MATH 30 PRECALCULUS SECOND TEST. FALL 2011

1. Given the fact that $x = 1/3$ is a zero of $f(x) = 3x^3 - 13x^2 - 8x + 4$. Find the other zeroes.
2. Given the polynomial $g(x) = 4(x+2)^2(x-1)^2(x+1)$.
   (a) Fin the y-intercept.
   (b) Find the leading term.
   (c) Find the zeroes and their multiplicities.
   (d) Sketch graph of $y = g(x)$.
3. Sketch the graph of a polynomial function with the following properties:
   1. the leading term is $-3x^4$.
   2. It has a double zero at $x = -3$.
   3. It has simples zeroes at $x = 3$ and $x = 4$.
   4. y-intercept is $(0, -5)$.

   (a) Estimate the maxima and minima of the functions you built.
   (b) Estimate the intervals where it is decreasing and the intervals where it is increasing.
   (c) Estimate the range.
4. Given $f(x) = 15x^4 + 53x^3 + 55x^2 + 19x + 2$
   (a) Find the list of possible rational zeroes.
   (b) Find the actual zeroes of $f(x)$.
   (c) Factor $f(x)$ completely.
5. Find the remainder of the following polynomials
   (a) $f(x) = x^3 - 8x^2 + 4x - 12$ when divided by $x - 2$.
   (b) $f(x) = x^{200} - 1$ when divided by $x + 1$.