}$)

r) $\frac{\sqrt[3]{a^2} \cdot (\sqrt{a^3})^3}{(\sqrt{a})^3 \cdot \sqrt[3]{a^4}} =$ (Sol : a^2)

s) $\frac{(\sqrt{27})^3 \cdot \sqrt[3]{9}}{\sqrt[3]{81}(\sqrt{3})^3} =$ (Sol : 9)

17. Introducir convenientemente factores y simplificar:

a) $2\sqrt{2} = \sqrt{2^2 \cdot 2} = \sqrt{2^3} = \sqrt{8}$

b) $2\sqrt{3}$

c) $2\sqrt{\frac{3}{2}}$ (Sol : $\sqrt{6}$)

d) $3\sqrt{2}$

e) $3\sqrt{\frac{2}{27}}$ (Sol : $\sqrt{2/3}$)

f) $3\sqrt[3]{3}$

g) $6\sqrt{\frac{5}{12}}$ (Sol : $\sqrt{15}$)

h) $3\sqrt[4]{5}$

i) $ab\sqrt{\frac{c}{ab^3}}$ (Sol : $\sqrt{\frac{ac}{b}}$)

j) $3\sqrt{7}$

k) $2a\sqrt{\frac{3c}{2a}}$ (Sol : $\sqrt{6ac}$)

l) $\sqrt{x}\sqrt{x} =$ (Sol : $\sqrt[4]{x^3}$)

$$\text{m)} \quad \sqrt{2 \cdot \sqrt[3]{2}} = \quad (\text{Sol} : \sqrt[3]{4})$$

$$\text{n)} \quad \sqrt{2\sqrt{2\sqrt{2}}} = \quad (\text{Sol} : \sqrt[8]{2^7})$$

$$\text{o)} \quad \sqrt{3\sqrt[3]{3\sqrt{3}}} =$$

$$\text{p)} \quad \sqrt{2 \cdot \sqrt{2} \cdot \sqrt[4]{2}} = \quad (\text{Sol} : 2)$$

$$\text{q)} \quad \sqrt{\sqrt[3]{2\sqrt{2} \cdot \sqrt{2}}} = \quad (\text{Sol} : \sqrt{2})$$

$$\text{r)} \quad \left(\sqrt{\sqrt[3]{4\sqrt{2} \sqrt{2}}} \right)^3 = \quad (\text{Sol} : 4)$$

$$\text{s)} \quad \sqrt{3\sqrt{3\sqrt[3]{3} \sqrt[3]{3}}} = \quad (\text{Sol} : 3)$$

$$\text{t)} \quad \left(\sqrt[3]{\sqrt{3\sqrt{3} \sqrt[3]{3}}} \right)^2 = \quad (\text{Sol} : \sqrt[18]{3^{13}})$$

$$\text{u)} \quad \frac{\sqrt[3]{81} (\sqrt{3})^8}{\sqrt[3]{3\sqrt{3}} \sqrt[3]{9}} = \quad (\text{Sol} : 9)$$

$$\text{v)} \quad \frac{\sqrt{2\sqrt[3]{2}} \sqrt[3]{16}}{\sqrt{2\sqrt[3]{2\sqrt{2}}} \sqrt[4]{8}} =$$

$$\quad (\text{Sol} : \sqrt{2})$$

$$\text{w)} \quad \frac{\left(\sqrt{2 \sqrt[3]{2}} \right)^3}{\sqrt{2\sqrt{2}} \sqrt[4]{2}} =$$

$$\quad (\text{Sol} : 2)$$

$$\text{x)} \quad \sqrt[4]{\frac{x}{y} \sqrt[3]{\frac{y}{x}}} = \quad (\text{Sol} : \sqrt[6]{xy})$$

$$y) \frac{(\sqrt[3]{a^2b})^2}{\sqrt{a\sqrt[3]{a}\sqrt{b}}} =$$

$$(Sol : \sqrt[12]{a^8b})$$

$$z) \frac{(\sqrt[3]{3}\sqrt{3})^3}{\sqrt{3\sqrt[3]{3}}} =$$

$$(Sol : \sqrt[6]{3^{11}})$$

$$\alpha) \frac{\sqrt{125}(\sqrt[3]{5})^2}{\sqrt{5\sqrt[3]{25}}} =$$

$$(Sol : \sqrt[3]{5^4})$$

$$\beta) \sqrt{ab\sqrt{8ab\sqrt{4a^2b^2}}} =$$

$$(Sol : 2ab)$$

18. Realizar las siguientes operaciones de dos formas distintas, y comprobar que se obtiene el mismo resultado:

- operando, teniendo en cuenta las propiedades de las raíces
- pasando a potencia de exponente fraccionario, y aplicando a continuación las propiedades de las potencias.

