CONTROL TEMA 3. 1º BACHILLERATO B

1. (1,25) Sean los siguientes polinomios:

$$P(x) = -4x^3 + 2x^2 - 9 \quad , Q(x) = 6x^3 - 10x + 6$$

$$R(x) = -3x^4 - 7x^3 + 2x - 1$$

Calcula $P(x) + Q(x) - R(x) \cdot Q(x) =$

2. (1,25) Calcula la siguiente división

$(3x^5 - 4x^4 - 3x^3 + 7x - 1) : (4x - 2)$

3. Resuelve: $\sqrt{x+1} + \sqrt{2x+3} = 5$
4. Resuelve: $4x^6 + 7x^3 - 2 = 0$
5. (2) Resuelve las siguientes inecuaciones:

$a) \frac{x^2-5x+4}{4-9x^2} \geq 0$ $\qquad$ $b) \frac{2(x-2)}{3} - \frac{3-5x}{4} \leq 2x - \frac{x+1}{5}$

6. (1,25) Resuelve: $\frac{x+9}{x} - \frac{10+2x}{2x+4} = \frac{12x+12}{x^2+2x}$
7. (1,25) Resuelve: $-4x^5 + 8x^4 + 12x^3 - 24x^2 - 8x + 16 = 0$
8. La suma de los cuadrados de dos números naturales consecutivos es 181. Halla dichos números.

TEMA 3. 1º BACH B

① (1,25)

$P(x)+Q(x)-R(x)\cdot Q(x)=$

$=[(-4x^3+2x^2-9)+(6x^3-10x+6)]-[(-3x^4-7x^3+2x-1)(6x^3-10x+6)]=$

$=[-4x^3+2x^2-9+6x^3-10x+6]-[-18x^7+30x^5-18x^4-42x^6+70x^4-42x^3$

$+12x^4-20x^2+12x-6x^3+10x-6]=$

$=(2x^3+2x^2-10x-3)-(-18x^7-42x^6+30x^5+64x^4-48x^3-20x^2+22x-6)=$

$=2x^3+2x^2-10x-3+18x^7+42x^6-30x^5-64x^4+48x^3+20x^2-22x+6=$

$=18x^7+42x^6-30^5-64x^4+50x^3+22x^2-32x+3$

② (1,25)

$3x^5-4x^4-3x^3+7x-1 \;\big|\; 4x-2$

$-3x^5+\frac{6}{4}x^4$

$\frac{3}{4}x^4-\frac{10}{16}x^3-\frac{17}{16}x^2-\frac{34}{64}x+\frac{95}{64}$

$-\frac{10}{4}x^4-3x^3$

$+\frac{10}{4}x^4-\frac{20}{16}x^3$

$-\frac{17}{4}x^3$

$+\frac{17}{4}x^3-\frac{34}{16}x^2$

$-\frac{34}{16}x^2+7x$

$+\frac{34}{16}x^2-\frac{68}{64}x$

$\frac{95}{16}x-1$

$-\frac{95}{16}x+\frac{190}{64}$

$\frac{63}{32}$

$C(x)=\frac{3}{4}x^4-\frac{10}{16}x^3-\frac{17}{16}x^2-\frac{34}{64}x+\frac{95}{64}$

$R(x)=\frac{63}{32}$

③ $\sqrt{x+1}+\sqrt{2x+3}=5$

$\sqrt{x+1}=5-\sqrt{2x+3} \Rightarrow (\sqrt{x+1})^2=(5-\sqrt{2x+3})^2 \Rightarrow$

$\Rightarrow x+1=25-10\sqrt{2x+3}+2x+3 \rightarrow 10\sqrt{2x+3}=x+27 \Rightarrow$

$(10\sqrt{2x+3})^2=(x+27)^2 \Rightarrow 100(2x+3)=x^2+54x+729$

$x^2+54x-200x+729-800=0 \rightarrow x^2-146x+429=0$

$x=\frac{146\pm\sqrt{146^2-4\cdot429}}{2}=\frac{146\pm\sqrt{19600}}{2}=\begin{cases}x_1=\frac{286}{2}=143\\ x_2=\frac{6}{2}=3\end{cases}$

