1. (1,25) Escribe el desarrollo de $(5x - 3y)^9$=
2. (1,25) Sean los siguientes polinomios:

$$P(x) = -5x^3 - 3x^2 + 6x - 7 \quad , Q(x) = 8x^3 - 2x^2 - 4x + 9$$

$$R(x) = -2x^4 + 5x^2 - x - 7$$

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

3. (1,25) Calcula la siguiente división $(2x^5 - 4x^3 + x^2 - 2x - 5) : (5x + 1)$
4. Resuelve: $\sqrt{x+4} - \sqrt{x-1} = 1$
5. Resuelve: $3x^6 - 18x^3 + 24$=0
6. (2) Resuelve las siguientes inecuaciones:

$a) \frac{x^2-16}{x+2} \geq 0$ $\qquad$ $b) \frac{3(x-1)}{2} - \frac{1-x}{5} \leq x - \frac{x}{16}$

7. Resuelve: $\frac{2x}{x^2-4} + \frac{x-3}{x+2} = \frac{1}{2x-4} - 3$
8. (1,25)Calcula un polinomio de grado 2 que verifique que -1 es una raíz, que el valor numérico del polinomio para x=-2 es 9 y que (x-7) es un factor.

① (1,25)

$(5x-3y)^9 = \binom{9}{0}(5x)^9(-3y)^0 + \binom{9}{1}(5x)^8(-3y) + \binom{9}{2}(5x)^7(-3y)^2 + \binom{9}{3}(5x)^6(-3y)^3 +$
$+\binom{9}{4}(5x)^5(-3y)^4 + \binom{9}{5}(5x)^4(-3y)^5 + \binom{9}{6}(5x)^3(-3y)^6 + \binom{9}{7}(5x)^2(-3y)^7 +$
$+\binom{9}{8}(5x)(-3y)^8 + \binom{9}{9}(5x)^0(-3y)^9 =$

$= 1 \cdot 1953125x^9 - 9 \cdot 390625x^8 3y + 36 \cdot 78125x^7 \cdot 9y^2 - 84 \cdot 15625x^6 \cdot 27y^3 +$
$+126 \cdot 3125x^5 \cdot 81y^4 - 126 \cdot 625x^4 \cdot 243y^5 + 84 \cdot 125x^3 \cdot 729y^6 - 36 \cdot 25x^2 \cdot 2187y^7$
$+9 \cdot 5x \cdot 6561y^8 - 19683y^9 =$
$= 1953125x^9 - 10546875x^8 y + 25312500x^7y^2 - 35437500x^6y^3 +$
$+ 31893750x^5y^4 - 19136250x^4y^5 + 7654500x^3y^6 - 1968300x^2y^7 + 295245xy^8$
$- 19683y^9$

② (1,25)

$(-5x^3 - 3x^2 + 6x - 7) + (8x^3 - 2x^2 - 4x + 9) - [(-2x^4 + 5x^2 - x - 7)(8x^3 - 2x^2 - 4x + 9)] =$
$= 3x^3 - 5x^2 + 2x + 2 - [-16x^7 + 4x^6 + 8x^5 - 18x^4 + 40x^5 - 10x^4 - 20x^3 + 45x^2 - 8x^4 + 2x^3$
$+4x^2 - 9x - 56x^3 + 14x^2 + 28x - 63] =$
$= 3x^3 - 5x^2 + 2x + 2 + 16x^7 - 4x^6 - 8x^5 + 18x^4 - 40x^5 + 10x^4 + 20x^3 - 45x^2 + 8x^4 - 2x^3$
$- 4x^2 + 9x + 56x^3 - 14x^2 - 28x + 63 =$
$= 16x^7 - 4x^6 - 48x^5 + 36x^4 + 77x^3 - 68x^2 - 17x + 65$

③ (1,25)

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

$-2x^5 - \frac{2}{5}x^4$

$-\frac{2}{5}x^4 - 4x^3$

$+\frac{2}{5}x^4 + \frac{2}{25}x^3$

$-\frac{98}{25}x^3 + x^2$

$+\frac{98}{25}x^3 + \frac{98}{125}x^2$

$\frac{223}{125}x^2 - 2x$

$-\frac{223}{125}x^2 - \frac{223}{625}x$

$-\frac{1473}{625}x - 5$

$+\frac{1473}{625}x + \frac{1473}{3125}$

$-4,52864$

$-\frac{14158}{3125}$

$\frac{2}{5}x^4 - \frac{2}{25}x^3 - \frac{98}{125}x^2 + \frac{223}{625}x - \frac{1473}{3125}$

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

(1) $4^2 = (2\sqrt{x-1})^2 \Rightarrow 16 = 4(x-1) \Rightarrow 4 = x-1 \rightarrow x = 5$ ✓

(5) $3x^6 - 18x^3 + 24 = 0$

(1) $x^3 = t \rightarrow 3t^2 - 18t + 24 = 0 \rightarrow t_1 = 4 \rightarrow x = \sqrt[3]{4}$

$t_2 = 2 \rightarrow x = \sqrt[3]{2}$

(6) (2) a) $\frac{x^2-16}{x+2} \geq 0 \rightarrow \frac{(x-4)(x+4)}{x+2} \geq 0$

	$-\infty$		-4		-2		4		$+\infty$
$x-4$		−		−		−	0	+	
$x+4$		−	0	+		+		+	
$x+2$		−		−	0	+		+	
I		−	0	+	∄	−	0	+	

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

b) $\frac{3(x-1)}{2} - \frac{1-x}{5} \leq x - \frac{x}{16} \rightarrow \frac{3x-3}{2} - \frac{1-x}{5} \leq x - \frac{x}{16}$

$\frac{120x - 120 - 16 + 16x}{80} \leq \frac{80x - 5x}{80} \Rightarrow 136x - 136 \leq 75x \Rightarrow 61x - 136 \leq 0$

$x \leq \frac{136}{61}$

$x \in (-\infty, \frac{136}{61}]$

(7) (1) $\frac{2x}{x^2-4} + \frac{x-3}{x+2} = \frac{1}{2x-4} - 3$

$x^2 - 4 = (x+2)(x-2)$

$x+2 = (x+2)$

$2x - 4 = 2(x-2)$

mcm $2(x-2)(x+2)$

$\frac{2x \cdot 2 + (x-3) \cdot 2 (x-2)}{2(x-2)(x+2)} = \frac{(x+2) - 3(x+2)(x-2) \cdot 2}{2(x-2)(x+2)}$

$4x + 2(x^2 - 5x + 6) = (x+2) - 6(x^2 - 4)$

$4x + 2x^2 - 10x + 12 = x + 2 - 6x^2 + 24 \Rightarrow 8x^2 - 7x - 14 = 0 \rightarrow x \begin{cases} \frac{7+\sqrt{497}}{16} = 1,83 \\ \frac{7-\sqrt{497}}{16} = -0,96 \end{cases}$

(8) (1,25) $P(0) = -14$, $P(-1) = 0$, $P(7) = 0$

$P(x) = ax^2 + bx + c$

$P(0) = -14 \rightarrow a \cdot 0^2 + b \cdot 0 + c = -14 \rightarrow c = -14$

$P(-1) = a - b + c = 0 \rightarrow a - b = 14$

$P(7) = 49a + 7b + c = 0 \rightarrow 49a + 7b = 14$

$7a - 7b = 98$

$49a + 7b = 14$

$56a = 112 \rightarrow a = \frac{112}{56} = 2$

$-49a + 49b = -686$

$49a + 7b = 14$

$56b = -672$

$b = -12$

$P(x) = 2x^2 - 12x - 14$