$$a) \frac{1}{2}\sqrt{2}\sqrt[4]{2} =$$

$$(Sol : \frac{1}{\sqrt[4]{2}})$$

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

$$(Sol : \frac{1}{\sqrt[6]{a^5}})$$

$$\text{c) } \frac{\sqrt[3]{a^2}}{a^2} \frac{a^3}{\sqrt{a}} =$$

$$(\text{Sol} : \sqrt[6]{a^7})$$

$$\text{d) } \sqrt{2\sqrt[3]{2\sqrt{2}}} =$$

$$(\text{Sol} : \sqrt[4]{8})$$

19. Extraer factores y simplificar cuando proceda:

$$\text{a) } \sqrt{8} = \sqrt{2^3} = \sqrt{2^2 \cdot 2} = 2\sqrt{2}$$

$$\text{q) } \sqrt[3]{2592}$$

$$(\text{Sol} : 6\sqrt[3]{12})$$

$$\text{b) } \sqrt{18}$$

$$\text{c) } \sqrt{98}$$

$$\text{r) } \sqrt[5]{279936}$$

$$(\text{Sol} : 6\sqrt[5]{36})$$

$$\text{d) } \sqrt{32}$$

$$\text{e) } \sqrt{60}$$

$$\text{s) } (\sqrt{\sqrt{2}})^{10}$$

$$(\text{Sol} : 4\sqrt{2})$$

$$\text{f) } \sqrt{72}$$

$$\text{g) } \sqrt{128}$$

$$\text{t) } \sqrt[3]{500}$$

$$(\text{Sol} : 5\sqrt[3]{4})$$

$$\text{h) } \sqrt{162}$$

$$\text{i) } \sqrt{200}$$

$$\text{u) } \sqrt[3]{32x^4}$$

$$(\text{Sol} : 2x\sqrt[3]{4x})$$

$$\text{j) } \sqrt{12}$$

$$\text{v) } \sqrt{1936}$$

$$(\text{Sol} : 44)$$

$$\text{k) } \sqrt{27}$$

$$\text{w) } \sqrt{3,24}$$

$$(\text{Sol} : 1,8)$$

$$\text{l) } \sqrt{48}$$

$$\text{x) } \sqrt{529}$$

$$(\text{Sol} : 23)$$

$$\text{m) } \sqrt{75}$$

$$\text{y) } \sqrt{676}$$

$$(\text{Sol} : 26)$$

$$\text{n) } \sqrt{108}$$

$$\text{z) } \sqrt[3]{128a^2b^7}$$

$$(\text{Sol} : 4b^2\sqrt[3]{2a^2b})$$

$$\text{o) } \sqrt[3]{3^45^5}$$

$$(\text{Sol} : 15\sqrt[3]{75})$$

$$\text{p) } \sqrt[4]{80}$$

$$(\text{Sol} : 2\sqrt[4]{5})$$

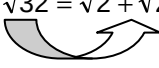
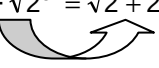
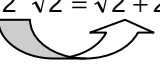
$$\alpha) \sqrt[3]{81a^3b^5c}$$

