

CONTROL TEMA 3. 1º BACHILLERATO B

1. (1,25) Escribe el desarrollo de $(5x - 3y)^9 =$

2. (1,25) Sean los siguientes polinomios:

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

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

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:

$$a) \frac{x^2 - 16}{x + 2} \geq 0$$

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

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.

$$\begin{aligned}
 (1) \quad (5x-3y)^9 &= \binom{9}{0} (5x)^9 (-3y)^0 + \binom{9}{1} (5x)^8 (-3y)^1 + \binom{9}{2} (5x)^7 (-3y)^2 + \binom{9}{3} (5x)^6 (-3y)^3 + \\
 (1,25) \quad &+ \binom{9}{4} (5x)^5 (-3y)^4 + \binom{9}{5} (5x)^4 (-3y)^5 + \binom{9}{6} (5x)^3 (-3y)^6 + \binom{9}{7} (5x)^2 (-3y)^7 + \\
 &+ \binom{9}{8} (5x)^1 (-3y)^8 + \binom{9}{9} (5x)^0 (-3y)^9 = \\
 &= 1 \cdot 1953125 x^9 - 9 \cdot 390625 x^8 3y + 36 \cdot 78125 x^7 \cdot 9y^2 - 84 \cdot 15625 x^6 \cdot 27y^3 + \\
 &+ 126 \cdot 3125 x^5 \cdot 81y^4 - 126 \cdot 625 x^4 \cdot 243y^5 + 84 \cdot 125 x^3 \cdot 729y^6 - 36 \cdot 25x^2 \cdot 2187y^7 \\
 &+ 9 \cdot 5x \cdot 6561y^8 - 19683y^9 = \\
 &= 1953125 x^9 - 10546875 x^8 y + 25312500 x^7 y^2 - 35437500 x^6 y^3 + \\
 &+ 31893750 x^5 y^4 - 19136250 x^4 y^5 + 7654500 x^3 y^6 - 1968300 x^2 y^7 + 295245 x y^8 \\
 &- 19683 y^9
 \end{aligned}$$

$$\begin{aligned}
 (2) \quad &(-5x^3 - 3x^2 + 6x - 7) + (8x^3 - 2x^2 - 4x + 9) - [(-2x^4 + 5x^2 - x - 7)(8x^3 - 2x^2 - 4x + 9)] = \\
 (1,25) \quad &= 3x^3 - 5x^2 + 2x + 2 - [-16x^7 + 4x^6 + 8x^5 - 18x^4 + 40x^5 - 10x^4 - 20x^3 + 45x^2 - 8x^4 + 2x^3 \\
 &+ 4x^2 - 9x - 56x^3 + 14x^2 + 28x - 63] = \\
 &= 3x^3 - 5x^2 + 2x + 2 + 16x^7 - 4x^6 - 8x^5 + 18x^4 - 40x^5 + 10x^4 + 20x^3 - 45x^2 + 8x^4 - 2x^3 \\
 &- 4x^2 + 9x + 56x^3 - 14x^2 - 28x + 63 = \\
 &= 16x^7 - 4x^6 - 48x^5 + 36x^4 + 77x^3 - 68x^2 - 17x + 65
 \end{aligned}$$

$$\begin{aligned}
 (3) \quad &2x^5 \quad -4x^3 + x^2 - 2x - 5 \quad (5x+1) \\
 (1,25) \quad &\begin{array}{r}
 2x^5 \quad -4x^3 + x^2 - 2x - 5 \\
 -2x^5 \quad + \frac{2}{5}x^4 \\
 \hline
 \frac{2}{5}x^4 - 4x^3 \\
 + \frac{2}{5}x^4 + \frac{2}{25}x^3 \\
 \hline
 -\frac{98}{25}x^3 + x^2 \\
 + \frac{98}{25}x^3 + \frac{98}{125}x^2 \\
 \hline
 \frac{223}{125}x^2 - 2x \\
 - \frac{223}{125}x^2 - \frac{223}{625}x \\
 \hline
 -\frac{1473}{625}x - 5 \\
 + \frac{1473}{625}x + \frac{1473}{3125} \\
 \hline
 -4,52864 \cdot \\
 -\frac{14193}{3125}
 \end{array}
 \end{aligned}$$

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

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

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

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

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

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

	-16	-4	-2	4	+∞
x-4	-	-	-	+	
x+4	-	+	+	+	
x+2	-	-	+	+	
f	-	+	-	+	

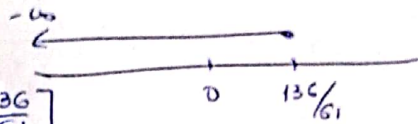
$$x \in (-4, -2) \cup [4, +\infty)$$

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

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

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

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



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

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

$$x+2 = (x+2)$$

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

mcu $2(x-2)(x+2)$

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

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

$$4x + 2x^2 - 10x + 12 = x + 2 - 6x^2 + 24 \Rightarrow 8x^2 - 7x - 14 = 0 \rightarrow x = \frac{7 \pm \sqrt{497}}{16}$$

$$x = \frac{7 + \sqrt{497}}{16} = 1,83$$

$$x = \frac{7 - \sqrt{497}}{16} = -0,98$$

(8)

(1,25)

$$P(0) = -14$$

$$P(-1) = 0$$

$$P(7) = 0$$

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

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

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

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

$$a - b = 14$$

$$49a + 7b = 14$$

$$7a - 7b = 98$$

$$49a + 7b = 14$$

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

$$-49a + 49b = -686$$

$$49a + 7b = 14$$

$$56b = -672$$

$$b = -12$$

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