

Let 7 Roots + Zero's (pg. 384)

#1a: $x^2 + 6x + 9 = 0$ b: $x^3 + 25x = 0$

$(x+3)(x+3) = 0$ $x(x^2 + 25) = 0$

$x+3=0$ $x=0$ $x^2 + 25 = 0$

$x = -3$ $-25 = -25$

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5i$

one real root

Ex #2: $f(x) = x^6 + 3x^5 - 4x^4 - 6x^3 + x^2 - 8x + 5$ one real + 2 imag

4	2	0	Pos	No	Y	No	Y	Y	Y	0	1	0	25	0
2	2	0	Neg	Y	Y	4	4	4	4	0	↓	0	0	0
6	4	2	0	Im	Y	3	1	0	25	0	1	0	25	0
6					+	-	+	+	+	+				
					Y	N	Y	N	N	N				

$x^2 + 25 = 0$

2A: $f(x) = 2x^5 + x^4 + 3x^3 - 4x^2 - x + 9$

2	0	Pos	No	No	Y	No	Y		
2	1	Neg	Y	Y	4	4	4	4	0
4	2	0	Imag	Y	3	1	0	25	0
5					+	-	+	+	+
					Y	Y	No	Y	No

$2(-1)^5 + (-1)^4 + 3(-1)^3 - 4(-1)^2 - (-1) + 9$

Ex #3: $f(x) = x^4 - 18x^2 + 12x + 80$

-4	1	0	-18	12	80	
↓	-4	16	8	-80		
-2	1	-4	-2	20	0	
↓	-2	12	-20			
1	-6	10	0			

$x^2 - 6x + 10 = 0$

$-b \pm \sqrt{b^2 - 4ac}$

$6 \pm \sqrt{36 - 4(1)(10)}$

$6 \pm \sqrt{-4} = \frac{6 \pm 2i}{2} = 3 \pm i$

$x = -4 \pm 2i$

Ex #4: $(x-p)(x-q)(x-r)$

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

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

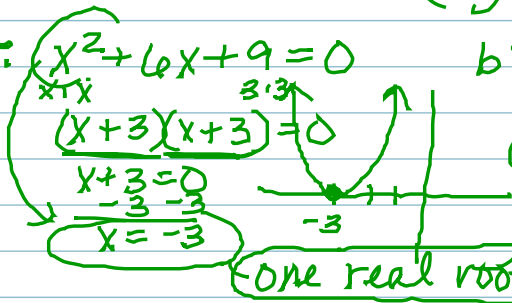
$(x+1)(x-5)^2 - i^2$

$(x+1)(x^2 - 10x + 25) - = 1$

$(x+1)(x^2 - 10x + 26)$

6.7 Roots + Zero's (Pg. 384)

#1a: $x^2 + 6x + 9 = 0$



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

$$x+3=0$$

$$x = -3$$

one real root

b: $x^3 + 25x = 0$



$$x(x^2 + 25) = 0$$

$$x = 0$$

$$x^2 + 25 = 0$$

$$-25 -25$$

$$\sqrt{x^2} = \sqrt{-25}$$

$$x = \pm 5i$$

Ex #2: $f(x) = x^6 + 3x^5 - 4x^4 - 6x^3 + x^2 - 8x + 5$ one real + 2 imag roots

4	2	0	Pos	No	Y	No	Y	Y	Y	0	1	0	25	0	
3	2	0	Neg	X ⁶	3x ⁵	-4x ⁴	-6x ³	x ²	-8x	+5	↓	0	0	0	
6	4	2	0	Im	(1) ⁶	3(-1) ⁵	-4(-1) ⁴	-6(-1) ³	+(-1) ²	-8(-1)	+5	1	0	25	0
6					+	-	-	+	+	+	+				
						Y	N	Y	N	N	N				

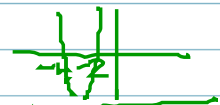
$$x^2 + 25 = 0$$

2A: $f(x) = 2x^5 + x^4 + 3x^3 - 4x^2 - x + 9$

2, 0	Pos	No	No	Y	No	Y	
3, 1	Neg	2(-1) ⁵	+(-1) ⁴	+3(-1) ³	-4(-1) ²	-(-1)	+9
4, 2, 0	Im	-	+	-	-	+	+
5		Y	Y	No	Y	No	

Ex #3: $f(x) = x^4 - 18x^2 + 12x + 80$

-4	1	0	-18	12	80
	↓	-4	16	8	-80
-2	1	-4	-2	20	0
	↓	-2	12	-20	
	1	-6	10	0	



$$-b \pm \sqrt{b^2 - 4ac}$$

$$2 \pm \sqrt{36 - 40}$$

$$6 \pm \sqrt{36 - 4(1)10}$$

$$6 \pm \sqrt{-4} = \frac{6 \pm 2i}{2} = 3 \pm i$$

$x = 1, 5$
 $3 \pm i$

$$x^2 - 6x + 10 = 0$$

Ex #4: $1, 5 - i, 5 + i$

$$(x-p)(x-q)(x-r)$$

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

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

$$(x+1)(x-5)^2 - i^2$$

$$(x+1)(x^2 - 10x + 25) - -1$$

$$(x-5)(x-5)$$

$$x^2 - 5x - 5x + 25$$

$$x^2 - 10x + 25$$

$$(x+1)(x^2 - 10x + 25)$$