$$(\text{Sol} : 3ab\sqrt[3]{3b^2c})$$

$\beta) \sqrt[5]{64}$	$(Sol : 2 \sqrt[5]{2})$	$\vartheta) \frac{\sqrt{11}\sqrt{132}}{132}$	
$\gamma) \sqrt[3]{16x^6}$			$(Sol : \sqrt{3} / 6)$
$\delta) \sqrt{\frac{28x^5}{75y^3}}$	$(Sol : \frac{2x^2}{5y} \sqrt{\frac{7x}{3y}})$	$\iota) \sqrt{25 + \frac{25}{4}}$	
$\epsilon) \frac{11\sqrt{132}}{132}$	$(Sol : \sqrt{33} / 6)$	$\kappa) \sqrt{12} \cdot \sqrt{3} \cdot \sqrt{50} =$	$(Sol : 5\sqrt{5} / 2)$
$\zeta) \frac{\sqrt{396}}{66}$	$(Sol : \sqrt{11} / 11)$	$\lambda) 5 \sqrt[3]{\frac{3}{2}} \sqrt[3]{\frac{4}{81}} =$	$(Sol : \frac{5}{3} \sqrt[3]{2})$
$\eta) \sqrt{\frac{3a^2}{4}}$	$(Sol : \frac{a}{2} \sqrt{3})$		

20. Sumar los siguientes radicales, reduciéndolos previamente a radicales semejantes (Fíjate en el 1^{er} ejemplo):

a) $\sqrt{2} + \sqrt{8} + \sqrt{18} - \sqrt{32} = \sqrt{2} + \sqrt{2^3} + \sqrt{3^2 \cdot 2} - \sqrt{2^5} = \sqrt{2} + 2\sqrt{2} + 3\sqrt{2} - 2^2\sqrt{2} = \sqrt{2} + 2\sqrt{2} + 3\sqrt{2} - 4\sqrt{2} = 2\sqrt{2}$

FACTORIZAMOS RADICANDOS EXTRAEMOS FACTORES SUMAMOS RADICALES SEMEJANTES

b) $\sqrt{5} + \sqrt{45} + \sqrt{180} - \sqrt{80}$ $(Soluc: 6\sqrt{5})$

c) $\sqrt{24} - 5\sqrt{6} + \sqrt{486}$ $(Soluc: 6\sqrt{6})$

d) $\sqrt[3]{54} - 2 \cdot \sqrt[3]{16}$ $(Soluc: -\sqrt[3]{2})$

e) $27\sqrt{3} - 5\sqrt{27} - 9\sqrt{12}$ $(Soluc: -6\sqrt{3})$

f) $\sqrt{75} - \sqrt{20} - \sqrt{12} + \sqrt{45}$ $(Soluc: 3\sqrt{3} + \sqrt{5})$

g) $2\sqrt{8} + 5\sqrt{72} - 7\sqrt{18} - \sqrt{50}$ (Soluc: $8\sqrt{2}$)

h) $5\sqrt[6]{256} - 2\sqrt[3]{16} - \sqrt[3]{128} =$ (Soluc: $2\sqrt[3]{2}$)

i) $\sqrt{32} + 2\sqrt{3} - \sqrt{8} + \sqrt{2} - 2\sqrt{12}$ (Soluc: $3\sqrt{2} - 2\sqrt{3}$)

j) $3\sqrt{24} - \frac{1}{3}\sqrt{54} + \sqrt{150}$ (Soluc: $10\sqrt{6}$)

k) $5\sqrt{2} + 4\sqrt{8} + 3\sqrt{18} + 2\sqrt{32} + \sqrt{50}$ (Soluc: $35\sqrt{2}$)

l) $\sqrt{20} - \frac{1}{5}\sqrt{5} + \sqrt{45}$ (Soluc: $\frac{24}{5}\sqrt{5}$)

m) $2\sqrt{108} - \sqrt{75} - \sqrt{27} - \sqrt{12} - \sqrt{3}$ (Soluc: $\sqrt{3}$)

n) $\sqrt{128} + 5\sqrt{12} - 2\sqrt{18} - 3\sqrt{27} - \sqrt{2} =$ (Soluc: $\sqrt{2} + \sqrt{3}$)

o) $\sqrt{5} + \sqrt{\frac{45}{4}}$ (Soluc: $\frac{5}{2}\sqrt{5}$)

p) $\sqrt{\frac{2}{3}} + \sqrt{\frac{18}{75}}$ (Soluc: $\frac{8}{5}\sqrt{\frac{2}{3}}$)

q) $\sqrt{\frac{1}{2}} + 3\sqrt{\frac{1}{8}}$ (Soluc: $\frac{5}{2}\sqrt{\frac{1}{2}}$)

