SOLUCIONES: SERIE 1 - 1º BI - NM

Álgebra. Inicio Polinomios. Logaritmos y exponenciales

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① a/ $\frac{1'2\cdot 10^{\cancel{2}}\ mm}{5\cdot \cancel{10^2}} = \boxed{0'24\ mm} = \boxed{2'40\cdot 10^{-1}\ mm}$

b/ AMERICAN BILLION = 1.000,000.000

SPANISH BILLION = 1,000.000,000.000

AMERICAN: $\frac{10^9 \text{ hours}}{365\cdot 24\cdot 60 \text{ min/year}} \simeq \boxed{1902'59 \text{ años}} \simeq \boxed{1'90\cdot 10^3 \text{ años}}$

SPANISH BILL → $1'90\cdot 10^6$ años

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② Si $7'985$ cm → $\boxed{\varepsilon_a \le 0'0005\ cm.}$

$\boxed{\varepsilon_r \le \frac{0'0005}{7'985-0'0005}} \simeq \boxed{6'26\cdot 10^{-5}}$ sin unidades.

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③ a/ $\sqrt{32}+\sqrt{18} = \sqrt{2^5}+\sqrt{3^2\cdot 2} = 4\sqrt{2}+3\sqrt{2} = \boxed{7\sqrt{2}}$

b/ $\frac{\sqrt{32}+\sqrt{18}}{3+\sqrt{2}} = \frac{7\sqrt{2}}{3+\sqrt{2}} = \frac{7\sqrt{2}\cdot(3-\sqrt{2})}{(3+\sqrt{2})(3-\sqrt{2})} = \frac{21\sqrt{2}-14}{9-2} = \frac{21\sqrt{2}-14}{7} =$

$= \cancel{\frac{21}{5}\sqrt{2}-\frac{14}{5}} = \boxed{3\sqrt{2}-2}$

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④ a/ $8^{5/3} = \sqrt[3]{8^5} = \sqrt[3]{8^3}\cdot\sqrt[3]{8^2} = 8\sqrt[3]{(2^3)^2} = 8\cdot\sqrt[3]{2^6} = 8\cdot 2^2 = \boxed{32}$

b/ $\frac{(2x^{1/2})^3}{4x^2} = \frac{8\cdot x^{3/2}}{4\cdot x^2} = 2\cdot\frac{\sqrt{x^3}}{x^2} = 2\cdot\frac{\cancel{x}\sqrt{x}}{x^{\cancel{2}}} = \boxed{\frac{2\sqrt{x}}{x}} = 2x^{-1/2} = \boxed{\frac{2}{\sqrt{x}}}$

racionalizando

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⑤ a/ $\boxed{6-\sqrt{3}}$ ($2+\sqrt{3}$)

c/ $l = \frac{6-\sqrt{3}}{2+\sqrt{3}} = \frac{(6-\sqrt{3})\cdot(2-\sqrt{3})}{(2+\sqrt{3})\cdot(2-\sqrt{3})} = \frac{12-6\sqrt{3}-2\sqrt{3}+3}{4-3} = \boxed{15-8\sqrt{3}}$ cm.

b/ perímetro $= 2\cdot(15-8\sqrt{3})+2\cdot(2+\sqrt{3}) = 30-16\sqrt{3}+4+2\sqrt{3} = \boxed{34-14\sqrt{3}}$ cm.

6) a) $R(x) = f(2) = 3\cdot 2^3 - 5\cdot 2^2 - 16\cdot 2 + 12 = \boxed{-16}$

b)

	3	−5	−16	12
−2		−6	22	−12
	3	−11	6	0
3		9	−6	
	3	−2	0	

$f(x) = (x+2)(x-3)(3x-2)$

7) a) $R(x) \to f(-2) = (-2)^3 + a\cdot(-2)^2 + b\cdot(-2) + 3 \to 7$

$-8 + 4a - 2b + 3 = 7$

$4a - 2b = 12$

$\boxed{2a - b = 6}$ (1)

b) $f(1) \to 4$

$f(1) = 1 + a + b + 3 \to 4$

$\boxed{a + b = 0}$ (2)

$$\left.\begin{array}{ll} (1) & 2a - b = 6 \\ (2) & a + b = 0 \end{array}\right\} (+)$$

$3a = 6 \to \boxed{a = 2}$

$\boxed{b = -2}$

8) a) $\log_a 10 = \log_a 5\cdot 2 = \log_a 5 + \log_a 2 = \boxed{p + q}$

b) $\log_a 8 = \log_a 2^3 = 3 \log_a 2 = \boxed{3\cdot q}$

c) $\log_a 2'5 = \log_a \frac{5}{2} = \log_a 5 - \log_a 2 = \boxed{p - q}$

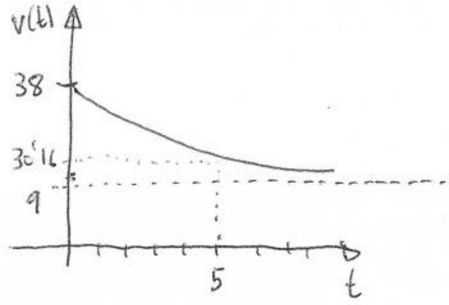
9) a) $M = \frac{2}{3}\cdot \log\left(\frac{3\cdot 10^6}{2'5\cdot 10^4}\right) = \boxed{1'39}$ Magnitud

b) $8'25 = \frac{2}{3}\cdot \log\left(\frac{E}{2'5\cdot 10^4}\right) \to 12'375 = \log E - \log(2'5\cdot 10^4)$

$\log E = 16'77294$

$E \simeq 10^{16'77294} \simeq \boxed{5'93 \times 10^{16} \text{ Julios}}$

a) Dando valors. o mejor con calculadora gráfica:



lowest possible speed (por la gráfica aproximado) 9 m/s

b) Cuando se abre → $t=0$

$$V(0)=9+29\cdot e^{0}=9+29=\boxed{38\ m/s}$$

c) • Por la gráfica, aproximadamente:

• tb. podemos dar un valor a t muy grande; p.ej. 1000

• Con límites (al final de este curso)

$$V(1000)\simeq 9+29\cdot e^{-0'063\cdot 1000}\simeq \boxed{9\ m/s}$$

d) $$V(45)=9+29\cdot e^{-0'063\cdot 45}\simeq \boxed{10'7\ m/s}$$

e) $$19=9+29e^{-0'063\cdot t}$$

$$10=29\cdot e^{-0'063\cdot t} \longrightarrow \frac{10}{29}=e^{-0'063\cdot t}$$

$$\ln\frac{10}{29}=-0'063\cdot t\cdot \underbrace{\ln e}_{1}$$

$$\frac{10}{29}=0'34482758 62$$

$$t=\frac{\ln\frac{10}{29}}{-0'063}\simeq \boxed{16'9\text{ segundos}}$$