$y' = \frac{1}{\sqrt{x}}, \quad y(1) = 4$

Integrate both sides:

$$y = \int x^{-\frac{1}{2}} dx = 2x^{\frac{1}{2}} + C$$

Apply initial condition:

$$y(1) = 2(1)^{\frac{1}{2}} + C = 4$$

$$\rightarrow C = 2$$

So, $\boxed{y = 2\sqrt{x} + 2}$