Polynomial Lab Name: Per:

1. Consider $f(x) = (x-3)(x+4)$
   (a) When is f zero?
   (b) Expand so $f(x)$ is in $ax^2 + bx + c$ form
   (c) Type this into the polynomial applet
      i. Does the graph of f cross the x axis at the zeros?
      ii. Zoom in and use the mouse to find the exact location where f crosses the horizontal axis
2. Consider $f(x) = x^2 - 7x + 10$
   (a) When is f zero? (try factoring)
   (b) Use Descartes' Rule
      i. $f(x) = x^2 - 7x + 10$ has how many variations?
      ii. So how many possible zeros are positive?
      iii. $f(-x) = (-x)^2 - 7(-x) + 10$ has how many variations?
      iv. So how many possible zeros are negative?
   (c) Type this into the polynomial applet
      i. Does the graph of f cross the x axis at the zeros?
      ii. How many positive zeros are there?
      iii. How many negative zeros are there?
3. Consider $f(x) = x^4 - 6x^3 - 7x^2 + 48x - 36$
   (a) What are the factors of the last term (36)?
   (b) What are the factors of the first term (1)?
   (c) What is the List of possible rational zeros?
   (d) Use Descartes' Rule
      i. $f(x) = x^4 - 6x^3 - 7x^2 + 48x - 36$ has how many variations?
      ii. So how many possible zeros are positive?
      iii. $f(-x) = (-x)^4 - 6(-x)^3 - 7(-x)^2 + 48(-x) - 36$ has how many variations?
      iv. So how many possible zeros are negative?
   (e) Now select possible rational zeros, and use synthetic division to see if there is a remainder.
   (f) Type this into the polynomial applet
      i. Does the graph of f cross the x axis at the zeros?
      ii. How many positive zeros are there?
      iii. How many negative zeros are there?

List all possible rational zeros. Then use the applet to decide which numbers on your list are the rational zeros. If possible, find all remaining real and non-real zeros.

4. $f(x) = 6x^4 - 5x^3 - 5x - 6$

5. $f(x) = x^3 - x^2 - 30x + 72$

6. $f(x) = x^3 - 35x^2 - 34^x - 72$

List the possible number of positive and negative real roots. Then use the applet to make sure your answers are consistent with the graph.

7. $f(x) = x^4 + x^3 - x^2 - x + 1$

8. $f(x) = x^4 + x^3 - x^2 - x + .5$

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