Práctica PRECALCULO

Factorice completamente cada expresión

1. $30a^2x^2 + 35a^2x - 15a^2$
2. $9 - 25(x+1)^2$
3. $9a^4(a+b) - 16a^2(a+b)^3$
4. $(a+1)^3 - (a+1)$
5. $(x^2 - x)^2 - 14(x^2 - x) + 24$
6. $4y^2 + 6x - 1 - 9x^2$
7. $32a^3 + 4b^3 - 8a^3m^4 - b^3m^4$
8. $2x^3 + 9x^2 + 7x - 6$

Realice las operaciones y simplifique

1. $\frac{4x^2-9}{4x^2-24x+9} \cdot \frac{4x^2-4x-3}{8x^3+27}$
2. $\frac{x+3}{x-1} - \frac{x+2}{x+4}$,
3. $\frac{3m}{m+1} - \frac{5}{m} + \frac{7m}{m^2+m}$
4. $\frac{3x}{2x+1} - \frac{x-19}{2x^2+3x+1} - \frac{x+5}{x+1}$
5. $\left(x - \frac{2}{x+1}\right)\left(x - \frac{3}{x+2}\right)$
6. $\frac{4b^2-12b+9}{b^2(2b-3)-3b(2b-3)+4(3-2b)} \cdot \left(\frac{1}{b} - \frac{2}{2b-3}\right)$
7. $\frac{\frac{1}{a-b} - \frac{1}{a+b}}{\frac{1}{a-b} + \frac{1}{a+b}}$
8. $\frac{x^4-1}{x^3-1} \cdot \left[1 - \frac{x}{(x+1)^2}\right] \div \left(x + \frac{1}{x}\right)$
9. $\frac{\frac{1}{2-2h} - \frac{1}{3+3h}}{\frac{1}{1-h^2} - \frac{1}{1+h}}$

1. $30a^2x^2 + 35a^2x - 15a^2$

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

$3x \quad -1$

$2x \quad 3$

$5a^2(3x-1)(2x-3)$

2. $9 - 25(x+1)^2$

$(3+5(x+1))(3-5(x+1))$

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

$(8+5x)(-2-5x)$

3. $9a^4(a+b) - 16a^2(a+b)^3$

$a^2(a+b)[9a^2 - 16(a+b)^2]$

$a^2(a+b)[3a-4(a+b)][3a+4(a+b)]$

$a^2(a+b)(3a-4a-4b)(3a+4a+4b)$

$a^2(a+b)(-a-4b)(7a+4b)$

4. $(a+1)^3 - (a+1)$

$(a+1)[(a+1)^2 - 1]$

$(a+1)(a+1+1)(a+1-1)$

$a(a+1)(a+2)$

8. $2x^3 + 9x^2 + 7x - 6$

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

$2x \quad -1$

$x \quad 3$

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

2	9	7	-6	| 1
	2	11	18	
2	11	18	12	

2	9	7	-6	| -1
	-2	-7	0	
2	7	0	(0)	

2	9	7	-6	| 2
	4	26	66	
2	13	33	60	

2	9	7	-6	| -2
	-4	-10	6	
2	5	-3	(0)	

