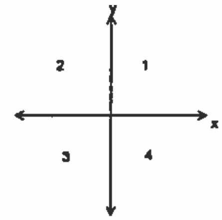
MHF 4UI POLYNOMIAL FUNCTIONS

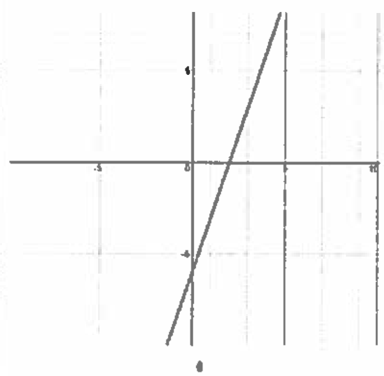
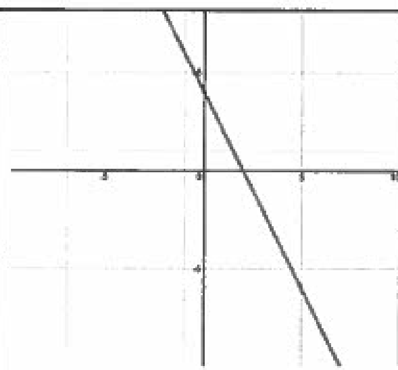
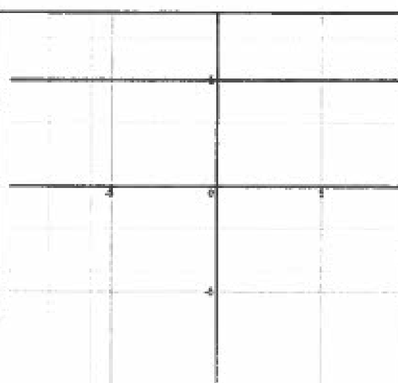


Sketch a graph of each of the following using the Desmos website or app.
As you complete this exercise consider

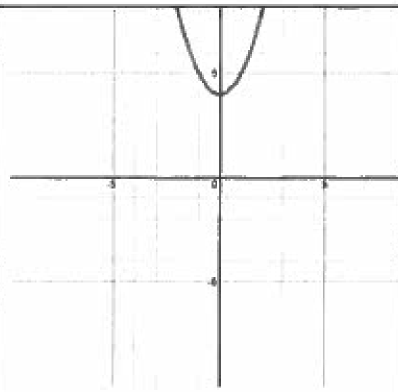
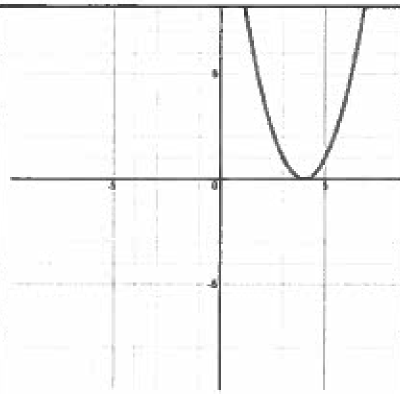
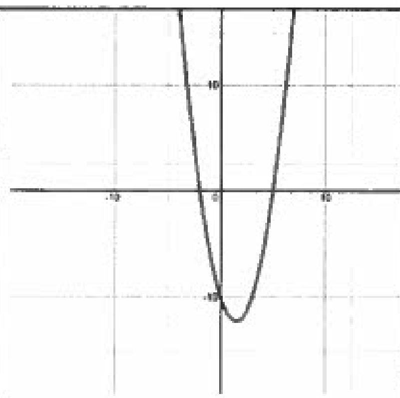
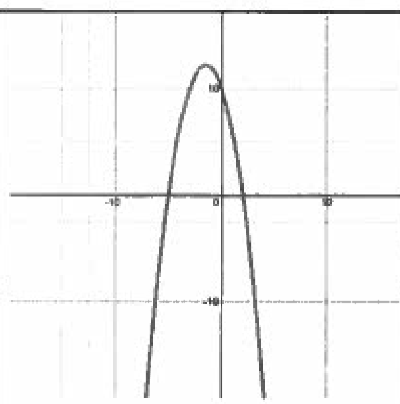
- Domain and Range
- Shape of the curve.
- Maximum number of x-intercepts.
- The effect of the sign of the coefficient of the dominant term. (leading coefficient)

