Homework 2

In problems 1-5 assume that each variable on the right hand side of the equation has a known value and error (measured by its standard deviation). Find the propagated error for the variable on the left hand side of the equation.

1) $W=x+y$ (eg. Find σ_W given x, y, σ_x and σ_y)

2) $R=x/y$

3) $G=x^2/y+1$

4) $R=\text{sqrt}(x^2+y^2)$

5) $U=r*\cos(\theta)$ (both r and θ are variables here)

6) For the equation $Z=x^2/y$ Consider the situation where:

   x=5 y=100 the relative error on x is 10% and the relative error on y is 15%

   a) What is the absolute error on Z?
   b) If you wanted to reduce the errors on Z which measurement (x or y) would you work on first? (Why?)

7) If for the equation of problem 5 you have r=10 and θ=45 degrees, and the relative uncertainties are both 2%, which variable contributes more to the uncertainty in U?