

## Departamento de Matemáticas 1º Bachillerato



4 - Polinomios

1. p<br/>012e03 - Dados los polinomios  $A(x) = 2x^3 - 5x^2 + 6$ ,  $B(x) = -\frac{1}{2}x^5 - x^4 + 6x$  halla:

(a) 
$$A(x) + B(x)$$

Sol: 
$$-\frac{x^5}{2} - x^4 + 2x^3 - 5x^2 + 6x + 6$$

(b) 
$$A(x) - B(x)$$

**Sol:** 
$$\frac{x^5}{2} + x^4 + 2x^3 - 5x^2 - 6x + 6$$

2. p012e04 - Dados los polinomios  $A(x) = 3x^3 - 6x^2 + 2x - 1$ ,  $B(x) = -x^4 + x^3 + x - 6$ ,  $C(x) = x^4 - x^2 + x + \frac{1}{2}$  halla:

(a) 
$$A(x) \cdot B(x)$$

**Sol:** 
$$-3x^7 + 9x^6 - 8x^5 + 6x^4 - 25x^3 + 38x^2 - 13x + 6$$

(b) 
$$A(x) - 3B(x) + 5C(x)$$
 (c)  $x^2 \cdot A(x) + 3x \cdot B(x)$ 

**Sol:** 
$$8x^4 - 11x^2 + 4x +$$

**Sol:** 
$$-3x^4 + 2x^3 + 2x^2 - 18x$$

3. p012e07 - Halla el cociente y el resto de:

(a) 
$$(5x^4 - 7x^2 + 6x + 1) : (3x^2)$$

**Sol:** 
$$\left(\frac{5x^2}{3} - \frac{7}{3}, 6x + 1\right)$$

(b) 
$$(7x^4 - 3x^2 + 6x - 1) : (x^2 - x + 3)$$

**Sol:** 
$$(7x^2 + 7x - 17, -32x + 50)$$

(c) 
$$(x^6-5):(x^2-x)$$

**Sol:** 
$$(x^4 + x^3 + x^2 + x + 1, x - 5)$$

(d) 
$$(8x^6 - 5x^4 + 6) : (2x^2 - 1)$$

**Sol:** 
$$\left(4x^4 - \frac{x^2}{2} - \frac{1}{4}, \frac{23}{4}\right)$$

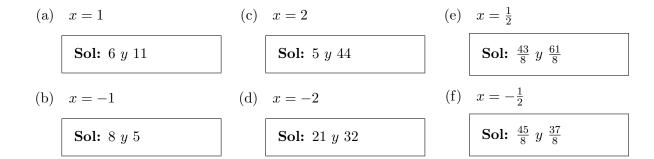
(e) 
$$(3x^5 - 6x^2 + 9) : (x^2 + 1)$$

**Sol:** 
$$(3x^3 - 3x - 6, 3x + 15)$$

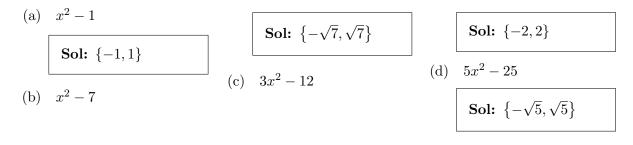
(f) 
$$(x^9 - 7x + 1) : (x^3 + x)$$

**Sol:** 
$$(x^6 - x^4 + x^2 - 1, -6x + 1)$$

4. p012e08 - Dados  $A(x) = -x^3 + 2x^2 + 5$ ,  $B(x) = 2x^4 + 3x + 6$  halla el valor numérico de ambos polinomios en:



5. p012e09 - Halla, para cada uno de los siguientes polinomios, sus raíces:



6. p<br/>012e10 - ¿Tiene el polinomio  $A(x) = x^4 + 3$  alguna raíz real?

(a) 
$$x^4 + 3$$

$$\mathbf{Sol:} \left\{ -\frac{\sqrt{2}\sqrt[4]{3}}{2} - \frac{\sqrt{2}\sqrt[4]{3}i}{2}, -\frac{\sqrt{2}\sqrt[4]{3}i}{2} + \frac{\sqrt{2}\sqrt[4]{3}i}{2}, \frac{\sqrt{2}\sqrt[4]{3}i}{2} - \frac{\sqrt{2}\sqrt[4]{3}i}{2}, \frac{\sqrt{2}\sqrt[4]{3}i}{2} + \frac{\sqrt{2}\sqrt[4]{3}i}{2} \right\}$$

7. p013e11 - Aplica la regla de Ruffini para hallar el cociente y el resto de las siguientes divisiones:

