Calculation of Darcy friction factor from Colebrook Equation:

Colebrook Equation:

$$\frac{1}{\sqrt{f}} = -2\log_{10}\left(\frac{\varepsilon}{3.71 \cdot D} + \frac{2.51}{Re\sqrt{f}}\right)$$

$\varepsilon = 1.52 \times 10^{-6}\,m$ (constant for copper pipes used)

$D = 1\ \text{inch} \cdot \frac{0.0254\,m}{1\ \text{inch}} = 0.0254\,m$ (from Table 2)

$Re = 7107$ (see sample calculation 3 for full calculation)

$$\frac{1}{\sqrt{f}} = -2\log_{10}\left(\frac{1.52 \times 10^{-6}\,m}{3.71 \cdot 0.0254\,m} + \frac{2.51}{7107 \cdot \sqrt{f}}\right) *$$

* to calculate f, an initial guess of 6 was made. (an arbitrary value to perform calculations). Excel calculated the difference between the left and right sides of the Colebrook equation. The goal seek function of Excel was used to get this difference as close to zero as possible by varying the value of f.

$\boxed{f = 0.034}$