1. $\dfrac{4x^2-9}{4x^2-24x+9} \cdot \dfrac{4x^2-4x-3}{8x^3+27}$

$2x \quad -7$

$2x \quad +1$

$\dfrac{(2x-3)(2x+3)}{4x^2-24x+9} \cdot \dfrac{(2x-3)(2x+1)}{(2x-3)(4x^2+6x+9)}$

$\dfrac{(2x+3)(2x-3)(2x+1)}{(4x^2-24x+9)(4x^2+6x+9)}$

2. $\dfrac{x+3}{x-1} - \dfrac{x+2}{x+4}$

$\dfrac{(x+3)\cdot(x+4) - (x+2)(x-1)}{(x-1)(x+4)}$

$\dfrac{x^2+4x+3x+12 - (x^2-x+2x-2)}{(x-1)(x+4)}$

$\dfrac{x^2+4x+3x+12-x^2+x-2x+2}{(x-1)(x+4)}$

$\dfrac{6x+14}{(x-1)(x+4)} = \dfrac{2(3x+7)}{(x-1)(x+4)}$

3. $\dfrac{3m}{m+1} - \dfrac{5}{m} + \dfrac{7m}{m^2+m}$

$\dfrac{3m}{m+1} - \dfrac{5}{m} + \dfrac{7m}{m(m+1)}$

$\dfrac{3m\cdot m - 5(m+1) + 7m}{m(m+1)}$

$\dfrac{3m^2-5m-5+7m}{m(m+1)}$

$\dfrac{3m^2+2m-5}{m(m+1)}$

$\dfrac{(3m+5)(m-1)}{m(m+1)}$

4. $\dfrac{3x}{2x+1} - \dfrac{x-19}{2x^2+3x+1} - \dfrac{x+5}{x+1}$

$2x \quad 1$

$x \quad 1$

$\dfrac{3x}{2x+1} - \dfrac{x-19}{(2x+1)(x+1)} - \dfrac{x+5}{x+1}$

$\dfrac{3x\cdot(x+1) - (x-19) - (x+5)\cdot(2x+1)}{(2x+1)(x+1)}$

$\dfrac{3x^2+3x-x+19-(2x^2+x+10x+5)}{(2x+1)(x+1)}$

$\dfrac{3x^2+3x-x+19-2x^2-x-10x-5}{(2x+1)(x+1)}$

$x \quad -7$

$x \quad -2$

$\dfrac{x^2-9x+14}{(2x+1)(x+1)}$

$\dfrac{(x-7)(x-2)}{(2x+1)(x+1)}$

5. $\left(\dfrac{x}{1} - \dfrac{2}{x+1}\right)\left(\dfrac{x}{1} - \dfrac{3}{x+2}\right)$

$\left(\dfrac{x\cdot(x+1) - 2}{x+1}\right)\left(\dfrac{x\cdot(x+2) - 3}{x+2}\right)$

$x \quad -2 \qquad x \quad -3$

$\left(\dfrac{x^2+x-2}{x+1}\right)\left(\dfrac{x^2+2x-3}{x+2}\right)$

$\dfrac{(x+2)(x-1)}{(x+1)} \cdot \dfrac{(x+3)(x-1)}{(x+2)}$

$\dfrac{(x+3)(x-1)^2}{x+1}$

7. $\dfrac{\frac{1}{a-b} - \frac{1}{a+b}}{\frac{1}{a-b} + \frac{1}{a+b}}$

$\left(\dfrac{1}{a-b} - \dfrac{1}{a+b}\right) \div \left(\dfrac{1}{a-b} + \dfrac{1}{a+b}\right)$

$\dfrac{(a+b)-(a-b)}{(a-b)(a+b)} \div \dfrac{a+b+a-b}{(a-b)(a+b)}$

$\dfrac{a+b-a+b}{(a-b)(a+b)} \div \dfrac{a+b+a-b}{(a-b)(a+b)}$

$\dfrac{2b}{(a-b)(a+b)} \cdot \dfrac{(a-b)(a+b)}{2a}$

$\dfrac{2b}{2a} = \dfrac{b}{a}$

9. $\dfrac{\frac{1}{2-2h} - \frac{1}{3+3h}}{\frac{1}{1-h^2} - \frac{1}{1+h}}$

2	3	3	| 3
1	3	3	
1	3	3	

$\left(\dfrac{1}{2-2h} - \dfrac{1}{3+3h}\right) \div \left(\dfrac{1}{1-h^2} - \dfrac{1}{1+h}\right)$

$\dfrac{1}{2(1-h)} - \dfrac{1}{3(1+h)} \div \dfrac{1}{(1-h)(1+h)} - \dfrac{1}{1+h}$

