

## 1. Factoriza los siguientes polinomios:

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |     |     |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|-----|----|----|----|----|---|----|-----|----|---|----|-----|----|---|----|---|---|--|---|---|---|--|--|---|---|---|---|---|
| $2x^4 - 18x^2$            | <p>Lo primero tienes que observar si todos los monomios tienen "x"...</p> <p>para poder sacar factor común a la "x"</p> $2x^4 - 18x^2 = x^2(2x^2 - 18) = 2x^2(x^2 - 9) = 2x^2(x+3)(x-3)$ <p><math>\hookrightarrow 2(x^2 - 9)</math> <math>\hookrightarrow</math> si no te das cuenta que estas con una identidad notable <math>x^2 - 9 = 0 \rightarrow x = \pm 3</math></p>                                                                                                                                                                                                                                                                                                                                                                                                              |    |     |     |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| $x^4 - x^3 - x^2 - x - 2$ | <p><u>Parti</u></p> <table style="border-collapse: collapse; text-align: center;"> <tr> <td></td> <td>1</td> <td>-1</td> <td>-1</td> <td>-1</td> <td>-2</td> </tr> <tr> <td>-1</td> <td></td> <td>-1</td> <td>2</td> <td>-1</td> <td>2</td> </tr> <tr> <td></td> <td>1</td> <td>-2</td> <td>1</td> <td>-2</td> <td>0</td> </tr> <tr> <td>2</td> <td></td> <td>2</td> <td>0</td> <td>2</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> </table> <p><math>x = 2 \rightarrow (x-2)</math></p> <p>Remante <math>x = -1 \rightarrow (x+1)</math></p> <p><math>x^4 - x^3 - x^2 - x - 2 = (x+1)(x-2)(x^2+1) \rightarrow</math> no se puede simplificar más</p> <p><math>x^2+1=0 \rightarrow x = \pm \sqrt{-1} \rightarrow \text{No}</math></p> |    | 1   | -1  | -1 | -1 | -2 | -1 |   | -1 | 2   | -1 | 2 |    | 1   | -2 | 1 | -2 | 0 | 2 |  | 2 | 0 | 2 |  |  | 1 | 0 | 1 | 0 | 0 |
|                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -1 | -1  | -1  | -2 |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| -1                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -1 | 2   | -1  | 2  |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
|                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -2 | 1   | -2  | 0  |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| 2                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2  | 0   | 2   |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
|                           | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0  | 1   | 0   | 0  |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| $2x^3 - 9x^2 - 8x + 15$   | <table style="border-collapse: collapse; text-align: center;"> <tr> <td></td> <td>2</td> <td>-9</td> <td>-8</td> <td>15</td> </tr> <tr> <td>1</td> <td></td> <td>2</td> <td>-7</td> <td>-15</td> </tr> <tr> <td></td> <td>2</td> <td>-7</td> <td>-15</td> <td>0</td> </tr> </table> <p><math>(2x^2 - 7x - 15)</math></p> <p><math>\hookrightarrow</math> ecuación de segundo grado</p> $x = \frac{+7 \pm \sqrt{49 - 4(2)(-15)}}{4} \rightarrow x = \begin{cases} \frac{+7+13}{4} = 5 \\ \frac{+7-13}{4} = -\frac{6}{4} = -\frac{3}{2} \end{cases}$ <p><math>2x^3 - 9x^2 - 8x + 15 = (x-5)(x+3/2)(x+2)</math></p> <p><u>Atención</u><br/>tenemos que añadir el dos de la ecuación de segundo grado.</p>                                                                                   |    | 2   | -9  | -8 | 15 | 1  |    | 2 | -7 | -15 |    | 2 | -7 | -15 | 0  |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
|                           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -9 | -8  | 15  |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| 1                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2  | -7  | -15 |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
|                           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -7 | -15 | 0   |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |
| $x^5 + x^4 - 2x^3$        | <p><math>x^5 + x^4 - 2x^3 = x^3(x^2 + x - 2) = (*)</math></p> <p><math>\hookrightarrow</math> ecuación de segundo grado</p> $x^2 + x - 2 = 0 \rightarrow x = \frac{-1 \pm \sqrt{1 - 4(1)(-2)}}{2} \rightarrow x = \begin{cases} \frac{-1+3}{2} = 1 \\ \frac{-1-3}{2} = -2 \end{cases}$ <p><math>(*) = x^3(x-1)(x+2)</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |     |     |    |    |    |    |   |    |     |    |   |    |     |    |   |    |   |   |  |   |   |   |  |  |   |   |   |   |   |

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|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|----|---|---|--|---|---|----|--|---|---|----|---|---|--|---|---|--|--|---|---|---|--|
| $x^3 - 3x + 2$ | <p><u>Ruffini</u></p> <p>observar que falta el término de <u><math>x^2</math></u></p> <div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex: 1;"> <table style="border-collapse: collapse; margin: 10px;"> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">-3</td> <td style="padding: 5px;">2</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">1</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">-2</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">-2</td> <td style="padding: 5px;">0</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">1</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;"></td> </tr> </table> </div> <div style="flex: 1; text-align: center;"> <p>por tanto, <math>x^3 - 3x + 2 = (x-1)(x-1)(x+2) =</math><br/> <math>= (x-1)^2(x+2)</math></p> </div> </div> <div style="margin-top: 10px; text-align: center;"> <p><math>\underbrace{1 \quad 2}_{(x+2)}</math></p> </div> |   | 1  | 0  | -3 | 2 | 1 |  | 1 | 1 | -2 |  | 1 | 1 | -2 | 0 | 1 |  | 1 | 2 |  |  | 1 | 2 | 0 |  |
|                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 | -3 | 2  |    |   |   |  |   |   |    |  |   |   |    |   |   |  |   |   |  |  |   |   |   |  |
| 1              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 1  | -2 |    |   |   |  |   |   |    |  |   |   |    |   |   |  |   |   |  |  |   |   |   |  |
|                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 | -2 | 0  |    |   |   |  |   |   |    |  |   |   |    |   |   |  |   |   |  |  |   |   |   |  |
| 1              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 | 2  |    |    |   |   |  |   |   |    |  |   |   |    |   |   |  |   |   |  |  |   |   |   |  |
|                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2 | 0  |    |    |   |   |  |   |   |    |  |   |   |    |   |   |  |   |   |  |  |   |   |   |  |