Math 151 Lab 1

Use Python to solve each problem.

1. Calculate the following:
   (a) $\sqrt{8 + \dfrac{80}{2.6}} + e^{3.5}$
   (b) $\dfrac{23 + 45^{1/3}}{16 \times 0.7} + \ln(589.006)$
2. Define the variables $x = 4.6$ and $y = 1.7$, then calculate the following:
   (a) $\dfrac{\sqrt{x+y}}{(x-y)^2} + 2x^2 - xy^2$
   (b) $\sqrt{x^2 + y^2}$. In a print statement, state whether or not your answer is equal to $x + y$ (which you can check in your head or by hand).
3. Let $\boldsymbol{a}$ and $\boldsymbol{b}$ be the vectors $\langle 9.1,\ 14.47\rangle$ and $\langle -5.55,\ 9.62\rangle$. (NOTE: for all calculations in this problem, use the definitions from class rather than trying to look up built-in functions).
   (a) Compute $|\boldsymbol{a}|$ and $|\boldsymbol{b}|$.
   (b) Use the Law of Cosines to find the cosine of the angle C between the vectors:
   $$\cos(C) = \frac{|\boldsymbol{a}|^2 + |\boldsymbol{b}|^2 - c^2}{2|\boldsymbol{a}||\boldsymbol{b}|}$$
   where c is the distance between the points corresponding to $\boldsymbol{a}$ and $\boldsymbol{b}$ above.
   (c) Use the dot product formula to find the cosine of the angle C between the vectors and show it is equal to the answer for (b).
   $$\cos(C) = \frac{\boldsymbol{a} \cdot \boldsymbol{b}}{|\boldsymbol{a}||\boldsymbol{b}|}$$