$\dfrac{1\cdot 3(1+h) - 1\cdot 2(1-h)}{6(1-h)(1+h)} \div \dfrac{1-1\cdot(1-h)}{(1-h)(1+h)}$

$\dfrac{3+3h-2+2h}{6(1-h)(1+h)} \div \dfrac{1-1+h}{(1-h)(1+h)}$

$\dfrac{1+5h}{6(1-h)(1+h)} \cdot \dfrac{(1-h)(1+h)}{h}$

$\dfrac{1+5h}{6h}$

1. $x^4 - 2x^2 - 3x - 2 = 0$

1	0	-2	-3	-2	2
	2	4	4	2	
1	2	2	1	0	

$(x-2)(x^3+2x^2+2x+1)=0$

$(x-2)(x+1)(x^2+x+1)=0$

$\Delta = 1^2 - 4 \cdot 1 \cdot 1$

$x=2 \quad x=-1 \quad x=\frac{-1\pm\sqrt{-3}}{2}$

$x=\frac{-1\pm\sqrt{-3}}{2}$

$\emptyset$

$S=\{2,-1\}$

1	2	2	1	1
	1	3		
1	3	5	0	

1	2	2	1	-1
	-1	-1	-1	
1	1	1	0	

2. $25x^4 + 5x = 125x^3 + x^2$

$25x^4 + 5x - 125x^3 - x^2 = 0$

$x(25x^3 - 125x^2 - x + 5) = 0$

$x(25x^2(x-5) - 1(x-5)) = 0$

$x(25x^2 - 1)(x-5) = 0$

$x(5x-1)(5x+1)(x-5) = 0$

$x=0 \quad 5x=1,\ x=\frac{1}{5} \quad 5x=-1,\ x=\frac{-1}{5} \quad x=5$

$S=\{0, \frac{1}{5}, \frac{-1}{5}, 5\}$

3. $(x^2-2x)^2 - 2(x^2-2x) - 3 = 0$

$(x^2-2x) \quad -3$

$(x^2-2x) \quad 1$

$(x^2-2x-3)(x^2-2x+1) = 0$

$(x-3)(x+1)(x-1)^2 = 0$

$x=3 \quad x=-1 \quad x=1$

$S=\{3,-1,1\}$

4. $(x+5)(2x-1) = x(x+9)$

$(x+5)(2x-1) - x(x+9) = 0$

$2x^2 - x + 10x - 5 - x^2 - 9x = 0$

$x^2 - 5 = 0$

$x^2 = 5$

$\sqrt{x^2} = \pm\sqrt{5} \quad S=\{\sqrt{5}, -\sqrt{5}\}$

$x = \pm\sqrt{5}$

5. $(x-3)^2 = 3x^2 - 9x$

$x^2 - 6x + 9 = 3x^2 - 9x$

$3x^2 - x^2 - 9x + 6x - 9 = 0$

$2x^2 - 3x - 9 = 0$

$2x \quad -3$

$(2x+3)(x-3) = 0$

$2x = -3 \quad x = 3$

$x = \frac{-3}{2}$

$S=\{3, \frac{-3}{2}\}$

6. $x^{-2} + 2x^{-1} - 3 = 0$

$x^{-1} \quad 3$

$x^{-1} \quad -1$

$(x^{-1}+3)(x^{-1}-1) = 0$

$x^{-1} = -3 \quad x^{-1} = 1$

$\frac{1}{x} = -3 \quad \frac{1}{x} = 1$

$1 = -3x \quad 1 = x$

$\frac{-1}{3} = x$

$S=\{1, \frac{-1}{3}\}$

7. $x^6 + 7x^3 - 8 = 0$

$x^3 \quad 8$

$x^3 \quad -1$

$(x^3+8)(x^3-1) = 0$

$x^3 = -8 \quad x^3 = 1$

$\sqrt[3]{x^3} = \sqrt[3]{-8} \quad \sqrt[3]{x^3} = \sqrt[3]{1}$

$x = -2 \quad x = 1$

$S=\{1, -2\}$