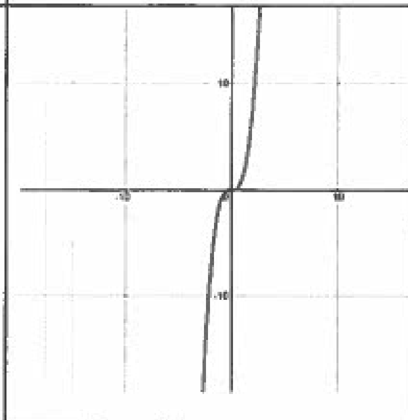
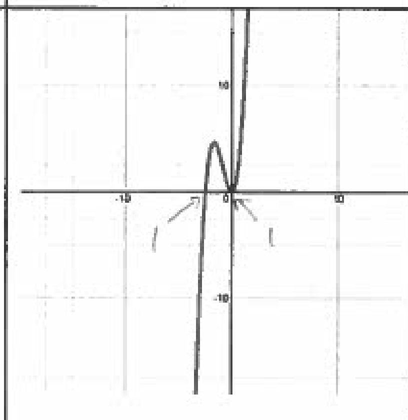
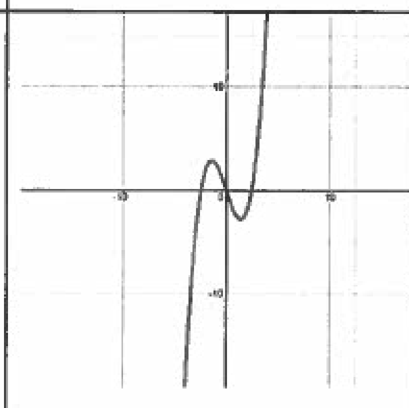
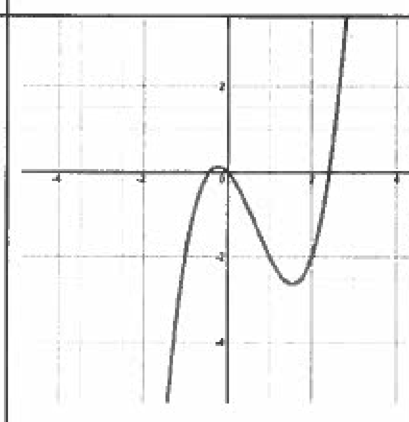
Go to www.desmos.com type in the equations that are listed and zoom in or out as necessary to find the intercepts of each function listed.

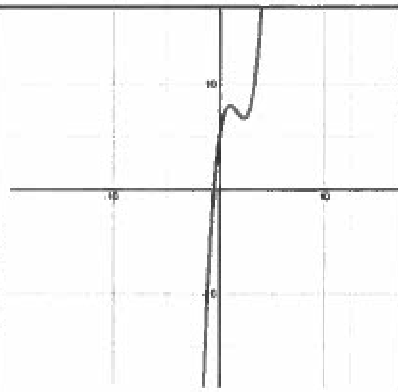
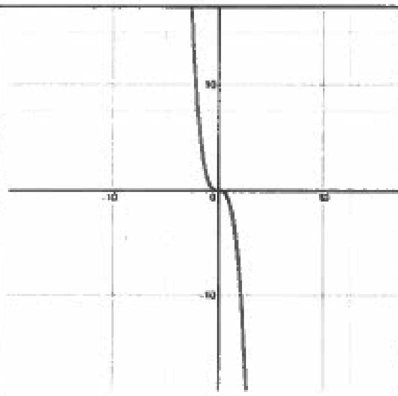
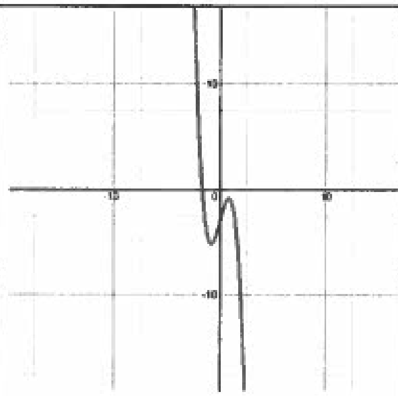
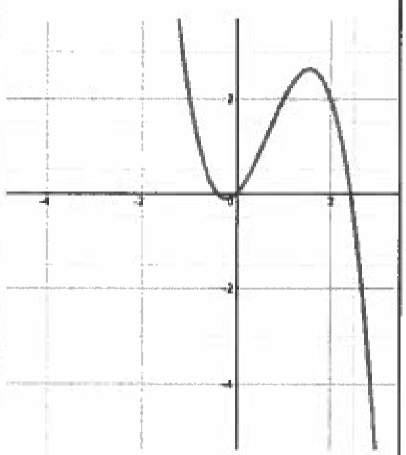
To find the actual value of the intercept click on the line
The intercept points should now be gray.
Click on the points again and the should become black and state the coordiantes