r) $\sqrt{\frac{3}{16}} - 4\sqrt{12}$ (Soluc: $-\frac{31}{4}\sqrt{3}$)

s) $\sqrt{\frac{5}{12}} - \sqrt{\frac{10}{6}}$ (Soluc: $-\frac{1}{2}\sqrt{\frac{5}{3}}$)

t) $\sqrt{50a} - \sqrt{18a}$ (Soluc: $2\sqrt{2a}$)

u) $5\sqrt{\frac{3}{4}} + \sqrt{27} - 4\sqrt{3} - \sqrt{300} =$ (Soluc: $-\frac{17}{2}\sqrt{3}$)

$$v) \sqrt{3} - \frac{2\sqrt{27}}{3} + \frac{5\sqrt{243}}{9}$$

(Soluc: $4\sqrt{3}$)

$$w) 6\sqrt[6]{4} - \frac{1}{3}\sqrt[3]{16} - 3\sqrt[9]{8} + 5\sqrt[3]{\frac{2}{27}} =$$

(Soluc: $4\sqrt[3]{2}$)

$$x) 2\sqrt[4]{\frac{2}{81}} - \sqrt[8]{4} + 2\sqrt[4]{32} =$$

(Soluc: $\frac{11}{3}\sqrt[4]{2}$)

$$y) \frac{2}{3}\sqrt[3]{16} + 2\sqrt[3]{2} - \frac{2}{3}\sqrt[3]{128} + \sqrt[3]{\frac{2}{27}} =$$

(Soluc: $\sqrt[3]{2}$)

$$z) \frac{3}{2}\sqrt[3]{40} - \frac{3}{2}\sqrt[3]{5} + \frac{5}{2}\sqrt[3]{320} - \frac{3}{2}\sqrt[3]{1080} + \sqrt[3]{\frac{135}{8}} =$$

(Soluc: $4\sqrt[3]{5}$)

$$\alpha) \frac{1}{2}\sqrt[3]{81} - \sqrt[3]{3} + \sqrt[3]{24} - \sqrt[3]{\frac{3}{8}} =$$

(Soluc: $2\sqrt[3]{3}$)

$$\beta) \sqrt{9x+9} - \sqrt{4x+4}$$

(Soluc: $\sqrt{x+1}$)

 Ejercicios libro: **pág. 15: 17; pág. 23: 52 f, g**

RECORDAR LAS IGUALDADES NOTABLES:

$(A+B)^2 = A^2 + 2AB + B^2$ $(A-B)^2 = A^2 - 2AB + B^2$ $(A+B)(A-B) = A^2 - B^2$
--

21. Calcular, dando el resultado lo más simplificado posible:

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

(Soluc: 8)

$$b) (3\sqrt{5})^2 =$$

(Soluc: 45)

c) $(1 + \sqrt{2})^2 =$ (Soluc: $3 + 2\sqrt{2}$)

d) $(\sqrt{2} + \sqrt{3})^2 =$ (Soluc: $5 + 2\sqrt{6}$)

e) $(\sqrt{3} - \sqrt{2})^2 =$ (Soluc: $5 - 2\sqrt{6}$)

f) $(\sqrt{2} + 1)(\sqrt{2} - 1) =$ (Soluc: 1)

g) $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2}) =$ (Soluc: 1)

h) $(1 + \sqrt{2})(1 - \sqrt{2}) =$ (Soluc: $-3 - \sqrt{2}$)

i) $(2 - \sqrt{3})(1 + \sqrt{12}) =$
(Soluc: $-4 + 3\sqrt{3}$)

j) $2\sqrt{3} \cdot 3\sqrt{2} =$ (Soluc: $6\sqrt{6}$)

k) $2\sqrt{8} \cdot 8\sqrt{2} =$ (Soluc: 64)

l) $3\sqrt{6} \cdot 2\sqrt{3} =$ (Soluc: $18\sqrt{2}$)

m) $2\sqrt{15} \cdot 3\sqrt{15} =$ (Soluc: 90)

n) $(5\sqrt{3})^2 =$ (Soluc: 75)

o) $(5 + \sqrt{3})^2 =$ (Soluc: $28 + 10\sqrt{3}$)

