Homework 15 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine which of the following functions are polynomial functions.
	1. $f\left(x\right)= 4x+x^{3}$
	2. $g\left(x\right)= 1-\frac{1}{x}$
	3. $h\left(x\right)= 3-\frac{1}{2}x$
	4. $k\left(x\right)= x\left(x-1\right)$
	5. $l\left(x\right)=\frac{x^{2}-5}{x^{3}}$
2. Form a polynomial whose real zeros and degree are given.
	1. Zeros: -1, 1, 3; degree 3
	2. Zeros: -3,0,4; degree 3
	3. Zeros: -1, 3 (multiplicity 2); degree 3
3. For each of the following polynomials: **(i)** list each real zero and its multiplicity, **(ii)** determine whether the graph crosses or touches the x-axis at each x-intercept, **(iii)** determine the behavior of the graph near each x-intercept, **(iv)** determine the maximum number of turning points on the graph, **(v)** determine the end behavior, that is, find the power function that the graph of f resembles for large values of |x|.
	1. $f\left(x\right)= 3\left(x-7\right)\left(x+3\right)^{2}$
	2. $g\left(x\right)= 4\left(x+4\right)\left(x+3\right)^{3}$
	3. $h\left(x\right)= 4\*\left(x^{2}+1\right)\left(x-2\right)^{3}$
	4. $l\left(x\right)= 2\left(x-3\right)\left(x+4\right)^{3}$
	5. $k\left(x\right)=\left(x-\frac{1}{3}\right)^{2}\left(x-1\right)^{3}$