Quadratic Factorising – 2 terms

Examples

1) $3x^2 - 9x = 3x(x-3)$

2) $15x^2 + 12x = 3x(5x+4)$

3) $7x^2 + 3x = x(7x+3)$

Exercise

1) $4x^2 + 4x = 4x(x+1)$

2) $10x^2 - 15x = 5x(2x-3)$

3) $8x^2 + 9x = x(8x+9)$

Difference of two squares

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

Examples

1) $x^2 - 9 = x^2 - 3^2 = (x+3)(x-3)$

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

3) $4x^2 - 81 = (2x)^2 - 9^2 = (2x+9)(2x-9)$

3) $x^2 - 3 = x^2 - \sqrt{3}^2 = (x+\sqrt{3})(x-\sqrt{3})$

Exercise

1) $4x^2 - 9y^2 = (2x)^2 - (3y)^2 = (2x+3y)(2x-3y)$

2) $25x^2 - 16 = (5x)^2 - 4^2 = (5x+4)(5x-4)$

3) $36x^2 - 49 = (6x)^2 - 7^2 = (6x+7)(6x-7)$

Exercise Simplify

1) $$\frac{x^2-16}{x^2-4x} = \frac{(x+4)\cancel{(x-4)}}{x\cancel{(x-4)}} = \frac{x+4}{x}$$

2) $$\frac{x^2+6x+8}{x^2-4} = \frac{\cancel{(x+2)}(x+4)}{\cancel{(x+2)}(x-2)} = \frac{x+4}{x-2}$$

3) $$\frac{x^2+3x+2}{x^2+7x+10} = \frac{\cancel{(x+2)}(x+1)}{\cancel{(x+2)}(x+5)} = \frac{x+1}{x+5}$$

4) $$\frac{x^2-3x-4}{2x^2-8x} = \frac{(x+1)\cancel{(x-4)}}{2x\cancel{(x-4)}} = \frac{x+1}{2x}$$

Quadratic Sequences

Examples

2nd diff		2	2	2		
1st diff	2	4	6	8		
1)	4,	6,	10,	16,	24	
n^2	1	4	9	16	25	−
	3	2	1	0	−1	
$-n$	−1	−2	−3	−4	−5	−
$+4$	4	4	4	4	4	

n^{th} term $= n^2 - n + 4$

2nd diff		6	6	6		
1st diff	4	10	16	22		
2)	7,	11,	21,	37,	59	
$3n^2$	3	12	27	48	75	−
	4	−1	−6	−11	−16	
$-5n$	−5	−10	−15	−20	−25	−
$+9$	+9	+9	+9	+9	+9	

n^{th} term $= 3n^2 - 5n + 9$