p) $(5 - \sqrt{3})^2 =$ (Soluc: $28 - 10\sqrt{3}$)

q) $(5 + \sqrt{3})(5 - \sqrt{3}) =$ (Soluc: 22)

r) $(\sqrt{5} + \sqrt{3})^2 =$ (Soluc: $8 + 2\sqrt{15}$)

s) $(\sqrt{5} - \sqrt{3})^2 =$ (Soluc: $8 - 2\sqrt{15}$)

t) $(2\sqrt{3} + 5)^2 =$ (Soluc: $37 + 20\sqrt{3}$)

$$\mathbf{u)} \quad (3\sqrt{2} + 2\sqrt{3})^2 = \quad (\text{Soluc: } 30 + 12\sqrt{6})$$

$$\mathbf{v)} \quad (2\sqrt{3} + 3\sqrt{2})(2\sqrt{3} - 3\sqrt{2}) = \quad (\text{Soluc: } -6)$$

$$\mathbf{w)} \quad \sqrt{2}(\sqrt{2} - 4) = \quad (\text{Soluc: } 2 - 4\sqrt{2})$$

$$\mathbf{x)} \quad (2 - \sqrt{3})\sqrt{3} = \quad (\text{Soluc: } 2\sqrt{3} - 3)$$

$$\mathbf{y)} \quad (3\sqrt{2} + 2)(2\sqrt{3} - \sqrt{6}) = \quad (\text{Soluc: } 4\sqrt{6} - 2\sqrt{3})$$

$$\mathbf{z)} \quad (2\sqrt{5} - 5)\sqrt{5} = \quad (\text{Soluc: } 10 - 5\sqrt{5})$$

$$\mathbf{\alpha)} \quad (\sqrt{2} - 3\sqrt{3})(\sqrt{2} + 5\sqrt{3}) = \quad (\text{Soluc: } -43 + 2\sqrt{6})$$

$$\mathbf{\beta)} \quad (2\sqrt{8} + 3\sqrt{2})(3\sqrt{8} - 2\sqrt{2}) = \quad (\text{Soluc: } 56)$$

$$\mathbf{\gamma)} \quad (2\sqrt{5} - 5\sqrt{2})(2\sqrt{5} + 5\sqrt{2}) = \quad (\text{Soluc: } -30)$$

$$\mathbf{\delta)} \quad (2\sqrt{5} - 5\sqrt{2})(3\sqrt{2} + 2) = \quad (\text{Soluc: } -30 + 6\sqrt{10} + 4\sqrt{5} - 10\sqrt{2})$$

$$\mathbf{\epsilon)} \quad (2\sqrt{27} - 3)(1 + \sqrt{3}) = \quad (\text{Soluc: } 1 + 3\sqrt{3})$$

$$\mathbf{\zeta)} \quad (3\sqrt{8} - 4\sqrt{2})(2\sqrt{2} - 5\sqrt{8}) = \quad (\text{Soluc: } -32)$$

$$\mathbf{\eta)} \quad (\sqrt{6} + \sqrt{5})^2 + (\sqrt{6} - \sqrt{5})^2 = \quad (\text{Soluc: } 22)$$

$$\theta) (\sqrt{7} + \sqrt{3})^2 (5 - \sqrt{21}) =$$

$$\iota) (3\sqrt{8} + 2\sqrt{2})(2\sqrt{8} - 3\sqrt{2}) =$$

(Soluc: 16)

$$\kappa) (2\sqrt{3} - 3\sqrt{2})^2 =$$

(Soluc: $30 - 12\sqrt{6}$)

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

RACIONALIZACIÓN:

22. Racionalizar denominadores, y simplificar:

$$a) \frac{1}{\sqrt{5}}$$

(Soluc: $\frac{\sqrt{5}}{5}$)

$$b) \frac{5}{2\sqrt{3}}$$

(Soluc: $\frac{5\sqrt{3}}{6}$)

$$c) \frac{5}{3\sqrt{5}}$$

(Soluc: $\frac{\sqrt{5}}{3}$)

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

(Soluc: $\frac{\sqrt{6}}{3}$)

