

Tema 2. 1º Bachillerato A

1. Escribe el desarrollo de $(3x - 4y)^8 =$
2. Calcula la siguiente división $(2x^5 - 3x^3 + 5x^2 - 2x - 3) : (3x - 1)$
3. Resuelve: $\sqrt{x+3} + \sqrt{x+6} = \frac{3}{\sqrt{x+3}}$
4. Resuelve: $\left. \begin{array}{l} x^2 + 6x + 8 \geq 0 \\ x^2 + 6x \leq 0 \end{array} \right\}$
5. Resuelve: $\left. \begin{array}{l} 2x + y > 5 \\ -x + 4y \leq 3 \\ x \geq -2 \\ y < 1 \end{array} \right\}$
6. Resuelve: $\left. \begin{array}{l} 2x + y - z = -1 \\ x - y + z = 4 \\ 4x - y + z = 7 \end{array} \right\}$
7. Resuelve: $\left. \begin{array}{l} \log x + \log y = 3 \\ x + \frac{y}{10} = 20 \end{array} \right\}$
8. Resuelve $8^{1+x} + 2^{3x-1} = \frac{17}{16}$
9. Calcula un polinomio de segundo grado que verifique que -5 es una raíz, el valor numérico del polinomio para $x=2$ es -7 y $(x-3)$ es un factor.
10. Si se disminuye en 10 cm el lado de un cuadrado, su área disminuye en 400 centímetros cuadrados. ¿Cuál es el tamaño original del cuadrado?

TEMA 2. 1.A (2020) (1)

$$\begin{aligned} \textcircled{1} (3x-4y)^8 &= \binom{8}{0} (3x)^8 (-4y)^0 + \binom{8}{1} (3x)^7 (-4y)^1 + \binom{8}{2} (3x)^6 (-4y)^2 + \binom{8}{3} (3x)^5 (-4y)^3 + \\ &+ \binom{8}{4} (3x)^4 (-4y)^4 + \binom{8}{5} (3x)^3 (-4y)^5 + \binom{8}{6} (3x)^2 (-4y)^6 + \binom{8}{7} (3x)^1 (-4y)^7 + \binom{8}{8} (3x)^0 (-4y)^8 \\ &= 6561x^8 - 8 \cdot 2187x^7 \cdot 4y + 28 \cdot 729x^6 \cdot 16y^2 - 56 \cdot 243x^5 \cdot 64y^3 + 70 \cdot 81x^4 \cdot 256y^4 \\ &- 56 \cdot 27x^3 \cdot 1024y^5 + 28 \cdot 9x^2 \cdot 4096y^6 - 8 \cdot 3x \cdot 16384y^7 + 65536y^8 \\ &= 6561x^8 - 69984x^7y + 326592x^6y^2 - 870912x^5y^3 + 1451520x^4y^4 - 1548288x^3y^5 + \\ &+ 1032192x^2y^6 - 393216xy^7 + 65536y^8 \end{aligned}$$

$$\textcircled{3} \sqrt{x+3} + \sqrt{x+6} = \frac{3}{\sqrt{x+3}}$$

$$\begin{aligned} (\sqrt{x+3} + \sqrt{x+6}) \sqrt{x+3} &= 3 \implies (\sqrt{x+3})^2 + \sqrt{(x+6)(x+3)} = 3 \implies x+3 + \sqrt{x^2+9x+18} = 3 \\ x + \sqrt{x^2+9x+18} &= 0 \implies (\sqrt{x^2+9x+18})^2 = (-x)^2 \implies x^2+9x+18 = x^2 \implies 9x+18=0 \\ \implies x &= -\frac{18}{9} \implies \boxed{x=-2} \quad \checkmark \end{aligned}$$

$$\textcircled{4} \begin{cases} x^2 + 6x + 8 \geq 0 & \textcircled{1} (x+4)(x+2) \geq 0 \\ x^2 + 6x \leq 0 & \textcircled{2} x(x+6) \leq 0 \end{cases}$$

①

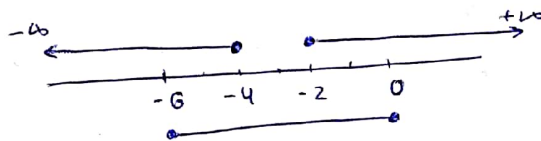
	$-\infty$	-4	-2	$+\infty$
$x+4$		-	+	+
$x+2$		-	-	+
I		+	-	+

