MA 180 Polynomial Functions
Section 3.3

Some polynomial functions are given below in factored form. For each function,

(a) Graph the function. Choose a window that will enable you to see all intercepts and local extreme points. Copy the graph onto the grid provided.

(b) List the zeros of the function. Remember, x = r is called a ***zero*** or ***root*** of f(x) if f(r) = 0.

(c) For each zero in part (ii), does the function ***cross*** or ***touch*** the x-axis?

(d) What is the relationship between the zeros of the function and the factors of that function?

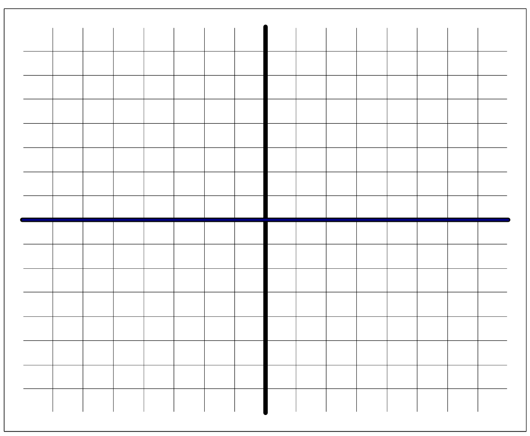
(e) What is the degree of the polynomial?

(f) How many zeros does the function have?

(g) How many turning points (local extreme points) does the function have?

1. $f(x) = (x-2)(x+3)(x-5)$

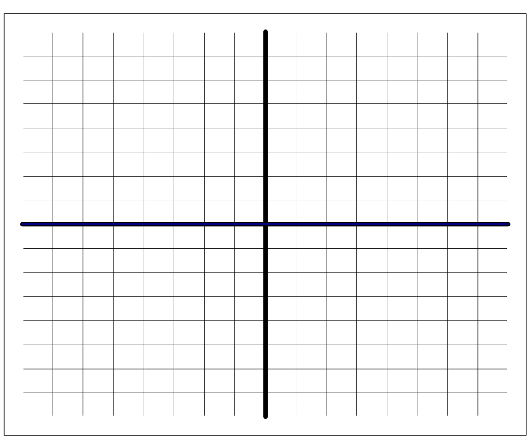
(a)



(b)	(c)
(d)	(e)
(f)	(g)

2. $g(x) = (x+2)^2(x-4)$

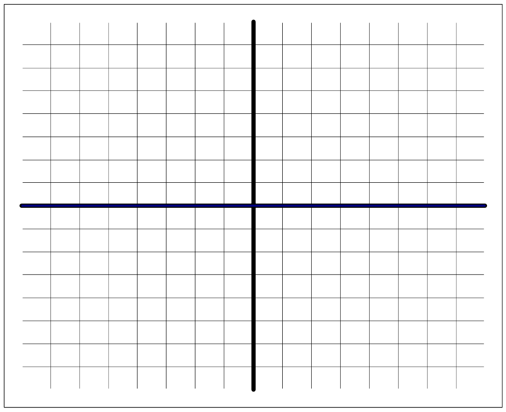
(a)



(b)	(c)
(d)	(e)
(f)	(g)

3. $h(x) = x(x^2 + 4)$

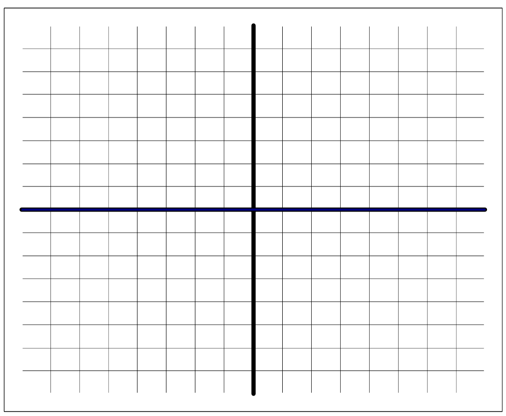
(a)



(b)	(c)
(d)	(e)
(f)	(g)

4. $f(x) = 0.2(x+2)(x-3)^3$

(a)



(b)	(c)
(d)	(e)
(f)	(g)

Conclusions:

1. If r is an x-intercept of f(x), then f(r) = _____ and (x – r) is a ___________ of f(x).

2. Definition: If (x - r) is a factor of f that appears exactly m times, that is $(x-r)^m$ is a factor of f(x), then r is called a ***zero of multiplicity m.***

   Choose ***touches*** or ***crosses*** for each blank in (a) and (b) below.

   (a) If r is a zero of multiplicity m of f and m is an ***even*** number, then the graph of f _________ the x-axis at r.

   (b) If r is a zero of multiplicity m of f and m is an ***odd*** number, then the graph of f _________ the x-axis at r.

3. A polynomial of degree n has at most ______ zeros.

4. A polynomial of degree n has at most ______ turning points.