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

(Soluc: $\frac{\sqrt{6}}{2}$)

$$f) \frac{2 - \sqrt{2}}{\sqrt{7}}$$

(Soluc: $\frac{2\sqrt{7} - \sqrt{14}}{7}$)

$$g) \frac{2 + \sqrt{2}}{\sqrt{2}}$$

(Soluc: $\sqrt{2} + 1$)

$$h) \frac{4}{\sqrt{6}}$$

(Soluc: $\frac{2\sqrt{6}}{3}$)

$$i) \frac{1}{\sqrt{27}} =$$

(Soluc: $\frac{\sqrt{3}}{9}$)

$$\text{j) } \frac{3}{2\sqrt{3}} \quad (\text{Soluc: } \frac{\sqrt{3}}{2})$$

$$\text{k) } \frac{12}{\sqrt{8}} = \quad (\text{Soluc: } 3\sqrt{2})$$

$$\text{l) } \frac{\sqrt{2}-4}{3\sqrt{2}} = \quad (\text{Soluc: } \frac{1}{3} - \frac{2\sqrt{2}}{3})$$

$$\text{m) } \frac{15\sqrt{3}}{2\sqrt{5}} \quad (\text{Soluc: } \frac{3\sqrt{15}}{2})$$

$$\text{n) } \frac{\sqrt{3}+3}{2\sqrt{3}} = \quad (\text{Soluc: } \frac{1+\sqrt{3}}{2})$$

$$\text{o) } \frac{-2\sqrt{7}}{7\sqrt{2}} \quad (\text{Soluc: } -\frac{\sqrt{14}}{7})$$

$$\text{p) } \frac{\sqrt{11}}{\sqrt{12}} \quad (\text{Soluc: } \frac{\sqrt{33}}{6})$$

$$\text{q) } \left(\frac{1}{\sqrt{2}} \right)^3 \quad (\text{Soluc: } \frac{\sqrt{2}}{4})$$

$$\text{r) } \frac{(1+\sqrt{2})^2+1}{\sqrt{2}} \quad (\text{Soluc: } 2+2\sqrt{2})$$

$$\text{s) } \frac{1-(1-\sqrt{2})^2}{\sqrt{2}} \quad (\text{Soluc: } 2-\sqrt{2})$$

$$\text{t) } \frac{\sqrt{81+\frac{81}{4}}}{\sqrt{5}} \quad (\text{Soluc: } \frac{9}{2})$$

$$\text{u) } \frac{2}{\sqrt{5}} - \frac{2}{\sqrt{125}} \quad (\text{Soluc: } \frac{8\sqrt{5}}{25})$$

$$\text{v) } \left(\frac{1}{\sqrt{3}} \right)^3 \quad (\text{Soluc: } \frac{\sqrt{3}}{9})$$

