Find the roots!

$X = -4, 2, 7$

Note Title 11/13/2015

$f(x) = x^3 - 5x^2 - 22x + 56$

$+ \quad 1 \quad - \quad - \quad 1 \quad +$

3 roots

+	−	i
2	1	0
0	1	2

$f(-x) = -x^3 - 5x^2 + 22x + 56$

$- \quad - \quad 1 \quad + \quad +$

$p = 56 : \pm 1, \pm 2, \pm 4, \pm 7, \pm 8, \pm 14, \pm 28, \pm 56$

$q = 1 : \pm 1$

$\frac{p}{q} = p$

	1	−5	−22	56
~~−1~~		−1	6	16
	1	−6	−16	72

	1	−5	−22	56
−4		−4	36	−56
	1	−9	14	0

$(x-2)(x-7) = 0$

$x = 2$ $\quad x-2=0 \quad x-7=0$ $\quad x = 7$

$x^2 - 9x + 14$

$f(x) = x^3 + 6x + 20$

$X = -2,\ 1+3i,\ 1-3i$

3 roots

+	−	i
0	1	2

$f(-x) = -x^3 - 6x + 20$

$p = 20 : \pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20$

$q = 1 : \pm 1$

$\frac{p}{q} = p$

-2	1	0	6	20
	:	-2	4	-20
	1	-2	10	0
	a	b	c	

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

$x = \frac{2 \pm \sqrt{4 - 4(1)(10)}}{2}$

$= \frac{2 \pm \sqrt{4 - 40}}{2} = \frac{2 \pm \sqrt{-36}}{2}$

$= \frac{2 \pm 6i}{2} = 1 \pm 3i$

$f(x) = x^3 - 9x^2 + 27x - 27$

$X = 3, 3, 3$

3 roots

+	−	i
3	0	0
1	0	2

+ 1 − 1 + 1 −

$f(-x) = -x^3 - 9x^2 - 27x - 27$

$p = 27 : \pm 1, \pm 9, \pm 3, \pm 27$

$q = 1 : \pm 1$

$\frac{p}{q} = p$

3	1	−9	27	−27
		3	−18	27
	1	−6	9	0
	a	b	c	

$x^2 - 6x + 9$

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

$x - 3 = 0$

$x = 3$

$f(x) = x^3 - x^2 - 8x + 12$ You try...

$x = -3, 2, 2$