Math 140  Classwork 27

7(a) Find the rectangular coordinates of the point with polar coordinates \((r, \theta) = (-3, -\pi/4)\). Note: this is in quad. II.
\[(x,y) = (r \cos \theta, r \sin \theta) = \]

chk=10 or 14

7(b) Find the polar coordinates of the point with rectangular coordinates \((x,y) = (-1, -\sqrt{3})\)

What is the quadrant for this point? I?, II?, III?, IV?

Find \(r\) using
\[r = \sqrt{x^2 + y^2} = \]

chk=2

Find \(\theta\).
If \(\theta\) is in quadrant I or IV, \(\theta = \tan^{-1}(y/x)\)
Otherwise use the formula \(\theta = \tan^{-1}(y/x) + \pi\)

chk=7

Now write your answer as an ordered pair:

\((r, \theta) = \)

8(a) Convert the polar equation to a rectangular equation:
\[
\sin \theta = r, \quad r \neq 0.
\]

First replace \(\sin \theta\) with \(y/r\).

Multiply by \(r\) to clear the fraction.

Now replace \(r\) with \(\sqrt{x^2 + y^2}\)

chk=4

8(b) Convert the rectangular equation to a polar equation:
\[
x^2 - y^2 = 1. \quad \text{Recall: } x = r \cos \theta, y = r \sin \theta.
\]