

1. (1,5) Escribe el desarrollo de $(2x - 5y)^8 =$

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

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

$$R(x) = -2x^4 + 4x^2 - x - 9$$

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

3. (1,25) Calcula la siguiente división $(2x^5 - 3x^3 + 2x^2 - x - 4) : (3x - 1)$

4. Resuelve: $\sqrt{x-4} + \sqrt{x-1} = 3$

5. Resuelve: $x^4 - 6x^2 + 5 = 0$

6. (2) Resuelve las siguientes inecuaciones:

$$a) \frac{x^2-25}{x+3} \geq 0$$

$$b) \frac{5(x-1)}{3} - \frac{2-x}{5} \leq x - \frac{x}{6}$$

7. Resuelve: $\frac{2x}{x^2-9} + \frac{x-3}{x+3} = \frac{1}{2x-6} - 3$

8. Calcula los lados de un triángulo rectángulo isósceles sabiendo que su perímetro es 24 cm.

$$\begin{aligned}
 (1) \quad (2x - 5y)^8 &= \binom{8}{0} (2x)^8 (-5y)^0 + \binom{8}{1} (2x)^7 (-5y)^1 + \binom{8}{2} (2x)^6 (-5y)^2 + \binom{8}{3} (2x)^5 (-5y)^3 + \\
 &+ \binom{8}{4} (2x)^4 (-5y)^4 + \binom{8}{5} (2x)^3 (-5y)^5 + \binom{8}{6} (2x)^2 (-5y)^6 + \binom{8}{7} (2x)^1 (-5y)^7 + \binom{8}{8} (2x)^0 (-5y)^8 = \\
 &= 1 \cdot 256x^8 + 8 \cdot 128x^7 \cdot (-5y) + 28 \cdot 64x^6 \cdot 25y^2 + 56 \cdot 32x^5 \cdot (-125y^3) + 70 \cdot 16x^4 \cdot 625y^4 + \\
 &+ 56 \cdot 8x^3 \cdot (-3125y^5) + 28 \cdot 4x^2 \cdot 15625y^6 + 8 \cdot 2x \cdot (-78125y^7) + 1 \cdot 390625y^8 = \\
 &= 256x^8 - 5120x^7y + 44800x^6y^2 - 224000x^5y^3 + 700000x^4y^4 - 1400000x^3y^5 \\
 &+ 1750000x^2y^6 - 1250000xy^7 + 390625y^8
 \end{aligned}$$

$$\begin{aligned}
 (2) \quad P(x) + Q(x) - R(x) \cdot Q(x) &= \\
 (1,25) \quad (-5x^3 - 2x^2 + 4x - 3) + (7x^3 - 3x^2 - 5x + 6) - (-2x^4 + 4x^2 - x - 9)(7x^3 - 3x^2 - 5x + 6) &= \\
 &= -5x^3 - 2x^2 + 4x - 3 + 7x^3 - 3x^2 - 5x + 6 - [-14x^7 + 6x^6 + 10x^5 - 12x^4 + 28x^3 - 12x^2 \\
 &- 20x^3 + 24x^2 - 7x^4 + 3x^3 + 5x^2 - 6x - 63x^3 + 27x^2 + 45x - 54] = \\
 &= 2x^3 - 5x^2 - x + 3 - [-14x^7 + 6x^6 + 38x^5 - 31x^4 - 80x^3 + 56x^2 + 39x - 54] = \\
 &= 2x^3 - 5x^2 - x + 3 + 14x^7 - 6x^6 - 38x^5 + 31x^4 + 80x^3 - 56x^2 - 39x + 54 = \\
 &= 14x^7 - 6x^6 - 38x^5 + 31x^4 + 82x^3 - 61x^2 - 40x + 57
 \end{aligned}$$

$$\begin{aligned}
 (3) \quad & \begin{array}{r}
 2x^5 \quad -3x^3 + 2x^2 - x - 4 \quad | \quad 3x - 1 \\
 \underline{2x^5 + \frac{2}{3}x^4} \\
 \frac{2}{3}x^4 - 3x^3 \\
 \underline{-\frac{2}{3}x^4 + \frac{2}{9}x^3} \\
 -\frac{25}{9}x^3 + 2x^2 \\
 \underline{+\frac{25}{9}x^3 - \frac{25}{27}x^2} \\
 \frac{29}{27}x^2 - x \\
 \underline{-\frac{29}{27}x^2 + \frac{29}{81}x} \\
 -\frac{52}{81}x - 4 \\
 \underline{\frac{52}{81}x - \frac{52}{243}} \\
 -\frac{1024}{243}
 \end{array}
 \end{aligned}$$

