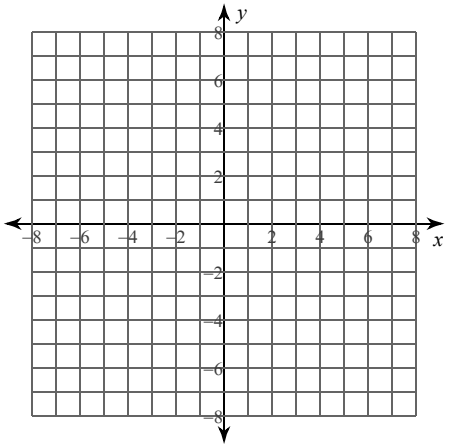
 Name_____

Graphs of Polynomial Functions

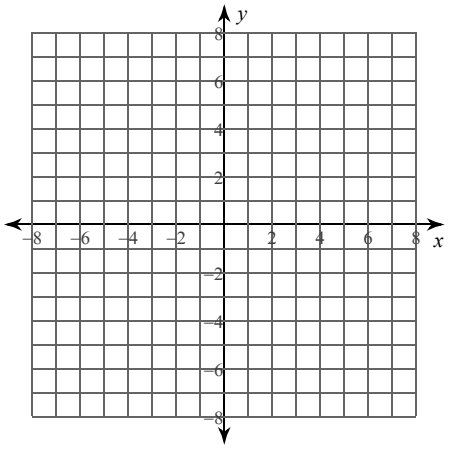
Date_____ Period____

For each function: (1) determine the real zeros and state the multiplicity of any repeated zeros, (2) list the x-intercepts where the graph crosses the x-axis and those where it does not cross the x-axis, and (3) sketch the graph.

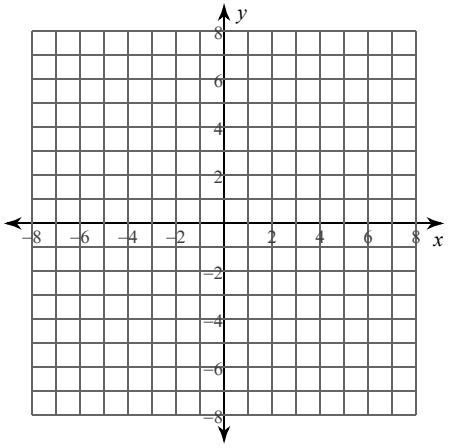
1) $f(x) = -x^3$



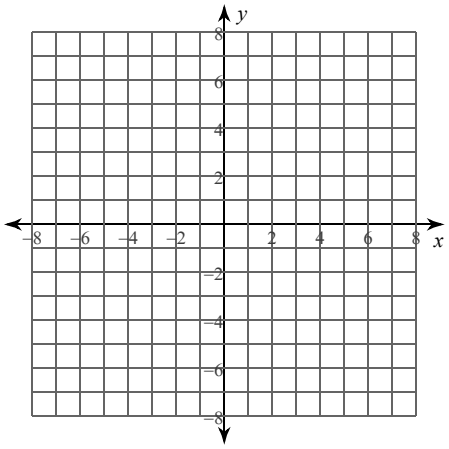
2) $f(x) = 2x^3 - 3x^2$



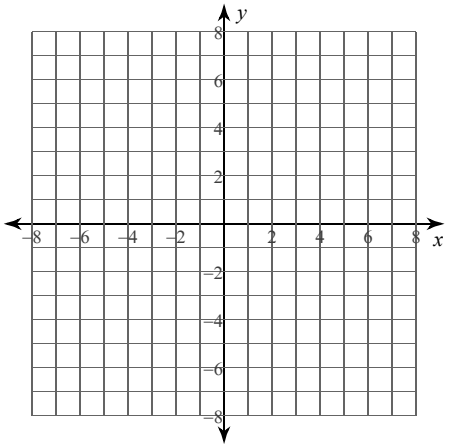
3) $f(x) = x^4 + x^3 - 4x^2 - 4x$



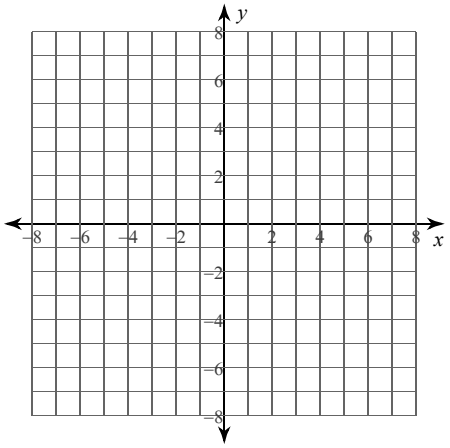
4) $f(x) = x^4 + x^3$



5) $f(x) = -x^3 + 6x^2 - 12x + 8$



6) $f(x) = x^3 - 2x^2$



Describe the end behavior of each function.

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

8) $f(x) = 2x^2 - 4x - 3$

9) $f(x) = x^4 - 2x^2 - x + 1$

10) $f(x) = -x^3 - 9x^2 - 24x - 20$

11) $f(x) = -x^5 + 3x^3 + 1$

12) $f(x) = x^2 + 6x + 6$

Critical thinking questions:

13) Write a polynomial function f with the following properties:
   (a) Zeros at 1, 2, and 3
   (b) $f(x) \le 0$ for all values of x
   (c) Degree greater than 1

14) Write a polynomial function g with degree greater than one that passes through the points $(0, 1)$, $(1, 1)$, and $(2, 1)$.