(a) 
$$(x^2 - 3x + 6) : (x + 2)$$

Sol:  $(x - 5, 16)$ 

(b)  $(2x^6 - 7x^4 + 6x - 9) : (x + 3)$ 

**Sol:** 
$$(2x^5 - 6x^4 + 11x^3 - 33x^2 + 99x - 291, 864)$$

(c) 
$$(7x^3 - 4x - 3) : (x - 1)$$
  
**Sol:**  $(7x^2 + 7x + 3, 0)$ 

(d) 
$$(x^2 - 1) : (x + 1)$$
 Sol:  $(x - 1, 0)$ 

8. p013e12 - Aplica el teorema del resto para calcular el resto de las siguientes divisiones:

(a) 
$$(7x^3 - 4x + 9) : (x+1)$$

**Sol:** 0

**Sol:** 0

(b) 
$$(7x^3 - 4x - 3) : (x - 1)$$

- (c)  $(x^2-1):(x+1)$
- 9. p013e17-18 Descomponer en factores
  - (a)  $x^2 81$

**Sol:** 
$$(x-9)(x+9)$$

(b)  $x^2 - 2$ 

**Sol:** 
$$(x - \sqrt{2})(x + \sqrt{2})$$

(c)  $4x^2 - 9$ 

**Sol:** 
$$4\left(x-\frac{3}{2}\right)\left(x+\frac{3}{2}\right)$$

(d)  $x^3 - x$ 

**Sol:** 
$$x(x-1)(x+1)$$

(e)  $x^2 - 3x$ 

**Sol:** 
$$x(x-3)$$

(f)  $x^2 - 2x + 1$ 

**Sol:** 
$$(x-1)^2$$

(g)  $x^5 - 3x^4 + 2x^3$ 

**Sol:** 
$$x^3(x-2)(x-1)$$

(h)  $x^2 - x - 30$ 

**Sol:** 
$$(x-6)(x+5)$$

(i)  $x^2 + 2x + 1$ 

**Sol:** 
$$(x+1)^2$$

(j)  $x^3 - x^2 - x + 1$ 

**Sol:** 
$$(x-1)^2(x+1)$$

(k)  $x^3 - 2x^2 - 5x + 6$ 

**Sol:** 
$$(x-3)(x-1)(x+2)$$

(1)  $x^5 + 4x^4 + x^3 - 10x^2 - 4x + 8$ 

**Sol:** 
$$(x-1)^2(x+2)^3$$

(m)  $x^3 + 3x^2 - 2x - 6$ 

**Sol:** 
$$(x+3)(x-\sqrt{2})(x+\sqrt{2})$$

(n)  $x^3 - 3x^2 - 13x + 15$ 

**Sol:** 
$$(x-5)(x-1)(x+3)$$

 $(\tilde{n})$   $x^3 + x^2 - 6x$ 

**Sol:** 
$$x(x-2)(x+3)$$

(o)  $3x^3 + x^2 - 12x - 4$ 

**Sol:** 
$$3(x-2)(x+\frac{1}{3})(x+2)$$

(p)  $x^4 + 2x^3 - x^2 - 2x$ 

**Sol:** 
$$x(x-1)(x+1)(x+2)$$

(q)  $x^4 - 2x^3 + 2x^2 - 2x + 1$ 

**Sol:** 
$$(x-1)^2 (x^2+1)$$

(r) 
$$x^4 + 2x^3 - 3x^2 - 4x + 4$$

**Sol:** 
$$(x-1)^2 (x+2)^2$$

**Sol:** 
$$(x-1)(x+2)(x+3)$$

(s) 
$$x^3 + 4x^2 + x - 6$$

(t) 
$$x^5 - 4x^3 - x^2 + 4$$

**Sol:** 
$$(x-2)(x-1)(x+2)(x^2+x+1)$$

10. p013e19 - Halla el m.c.d. y el m.c.m. de los polinomios:

(a) 
$$A(x) = x^4 - 4y$$
  $B(x) = x^3 + 2x$ 

**Sol:**  $x^2 + 2 y x^5 - 4x$ 

**Sol:** 
$$x+3$$
  $y$   $x^5+2x^4-12x^3-18x^2+27x$ 

(b) 
$$A(x) = x^3 - 9x \ y \ B(x) = (x-1)(x+3)^2$$

(c) 
$$A(x) = x^3 + x^2 - 2x \ y \ B(x) = x^3 + 2x^2$$

**Sol:** 
$$1 \ y \ x^6 + 3x^5 - 4x^3$$

11. p<br/>013e21 - Halla el valor numérico del polinomio  $x^4 - 2x^3 - x^2 + 3$ , para los valores:

(a) 
$$x = 0$$

**Sol:** 3

**Sol:** 1

Sol: -1

x = 2(b) x = 1

(d)  $x = \frac{2}{3}$ 

**Sol:**  $\frac{175}{81}$