$x \in (-\infty, -4] \cup [-2, +\infty)$

②

	$-\infty$	-6	0	$+\infty$
x		-	-	+
$x+6$		-	+	+
I		+	-	+

$x \in [-6, 0]$



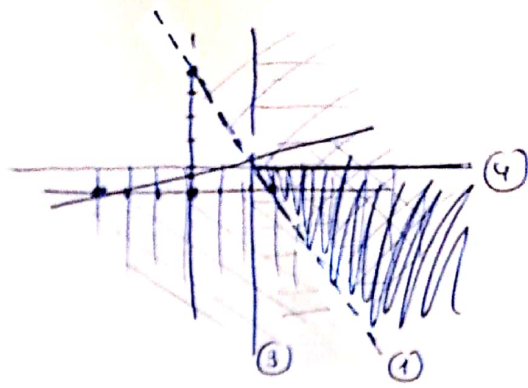
Solución $x \in [-6, -4] \cup [-2, 0]$

$$\textcircled{2} \begin{array}{r} 2x^5 - 3x^3 + 5x^2 - 2x - 3 \quad | \quad 3x-1 \\ \underline{-2x^5 + \frac{2}{3}x^4} \\ \frac{2}{3}x^4 - 3x^3 \\ \underline{-\frac{2}{3}x^4 + \frac{2}{9}x^3} \\ -\frac{25}{9}x^3 + 5x^2 - 2x - 3 \\ \underline{+\frac{25}{9}x^3 - \frac{25}{27}x^2} \\ \frac{110}{27}x^2 - 2x - 3 \\ \underline{-\frac{110}{27}x^2 + \frac{110}{81}x} \\ -\frac{52}{81}x - 3 \\ \underline{+\frac{52}{81}x - \frac{52}{243}} \\ -\frac{781}{243} \end{array}$$

$$C(x) = \frac{2}{3}x^4 + \frac{2}{9}x^3 - \frac{25}{27}x^2 + \frac{110}{81}x - \frac{52}{243}$$

$$R(x) = \frac{-781}{243}$$

$$\begin{cases} \textcircled{5} \textcircled{1} 2x+y > 5 \\ \textcircled{2} -x+4y \leq 3 \\ \textcircled{3} x \geq -2 \\ \textcircled{4} y < 1 \end{cases} \quad \begin{cases} \textcircled{1} 2x+y=5 \\ \frac{x}{5} \mid \frac{5}{2} \mid 0 \\ \frac{y}{0} \mid 0 \end{cases} \quad \begin{cases} \textcircled{2} -x+4y=3 \\ \frac{x}{3} \mid \frac{-3}{4} \mid 0 \\ \frac{y}{0} \mid 0 \end{cases}$$



$$\textcircled{6} \begin{cases} 2x+y-z=-1 \\ x-y+z=4 \\ 4x-y+z=7 \end{cases} \xrightarrow{\substack{E_1-2E_2 \\ -2E_1+E_3}} \begin{cases} 2x+y-z=-1 \\ 3y-3z=-9 \\ -3y+3z=9 \end{cases} \xrightarrow{E_2+E_3} \begin{cases} 2x+y-z=-1 \\ 3y-3z=-9 \\ 0z=0 \end{cases} \text{SCI}$$

$$\boxed{z=\lambda} \quad 3y-3\lambda=-9 \rightarrow y = \frac{-9+3\lambda}{3} = -3+\lambda \quad \begin{cases} 2x-3+\lambda-\lambda=-1 \\ 2x=2 \\ \boxed{x=1} \end{cases}$$

Solución: SCI $(1, -3+\lambda, \lambda) \quad \forall \lambda \in \mathbb{R}$

$$\textcircled{7} \begin{cases} \log x + \log y = 3 \\ x + \frac{y}{10} = 20 \end{cases} \left\{ \begin{array}{l} \log xy = \log 1000 \\ 10x + y = 200 \end{array} \right. \left\{ \begin{array}{l} xy = 1000 \\ y = 200 - 10x \end{array} \right.$$

$$x(200-10x) = 1000 \rightarrow 200x - 10x^2 = 1000 \\ 10x^2 - 200x + 1000 = 0 \\ x^2 - 20x + 100 = 0 \rightarrow x=10 \rightarrow y=100$$

$$\textcircled{8} 8^{1+x} + 2^{3x-1} = \frac{17}{16}$$

$$8 \cdot 8^x + 2^{3x} \cdot 2^{-1} = \frac{17}{16} \Rightarrow 8 \cdot (2^3)^x + \frac{(2^3)^x}{2} = \frac{17}{16} \rightarrow (2^3)^x = t$$

$$8t + \frac{t}{2} = \frac{17}{16} \rightarrow 128t + 8t = 17 \rightarrow 136t = 17 \rightarrow t = \frac{17}{136} = \frac{1}{8} = 8^{-1}$$

$$(2^3)^x = 8^x = t = 8^{-1} \rightarrow \boxed{x=-1}$$

$$\textcircled{9} P(x) = ax^2 + bx + c$$

$$-5 \text{ es raíz} \rightarrow P(-5) = 0 \Rightarrow 25a - 5b + c = 0$$

$$P(2) = -7 \Rightarrow 4a + 2b + c = -7$$

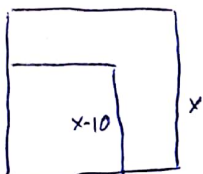
$$(x-3) \text{ factor} \rightarrow P(3) = 0 \Rightarrow 9a + 3b + c = 0$$

$$\begin{cases} 25a - 5b + c = 0 \\ -70b - 21c = 175 \\ -120b - 16c = 0 \end{cases}$$

$$\xrightarrow{12E_2 - 7E_3} \begin{cases} 25a - 5b + c = 0 \\ -70b - 21c = 175 \\ -140c = 2100 \end{cases} \quad \begin{cases} \boxed{c = -15} \\ \boxed{b = 2} \\ \boxed{a = 1} \end{cases}$$

$$\boxed{P(x) = x^2 + 2x - 15}$$

10



$$x^2 = (x-10)^2 + 400$$

$$x^2 = x^2 - 20x + 100 + 400 \rightarrow 20x = 500 \rightarrow x = \frac{500}{20} = 25$$

El lado del cuadrado mide 25 cm