

6.5 Solving Polynomial Equations (Part 2)

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#3A)  $x^6 - y^6 \rightarrow a^2 - b^2 = (a+b)(a-b)$   
 $(x^3)^2 - (y^3)^2 \rightarrow a^2 - b^2 = (a-b)(a^2 + ab + b^2)$   
 $(x^3 + y^3)(x^3 - y^3) \rightarrow a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$(x+y)(x^2 - xy + y^2)(x-y)(x^2 + xy + y^2)$

B)  $(a^3x^2 - 6a^2bx + 9a^2b^2 - b^3x^2 + 6b^3x - 9b^3)$   
 $a^3(x^2 - 6bx + 9) - b^3(x^2 - 6bx + 9)$   
 $(a^3 - b^3)(x^2 - 6bx + 9)$   
 $(a-b)(a^2 + ab + b^2)(x-3)^2$

3A)  $a^6 + b^6$   
 $(a^2)^3 + (b^2)^3$   
 $(a^2 + b^2)(a^4 - a^2b^2 + b^4)$

3B)  $(x^2 + 4x + 4)(x^2 + 4x + 4)$   
 $(x^2 + 4x + 4)^2$   
 $(x^2 + 4x + 4)(x^2 + 4x + 4)$   
 $(x+y)(x^2 - xy + y^2)(x+z)$

EX #6:  $18x^2 - 21x^2 + 3 = 0$  6A)  $4x^2 - 8x^2 + 3 = 0$   
 $x = 1, -1, 4, -4$   $x = \pm 1.22, \pm 0.707$   
 $\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}$   $\pm \frac{\sqrt{2}}{2}, \pm \frac{\sqrt{6}}{2}$

6B)  $8x^2 + 10x^2 - 12 = 0$   
 $x = \pm 0.866 \pm 2 \text{ complex roots}$

18)  $x^4 - 6x^2 + 8 = 0$   
 $x = 2, -2$

2	1	0	-6	0	-8
	↓	2	4	-4	-8
-2	1	2	-2	-4	0
	↓	-2	0	4	
	1	0	-2	0	

$x^2 - 2 = 0$   $x = \pm \sqrt{2}$   
 $\sqrt{x^2} = \sqrt{2}$

# 6.5: Solving Polynomial Equations (Part 2)

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#3a)  $x^6 - y^6$  →  $a^2 - b^2 = (a+b)(a-b)$   
 $(x^3)^2 - (y^3)^2$  →  $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$   
 $(x^3 + y^3)(x^3 - y^3)$  →  $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$(x+y)(x^2 - xy + y^2)(x-y)(x^2 + xy + y^2)$

b)  $(a^3x^2 - 6a^3x + 9a^3 - b^3x^2 + 6b^3x - 9b^3)$

$a^3(x^2 - 6x + 9) - b^3(x^2 - 6x + 9)$

$(a^3 - b^3)(x^2 - 6x + 9)$        $(x^2 - 6x + 9)$   
 $(a-b)(a^2 + ab + b^2)(x-3)^2$        $(x-3)(x-3)$

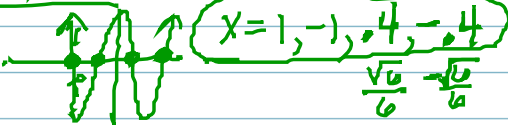
3A)  $a^6 + b^6$   
 $(a^2)^3 + (b^2)^3$

3B.  $(x^3 + 4x^2 + 4x + 4)(x^2y^3 + 4xy^3 + 4y^3)$   
 $x^3(x^2 + 4x + 4) + y^3(x^2 + 4x + 4)$

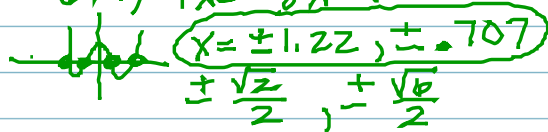
$(a^2 + b^2)((a^2)^2 - a^2b^2 + (b^2)^2)$        $(x^3 + y^3)(x^2 + 4x + 4)$

$(a^2 + b^2)(a^4 - a^2b^2 + b^4)$        $(x+y)(x^2 - xy + y^2)(x+2)$

EX #6:  $18x^4 - 21x^2 + 3 = 0$       6A)  $4x^4 - 8x^2 + 3 = 0$

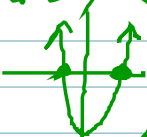


$x = 1, -1, 4, -4$   
 $\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}$



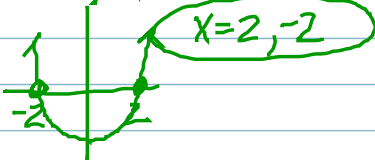
$x = \pm 1.22, \pm 7.07$   
 $\pm \frac{\sqrt{2}}{2}, \pm \frac{\sqrt{6}}{2}$

6B)  $8x^4 + 10x^2 - 12 = 0$



$x = \pm 1.22, \pm 7.07$  & 2 complex roots

18)  $6x^2 + 8 = 0$



$x = 2, -2$

z	1	0	-6	0	8
	↓	2	4	-4	-8
-2	1	2	-2	-4	0
	↓	-2	0	4	
	1	0	-2	0	

$x^2 - 2 = 0$        $x = \pm \sqrt{2}$   
 $+2 \quad +2$

$\sqrt{x^2} = \sqrt{2}$