Problem:

Find the solution of the differential equation:

$\sqrt{x}dy = \sqrt{y}dx.$

Solution:

This is an equation with separable variables ⇒

$\frac{dy}{\sqrt{y}} = \frac{dx}{\sqrt{x}}$, let's integrate ⇒ $\int \frac{dy}{\sqrt{y}} = \int \frac{dx}{\sqrt{x}}, \qquad \sqrt{y} = \sqrt{x} + C \Rightarrow y = \left(\sqrt{x} + C\right)^2,$

this is the general solution of the equation, where C is the arbitrary constant.

Answer: $y = (\sqrt{x} + C)^2.$