1. $6x^2 - 12x = -5$

$6x^2 - 12x + 5 = 0$

$x_{1,2} = \frac{12 \pm \sqrt{12^2 - 4(6)(5)}}{2(6)}$

$= \frac{12 \pm 2\sqrt{6}}{12}$

$x_1 = \frac{6 + \sqrt{6}}{6}$

$x_2 = \frac{6 - \sqrt{6}}{6}$

2

$P(x) = 1(x-4)(x+4)(x-5i)(x+5i)$

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

$P(x) = (x^2 - 16)(x^2 + 25)$

$= x^4 + 25x^2 - 16x^2 - 400$

$= x^4 + 9x^2 - 400$

3 (a) $h(x) = -14x^5(x^2 - 36)(x+7)^2(x-9)^9$

(a) degree $= 5 + 2 + 2 + 9$

$= 18$

(b) No of turning points $= n - 1$

$= 18 - 1 = 17$

(c) Since the leading coefficient is negative and the degree is even the graph falls on both far right and far left

(d)

Zero	Multiplicity
-7	2
-6	1
0	5
6	1
8	9

(e)

Zero	Behaviour
-7	touches the graph
-6, 0, 6, 8	passes through the graph

6 (a) degree $= 4 + 1 = 5$

(b) The graph falls on the left and rises on the right

(c) Odd degree

(d) Positive

(e) $-4, 3$

(f) -1

(g) $P(x) = 1(x+4)^2(x+1)(x-3)^2$

7. $f(x) = 5x^2 + 27x - 18$

$5x^2 - 27x - 18 = 0$

$5x^2 + 3x - 30x - 18 = 0$

$x(5x+3) - 6(5x+3) = 0$

$(5x+3)(x-6) = 0$

$5x + 3 = 0, \quad x - 6 = 0$

$5x = -3$

$x = -\frac{3}{5}, \quad x = 6$

x-intercepts $= (-\frac{3}{5}, 0), (6, 0)$

$f(x) = 4x^4 + 31x^3 + 8x^2 + 124x - 32$

1. $\pm \frac{p}{q} = \pm 1, \pm \frac{1}{2}, \pm \frac{1}{4}, \pm 2, \pm 4, \pm 8, \pm 8$

± 32

2.

-8	4	31	8	124	-32
		-32	8	-128	32
	4	-1	16	-4	0

$= (x + 8)$

$= -8$

3.

$\frac{1}{4}$	4	-1	16	-4	
		1	0	4	
	4	0	16	0	

$x = \frac{1}{4}$

4) $4x^2 + 16 = 0$

$4x^2 = -16$

$x^2 = -4$

$x = \sqrt{-4}$

$= -2i, 2i$