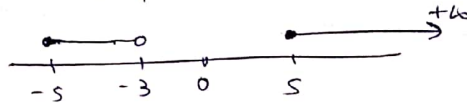
(4) $\sqrt{x-4} + \sqrt{x-1} = 3 \Rightarrow \sqrt{x-4} = 3 - \sqrt{x-1} \Rightarrow (\sqrt{x-4})^2 = (3 - \sqrt{x-1})^2 =$
 $\Rightarrow x-4 = 9 + x-1 - 6\sqrt{x-1} \Rightarrow -12 = -6\sqrt{x-1} \Rightarrow 2 = \sqrt{x-1} \Rightarrow$
 $\Rightarrow 2^2 = (\sqrt{x-1})^2 \Rightarrow 4 = x-1 \Rightarrow x = 5 \checkmark$
 Comprobar $\sqrt{5-4} + \sqrt{5-1} = 3 \checkmark$

(5) $x^4 - 6x^2 + 5 = 0$
 $x^2 = t \rightarrow t^2 - 6t + 5 = 0 \Rightarrow t = \frac{6 \pm \sqrt{36 - 20}}{2} = \frac{6 \pm 4}{2} = \begin{cases} t_1 = 5 \\ t_2 = 1 \end{cases}$
 $x^2 = t_1 = 5 \rightarrow x = \pm\sqrt{5}$
 $x^2 = t_2 = 1 \rightarrow x = \pm 1$

(6) a) $\frac{x^2 - 25}{x+3} \geq 0 \Rightarrow \frac{(x+5)(x-5)}{x+3} \geq 0$

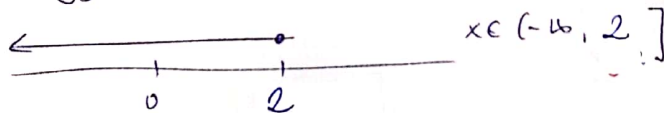
	$-\infty$	-5	-3	5	$+\infty$
$(x+5)$		-	+	+	+
$(x-5)$		-	-	-	+
$(x+3)$		-	-	+	+
		-	+	-	+

$x \in [-5, -3) \cup [5, +\infty)$



b) $\frac{5(x-1)}{3} - \frac{2-x}{5} \leq x - \frac{x}{6} \Rightarrow \frac{5x-5}{3} - \frac{2-x}{5} \leq x - \frac{x}{6} \Rightarrow$

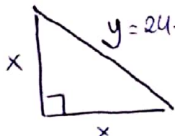
$\frac{50x - 50 - 12 + 6x}{30} \leq \frac{30x - 5x}{30} \Rightarrow 56x - 62 \leq 25x \Rightarrow 31x \leq 62 \Rightarrow x \leq \frac{62}{31} = 2$



(7) $\frac{2x}{x^2-9} + \frac{x-3}{x+3} = \frac{1}{2x-6} - 3 \Rightarrow \left\{ \begin{array}{l} x^2 - 9 = (x+3)(x-3) \\ x+3 = (x+3) \\ 2x-6 = 2(x-3) \end{array} \right\} \text{ mcm} = 2(x+3)(x-3)$

$\frac{2x \cdot 2 + (x-3) \cdot 2(x-3)}{2(x+3)(x-3)} = \frac{(x+3) - 3(x+3)(x-3) \cdot 2}{2(x+3)(x-3)} \Rightarrow 4x + 2x^2 - 12x + 18 = x + 3 - 6x^2 + 54$

$\Rightarrow 8x^2 - 9x - 39 = 0 \rightarrow \begin{cases} x_1 = 2,84 \\ x_2 = -1,76 \end{cases}$

(8)  $2x + y = 24 \rightarrow y = 24 - 2x$
 $(24 - 2x)^2 = x^2 + x^2$

$576 - 96x + 4x^2 = 2x^2 \Rightarrow 2x^2 - 96x + 576 = 0$

$\rightarrow \begin{cases} x = 40,97 \\ x = 7,03 \end{cases}$

Si $x = 40,97$ no es posible porque el perimetro es 24

Si $x = 7,03 \rightarrow y = 9,94$