$$\text{w)} \sqrt{\frac{5+\sqrt{5}}{10}}$$

$$(\text{Soluc: } \frac{\sqrt{50+10\sqrt{5}}}{10})$$

$$\text{x)} \frac{2\sqrt{6}}{6\sqrt{2}}$$

$$(\text{Soluc: } \frac{\sqrt{3}}{3})$$

$$\text{y)} \frac{3\sqrt{10}}{5\sqrt{6}}$$

$$(\text{Soluc: } \frac{\sqrt{15}}{5})$$

23. Racionalizar denominadores, y simplificar:

$$\text{a)} \frac{1}{\sqrt[3]{2}}$$

$$(\text{Soluc: } \frac{\sqrt[3]{4}}{2})$$

$$\text{b)} \frac{3}{\sqrt[5]{9}}$$

$$(\text{Soluc: } \sqrt[5]{27})$$

$$\text{c)} \frac{8}{\sqrt[6]{8}}$$

$$(\text{Soluc: } 4\sqrt{2})$$

$$\text{d)} \frac{10}{3\sqrt[4]{125}}$$

$$(\text{Soluc: } \frac{2}{3}\sqrt[4]{5})$$

$$\text{e)} \frac{\sqrt[5]{25}}{5\sqrt[3]{5}}$$

$$(\text{Soluc: } \frac{\sqrt[15]{5}}{5})$$

$$\text{f)} \frac{10}{\sqrt[5]{128}} =$$

$$(\text{Soluc: } \frac{5}{2}\sqrt[5]{8})$$

$$\text{g)} \frac{\sqrt{3}}{5\sqrt[5]{27}}$$

$$(\text{Soluc: } \frac{\sqrt[10]{3^9}}{15})$$

$$\text{h)} \frac{3\sqrt[5]{9}}{2\sqrt[3]{243}}$$

$$(\text{Soluc: } \frac{\sqrt[15]{3^{11}}}{6})$$

$$\text{i)} \frac{5\sqrt{15}}{\sqrt[3]{15}}$$

$$(\text{Soluc: } 5\sqrt[6]{15})$$

$$\text{j)} \frac{\sqrt{3}}{\sqrt[5]{9}}$$

$$(\text{Soluc: } \sqrt[10]{3})$$

$$\text{k) } \frac{\sqrt{2}}{\sqrt[5]{2}} \quad (\text{Soluc: } \sqrt[10]{8})$$

$$\text{l) } \frac{3}{\sqrt[3]{3}} \quad (\text{Soluc: } \sqrt[6]{243})$$

$$\text{m) } \frac{4}{\sqrt[4]{64}} \quad (\text{Soluc: } \sqrt{2})$$

$$\text{n) } \frac{x}{\sqrt{x}} + \frac{x}{\sqrt[3]{x^2}} \quad (\text{Soluc: } \sqrt{x} + \sqrt[3]{x})$$

24. Racionalizar denominadores, y simplificar:

$$\text{a) } \frac{1+\sqrt{2}}{1-\sqrt{3}} \quad (\text{Soluc: } -\frac{1+\sqrt{2}+\sqrt{3}+\sqrt{6}}{2})$$

$$\text{b) } \frac{9}{\sqrt{7}-\sqrt{3}} \quad (\text{Soluc: } \frac{9}{4}\sqrt{7} + \frac{9}{4}\sqrt{3})$$

$$\text{c) } \frac{4(\sqrt{5}+2)}{\sqrt{5}-1} \quad (\text{Soluc: } 7+3\sqrt{5})$$

$$\text{d) } \frac{3(\sqrt{7}+1)}{\sqrt{7}+2} \quad (\text{Soluc: } 5-\sqrt{7})$$

$$\text{e) } \frac{\sqrt{3}+1}{\sqrt{3}-1} \quad (\text{Soluc: } 2+\sqrt{3})$$

$$\text{f) } \frac{1+\sqrt{2}}{2-\sqrt{2}} \quad (\text{Soluc: } 2+\frac{3}{2}\sqrt{2})$$

$$\text{g) } \frac{5-7\sqrt{3}}{1+\sqrt{3}} \quad (\text{Soluc: } -13+6\sqrt{3})$$