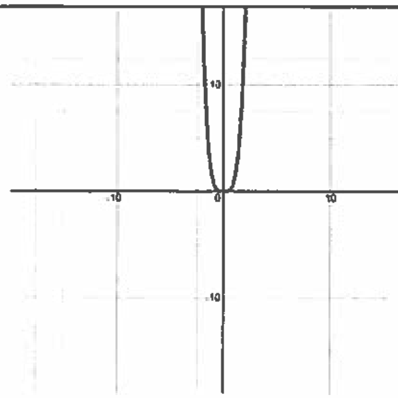
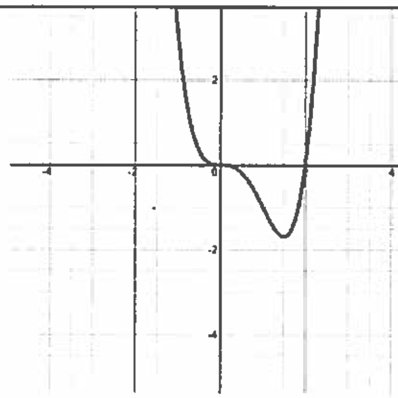
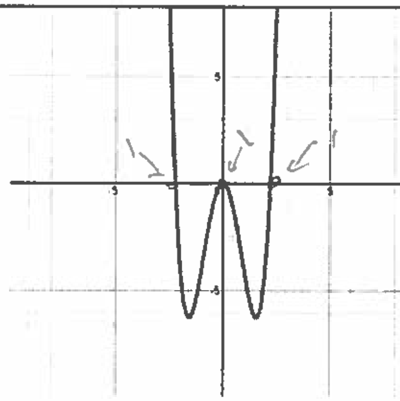
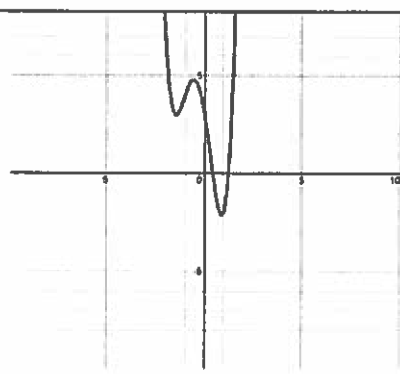
	Function Type and its equation	Sketch of graph	Coefficient of the Dominant Term (+/-)	Quadrant where the curve "starts"	Quadrant where the curve "ends"	# of x-intercepts
	Linear Functions					
1	$y=3x-6$		+	3	1	1
2	$y=-2x+4$		−	2	4	1
3	$y=5$		N/A	2	1	0

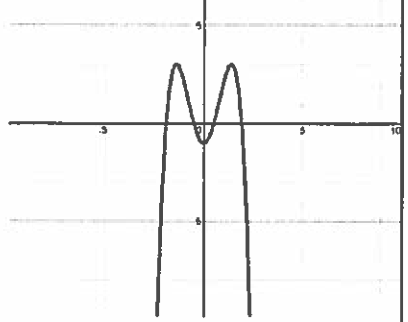
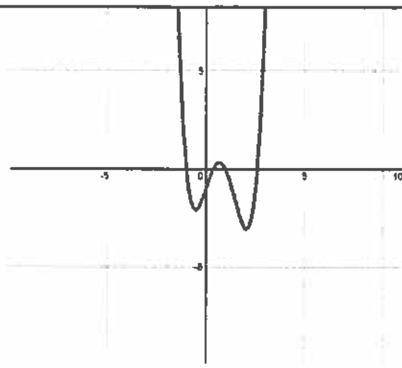
MHF 4UI POLYNOMIAL FUNCTIONS

	Quadratic Functions					
	$y=x^2+4$		+	2	1	0
5 x	$y=x^2-8x+16$		+	2	1	1
	$y=x^2-3x-10$		+	2	1	2
7	$y=-x^2+3x+10$		−	3	4	2

	Cubic Functions					
8	$y=x^3$		+	3	1	1
9	$y=2x^3+5x^2$		+	3	1	2
10	$y=0.5x^3-3x$		+	3	1	3
11	$y=x^3-2x^2-x$		+	3	1	3

12	$y = x^3 - 5x^2 + 7x + 5$		+	3	1	1
13	$y = -x^3$		−	2	4	1
14	$y = -2x^3 + 4x - 3$		−	2	4	1
15	$y = -x^3 + 2x^2 + x$		−	2	4	3

	Quartic Functions					
16	$y = x^4$		+	2	1	1
17	$y = x^4 - 2x^3$		+	2	1	2
18	$y = x^4 - 5x^2$		+	2	1	3
19	$y = 2x^4 + 3x^3 - 4x^2 - 6x + 3$		+	2	1	2

20	$y=-x^4+4x^2-1$		−	3	4	4
21	$y=x^4-3x^3+3x-1$		+	2	1	4

1. Using the results from above, what is the **maximum** number of x-intercepts each function can have?
   a) linear ___1___ b) quadratic ___2___
   c) cubic ___3___ d) quartic ___4___

2. In which quadrant will the graph of a polynomial function "end" if the coefficient of the dominant term is positive? ___1___

3. In which quadrant will the graph of a polynomial function "end" if the coefficient of the dominant term is negative? ___4___

4. If the degree of the dominant term is odd and the curve "starts" in the third quadrant, the curve will "end" in the ___1___ quadrant.

5. If the degree of the dominant term is even and the curve "starts" in the third quadrant, the curve will "end" in the ___4___ quadrant.

6. Describe the shape of a function with positive leading coefficients if the function is
   a) Cubic

   b) Quartic

7. Describe the effect of the leading coefficient being negative. Reflect in x axis

8. For a cubic function: The domain is $\{x \mid x \in \mathbb{R}\}$
   The range is $\{y \mid y \in \mathbb{R}\}$

9. For a quartic function: The domain is $\{x \mid x \in \mathbb{R}\}$
   The range depends on leading coefficient (pos or neg) AND constant term (shifts up or down)