Problem Set Week 7 and 8

1. For the following:
   a. Convert the point (-1,1, $\sqrt{2}$) from Cartesian to cylindrical coordinates
   b. Convert the point (4,$\frac{5\pi}{6}$,3) from cylindrical to cartesian coordinates
2. Convert the point (-1,1, $\sqrt{2}$) from Cartesian to spherical coordinates
3. For the following:
   a. Convert the point (4, $\frac{\pi}{4}$, 0) from cylindrical to spherical
   b. Convert the point (10,$\frac{\pi}{6}$, $\frac{\pi}{2}$) from spherical to cylindrical
4. Plot the points whose polar coordinates are given by
   (2,$\frac{\pi}{4}$), (3,-$\frac{\pi}{4}$), (3,$\frac{7\pi}{4}$), (2,$\frac{5\pi}{2}$)
5. Plot the point (-3,$\frac{3\pi}{4}$)
6. Convert the following (given in polar coordinates) to Cartesian coordinates (2,$\frac{\pi}{4}$) and (3,-$\frac{\pi}{3}$)
7. Graph the following equations $r = 5, \theta = \frac{\pi}{4}$
8. Graph the following equation $r = 1 + \cos\theta$.
9. Convert polar coordinates $(r, \theta) = (2, \pi)$ to (x, y)
10. Convert Cartesian coordinates $(x, y) = (0, -4)$ to (r, θ)
11. Sketch a graph of the polar equation $r = 3\sin\theta$, and find an interval on which it completes one cycle.
12. Sketch a graph of the polar equation $r = \sin 2\theta$ is it limacon or a rose?
13. Rewrite the Cartesian equation $y = 3x + 2$ as a polar equation.
14. Rewrite the Cartesian equation in polar form $y = \pm\sqrt{3 - x^2}$
15. Rewrite the polar equation in Cartesian form $r = 2\sin\theta$