

**Matemáticas 3º E.S.O.**

Nombre \_\_\_\_\_

Fecha \_\_\_\_\_ Evaluación \_\_\_\_\_

Nota: En el examen no se puede usar ni lápiz, ni corrector.

Calificación

1. (1,5 p.) Descompón los siguientes polinomios:

- $P(x) = 3x^3 + 2x^2 - 27x - 18$

- $Q(x) = x^3 - 4x^2 + 4x - 16$

2. (2,5 p.) Opera con las siguientes fracciones y redúcelas todo lo que puedas.

a.  $\frac{x}{x^2 - 4x + 4} - \frac{x-1}{x-2}$

b.  $\frac{1}{x} + \frac{x}{x^2 - 1} - \frac{2x+1}{x^3 - x}$

c.  $\frac{x^2}{x-1} \cdot \frac{x^2 - 2x + 1}{x}$

3. (2 p.) Resuelve las siguientes ecuaciones:

- $\frac{3x+1}{4} - \frac{1}{3} = \frac{2}{15}(3x+2) + \frac{4(1-x)}{3}$

- $12x^2 - 7x + 1 = 0$

- $7x^2 = 14x$

4. (1,5 p.) Opera

- $(xy^2 - 3x)^2 =$

- $(ab^2 + c^3)^2 =$

- $(ay - b) \cdot (ay + b) =$

5. (1 p.) Completa la tabla

	Coeficiente	Parte Literal	Grado
$-5x^{-2}$			
$-yz^5$	-1	$yz^5$	6
$\frac{x^5}{3}$	$\frac{1}{3}$	$x^5$	5
$-7a^2b^5$	-7	$a^2b^5$	7
$\frac{x}{-4}$	$-\frac{1}{4}$	$x$	1

6. (1,5 p.) Opera

- $(x^2 - 2x + 5x^3 - 1) \times (3x - 3x^2 - 2) =$

- $(x^5 - 3x^4 - 5x^2 + x - 6) \div (x^2 - 2x - 5) =$

C  
O  
I  
X  
i  
O  
V  
i  
i  
a  
d  
O  
A  
r  
e  
n  
t  
e  
i  
r  
o



$$\textcircled{1} a) 3x^3 + 2x^2 - 27x - 18$$

$$\begin{array}{r|rrrr}
 & 3 & 2 & -27 & -18 \\
 3 & & 9 & 33 & 18 \\
 \hline
 & 3 & 11 & 6 & 0 \\
 -3 & & -9 & -6 & \\
 \hline
 & 3 & 2 & & 
 \end{array}$$

$$3x^3 + 2x^2 - 27x - 18 = (x-3)(x+3)(3x+2)$$

$$b) x^3 - 4x^2 + 4x - 16$$

$$\begin{array}{r|rrrr}
 & 1 & -4 & 4 & -16 \\
 4 & & 4 & 0 & 16 \\
 \hline
 & 1 & 0 & 4 & 0
 \end{array}$$

$$x^3 - 4x^2 + 4x - 16 = (x-4)(x^2+4)$$

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

$$\left. \begin{array}{l}
 x^2 - 4x + 4 = (x-2)^2 \\
 x-2 = x-2
 \end{array} \right\} \text{m.c.m.} = (x-2)^2$$

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



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

$$x = x$$

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

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

$$\left. \begin{array}{l} \\ \\ \end{array} \right\} \text{mcm} = x(x+1)(x-1)$$

$$= \frac{x^2-1 + x^2 - 2x - 1}{x^3-x} = \frac{2x^2 - 2x - 2}{x^3-x}$$

$$c) \frac{x^2}{x-1} \cdot \frac{x^2-2x+1}{x} = \frac{x^2 \cdot (x-1)^2}{(x-1) \cdot x} = x(x-1)$$

$$\textcircled{3} \frac{3x+1}{4} - \frac{1}{3} = \frac{2}{15}(3x+2) + \frac{4(1-x)}{3}$$

$$\frac{3x+1}{4} - \frac{1}{3} = \frac{6x+4}{15} + \frac{4-4x}{3}$$

$$\frac{45x+15-20}{60} = \frac{24x+16+80-80x}{60}$$

$$45x - 24x + 80x = -15 + 20 + 16 + 80$$

$$101x = 101$$

$$x = \frac{101}{101} = 1$$

$$\boxed{x=1}$$



$$12x^2 - 7x + 1 = 0$$

$$x = \frac{+7 \pm \sqrt{49 - 4 \cdot 12 \cdot 1}}{2 \cdot 12} = \frac{+7 \pm \sqrt{49 - 48}}{24} = \frac{+7 \pm 1}{24}$$

$$x_1 = \frac{+7+1}{24} = \frac{8}{24} = \frac{1}{3} \quad x_2 = \frac{+7-1}{24} = \frac{+6}{24} = \frac{1}{4}$$

$$7x^2 = 14x \rightarrow 7x^2 - 14x = 0 \rightarrow 7x(x-2) = 0$$

$$7x = 0 \quad x_1 = 0$$

$$x-2 = 0 \quad x_2 = 2$$

$$(4) \quad (xy^2 - 3x)^2 = x^2y^4 + 9x^2 - 6x^2y^2$$

$$(ab^2 + c^3)^2 = a^2b^4 + c^6 + 2ab^2c^3$$

$$(ay - b)(ay + b) = a^2y^2 - b^2$$

$$(6) \quad \begin{array}{r} 5x^3 + x^2 - 2x - 1 \\ -3x^2 + 3x - 2 \\ \hline \end{array}$$

$$\begin{array}{r} -10x^3 - 2x^2 + 4x + 2 \\ +15x^4 + 3x^3 - 6x^2 - 3x \\ -15x^5 - 3x^4 + 6x^3 + 3x^2 \\ \hline -15x^5 + 12x^4 - x^3 - 5x^2 + x + 2 \end{array}$$



$$\begin{array}{r} x^5 - 3x^4 + 0x^3 - 5x^2 + x - 6 \\ -x^5 + 2x^4 + 5x^3 \\ \hline \end{array}$$

$$-x^4 + 5x^3 - 5x^2$$

$$+x^4 - 2x^3 - 5x^2$$

$$3x^3 - 10x^2 + x$$

$$-3x^3 + 6x^2 + 15x$$

$$-4x^2 + 16x - 6$$

$$+4x^2 - 8x + 20$$

$$8x - 26$$

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

$$x^3 - x^2 + 3x - 4$$