$$\text{h)} \frac{3\sqrt{2} - 2\sqrt{3}}{6 + \sqrt{6}} =$$

$$(\text{Soluc: } \frac{4}{5}\sqrt{2} - \frac{3}{5}\sqrt{3})$$

$$\text{i)} \frac{7}{7 - \sqrt{7}}$$

$$(\text{Soluc: } \frac{7}{6} + \frac{\sqrt{7}}{6})$$

$$\text{j)} \frac{4}{\sqrt{3} + \sqrt{2}}$$

$$(\text{Soluc: } 4\sqrt{3} - 4\sqrt{2})$$

$$\text{k)} \frac{\sqrt{2} + 1}{3\sqrt{2} - 2}$$

$$(\text{Soluc: } \frac{4}{7} + \frac{5}{14}\sqrt{2})$$

$$\text{l)} \frac{\sqrt{3}}{\sqrt{3} + \sqrt{2}}$$

$$(\text{Soluc: } 3 - \sqrt{6})$$

$$\text{m)} \frac{7}{\sqrt{8} - 2}$$

$$(\text{Soluc: } \frac{7}{2} + \frac{7}{2}\sqrt{2})$$

$$\text{n)} \frac{2\sqrt{3} - 5}{\sqrt{3} - 2} =$$

$$(\text{Soluc: } 4 + \sqrt{3})$$

$$\text{o)} \frac{1 + \sqrt{3}}{1 - \sqrt{3}}$$

$$(\text{Soluc: } -2 - \sqrt{3})$$

$$\text{p)} \frac{\sqrt{5} + 2\sqrt{3}}{2\sqrt{5} - \sqrt{3}} =$$

$$(\text{Soluc: } \frac{16}{17} + \frac{5}{17}\sqrt{15})$$

$$\text{q)} \frac{3\sqrt{2} - 4}{3\sqrt{2} + 4} =$$

$$(\text{Soluc: } 17 - 12\sqrt{2})$$

$$\text{r)} \frac{2\sqrt{8} - 3\sqrt{2}}{2\sqrt{8} + 3\sqrt{2}} =$$

$$(\text{Soluc: } 1/7)$$

$$\text{s)} \frac{12 - 5\sqrt{3}}{2\sqrt{3} - 3} =$$

(Soluc: $2 + 3\sqrt{3}$)

$$\text{t)} \frac{\left(\sqrt{2 + \sqrt{8}}\right)^2}{2 - \sqrt{2}} =$$

(Soluc: $4 + 3\sqrt{2}$)

$$\text{u)} \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} =$$

(Soluc: $4 + \sqrt{15}$)

$$\text{v)} \frac{3\sqrt{5} - 4}{\sqrt{5} - 2} =$$

(Soluc: $7 + 2\sqrt{5}$)

$$\text{w)} \frac{24 - 13\sqrt{3}}{2\sqrt{3} - 3} =$$

(Soluc: $-2 + 3\sqrt{3}$)

$$\text{x)} \frac{2\sqrt{2}}{\sqrt{3} - \sqrt{2}}$$

$$\text{y)} \frac{4 - \sqrt{6}}{\sqrt{6} - 2} =$$

(Soluc: $1 + \sqrt{6}$)

$$\text{z)} \frac{2 - \sqrt{8}}{2 + \sqrt{2}} =$$

(Soluc: $4 - 3\sqrt{2}$)

$$\alpha) \frac{-\sqrt{3} - 1}{1 - \sqrt{3}} =$$

(Soluc: $2 + \sqrt{3}$)

$$\beta) \frac{9 + 4\sqrt{3}}{3(4 - \sqrt{3})} =$$

(Soluc: $\frac{48 + 25\sqrt{3}}{39}$)

$$\gamma) \frac{\sqrt{2}+4}{2-\sqrt{2}} = \quad (\text{Soluc: } 3\sqrt{2}+5)$$

$$\delta) \sqrt{x} + \frac{x}{2\sqrt{x}} = \quad (\text{Soluc: } \frac{3}{2}\sqrt{x})$$

$$\epsilon) \frac{2\sqrt{3}-3}{2\sqrt{3}+3} + \frac{12}{\sqrt{3}} = \quad (\text{Soluc: } 7)$$

$$\zeta) \frac{17-9\sqrt{3}}{3\sqrt{3}-5} - \frac{9}{\sqrt{3}} = \quad (\text{Soluc: } 2)$$

25. ¿V o F? Razonar algebraicamente la respuesta:

$$\text{a)} \frac{5+\sqrt{3}}{5} = 1+\sqrt{3} \quad (\text{Soluc: } F)$$

$$\text{b)} \frac{5+\sqrt{3}}{5} = \sqrt{3} \quad (\text{Soluc: } F)$$

$$\text{c)} \frac{2+\sqrt{3}}{2} = 1+\frac{\sqrt{3}}{2} \quad (\text{Soluc: } V)$$

$$\text{d)} \frac{5+\sqrt{2}+\sqrt{3}}{5} = 1+\sqrt{2}+\sqrt{3} \quad (\text{Soluc: } F)$$

$$\text{e)} \frac{3+6\sqrt{2}}{3} = 1+2\sqrt{2} \quad (\text{Soluc: } V)$$

$$\text{f)} \frac{4+14\sqrt{5}}{6} = \frac{2+7\sqrt{5}}{3} \quad (\text{Soluc: } V)$$

$$\text{g)} (\sqrt{2}+\sqrt{3})^2 = 2+3=5 \quad (\text{Soluc: } F)$$

$$\text{h)} \sqrt{16+9} = 4+3=7 \quad (\text{Soluc: } F)$$