$\sqrt{143+1}+\sqrt{286+3}=\sqrt{144}+\sqrt{289}=12+17=29\neq5$ NO

$\sqrt{3+1}+\sqrt{6+3}=\sqrt{4}+\sqrt{9}=2+3=5$ ✓

④ $4x^6 + 7x^3 - 2 = 0$

$x^3 = t \rightarrow 4t^2 + 7t - 2 = 0 \rightarrow t = \frac{-7 \pm \sqrt{49+32}}{8} = \frac{-7 \pm \sqrt{81}}{8} = \frac{-7 \pm 9}{8}$

$t_1 = \frac{-16}{8} = -2 \rightarrow x^3 = -2 \rightarrow x = \sqrt[3]{-2}$

$t_2 = \frac{2}{8} = \frac{1}{4} \rightarrow x^3 = \frac{1}{4} \rightarrow x = \sqrt[3]{\frac{1}{4}}$

⑤ a) $\frac{x^2-5x+4}{4-9x^2} \geq 0 \rightarrow \frac{(x-1)(x-4)}{(2-3x)(2+3x)} \geq 0$

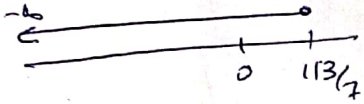
	$-\infty$	$-2/3$	$2/3$	1	4	$+\infty$
$(x-1)$	−	−	−	+	+	
$(x-4)$	−	−	−	−	+	
$(2-3x)$	+	+	−	−	−	
$(2+3x)$	−	+	+	+	+	
I	−	+	−	+	−	

$x \in (-\frac{2}{3}, \frac{2}{3}) \cup [1,4]$

b) $\frac{2(x-2)}{3} - \frac{3-5x}{4} \leq 2x - \frac{x+1}{5} \Rightarrow \frac{40(x-2) - 15(3-5x)}{60} \leq \frac{60 \cdot 2x - 12(x+1)}{60}$

$40x - 80 - 45 + 75x \leq 120x - 12x - 12 \Rightarrow 7x \leq 113 \rightarrow x \leq \frac{113}{7}$

$x \in (-\infty, \frac{113}{7}]$



⑥ (1,25) $\frac{x+9}{x} - \frac{10+2x}{2x+4} = \frac{12x+12}{x^2+2x} \rightarrow \frac{x+9}{x} - \frac{10+2x}{2(x+2)} = \frac{12x+12}{x(x+2)}$ mcm $2 \cdot x(x+2)$ $\Rightarrow$

$\frac{2(x+2)(x+9) - x(10+2x)}{2x(x+2)} = \frac{2(12x+12)}{2x(x+2)} \rightarrow 2x^2 + 22x + 36 - 10x - 2x^2 = 24x + 24$

$-12x = -12 \rightarrow \boxed{x = 1}$

⑦ (1,25) $-4x^5 + 8x^4 + 12x^3 - 24x^2 - 8x + 16 = 0 \rightarrow -4(x^5 - 2x^4 - 3x^3 + 6x^2 + 2x - 4) = 0$

$-4(x-1)(x+1)(x-2)(x-\sqrt{2})(x+\sqrt{2}) = 0$

Soluciones: $1, -1, 2, \pm\sqrt{2}$

	1	−2	−3	6	2	−4
1		1	−1	−4	2	4
	1	−1	−4	2	4	0
−1		−1	2	2	−4	
	1	−2	−2	4	0	
2		2	0	−4		
	1	0	−2	0		

$x^2 - 2 = 0 \rightarrow x = \pm\sqrt{2}$

⑧ $x^2 + (x+1)^2 = 181 \rightarrow x^2 + x^2 + 2x + 1 = 181 \rightarrow 2x^2 + 2x - 180 = 0$

$x^2 + x - 90 = 0$

$x = \frac{-1 \pm \sqrt{1+360}}{2} = \frac{-1 \pm 19}{2} = \begin{cases} -10 \\ 9 \end{cases}$

Los números son $-10, -9$ o $9, 10$