Putnam Homework Problem Set #5

**Problem 1:** Solve the system of equations
\[
\frac{1}{x^2} + \frac{1}{xy} = \frac{1}{9},
\]
\[
\frac{1}{y^2} + \frac{1}{xy} = \frac{1}{16}.
\]

**Problem 2:** There are numbers \(a\) and \(b\) with \(a < b\) such that the function \(f\) defined by
\[
f(x) = \sqrt{x + 6\sqrt{x - 9}} + \sqrt{x - 6\sqrt{x - 9}}, \quad x \geq 9
\]
is constant for \(a \leq x \leq b\). Find \(a, b\) and the constant value of \(f(x)\) on \([a, b]\).