**Mathematica Problems 1**

Use Mathematica (or Wolfram Alpha if you prefer) to solve the following problems. Please type (or better: use copy-and-paste) your answers into this document if possible. Then submit the finished document via email attachment to me on or before next week Friday.

1. Consider $p\left(x\right)=1-4x-4x^{2}+16x^{3}$. Find the roots (or zeros or x-intersects) of the function as well as all critical points. Note: Make sure to use **==** to indicate an *equal* sign in Mathematica. Also, you can use either the **Solve** command (to find exact answers if possible) or **NSolve** to find decimal numbers as answers. To find the critical points, you need to set the derivative equal to zero, of course (using **==** as before).
2. If $f\left(x\right)=\frac{-x+2x^{3}}{\frac{1}{3}-\frac{x}{2}+3x^{2}}$ find
3. $f(0)$ (b) $f(-3/2)$ (c) $f(10.5)$ (d) $f(1-2h)$

Note: Make sure to use the *underscore* after the variable when defining a function on the left side, but the *regular variable only* on the right side (as in **f[x\_] = x^2-1**)

1. Find the first, second, and third derivatives of $f\left(x\right)=\frac{-1+x^{2}}{4-x^{2}}$. Note: make sure your answers are simplified
2. Find all critical and possible inflection points of $p\left(x\right)=-2x^{2}+3x^{3}+3x^{5}+2x^{6}$. Note: make sure to use **NSolve** to find any answers as decimals; ignore any complex numbers.
3. Find the graphs of
4. $p\left(x\right)=1-4x-4x^{2}+16x^{3}$ (Make sure to select a range for $x$ so that you can clearly see the max/mins of this graph)
5. $f\left(x\right)=\frac{-1+x^{2}}{4-x^{2}}$