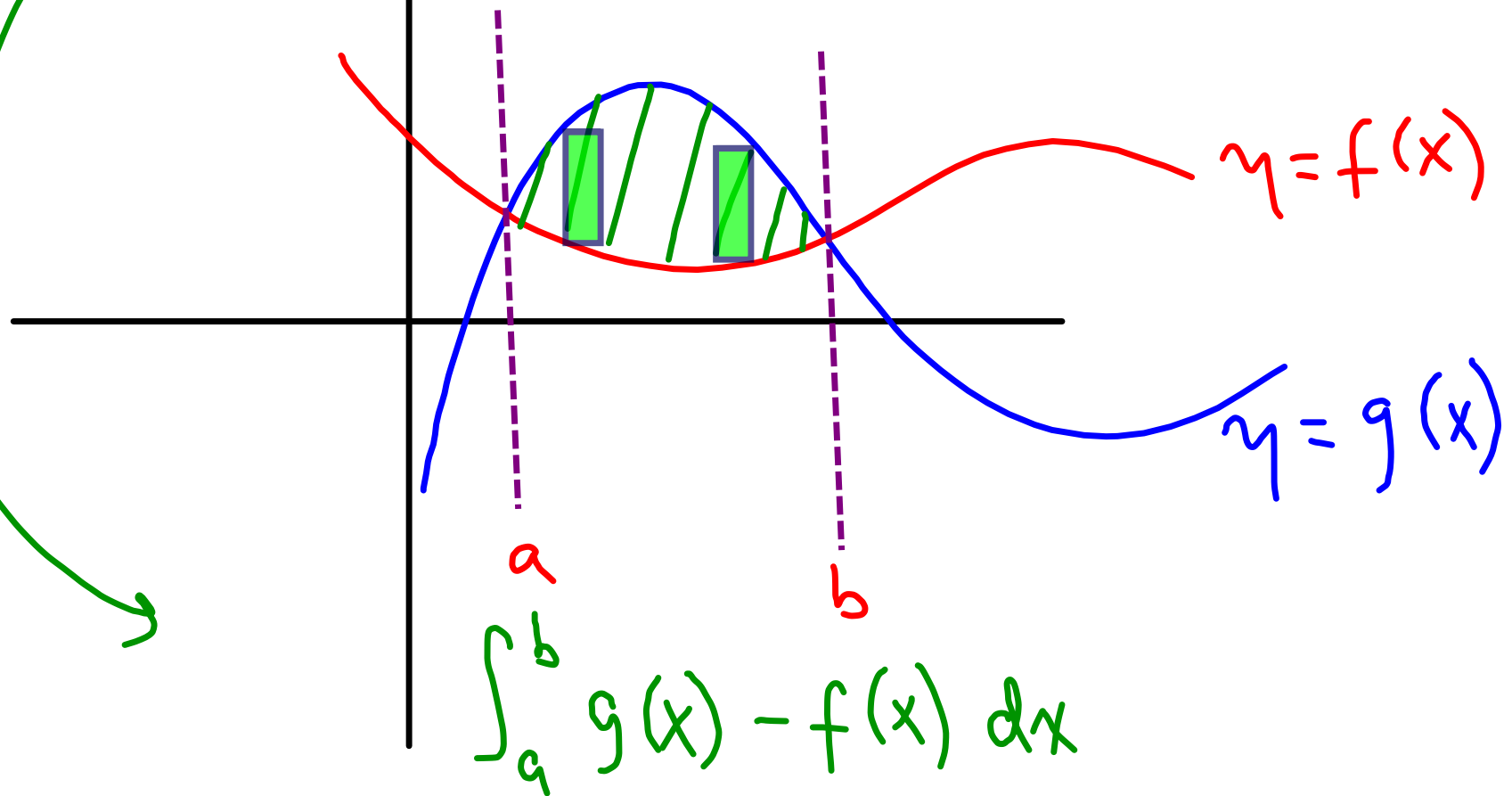
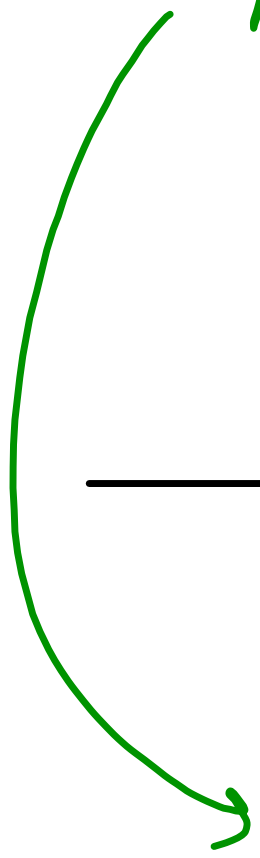


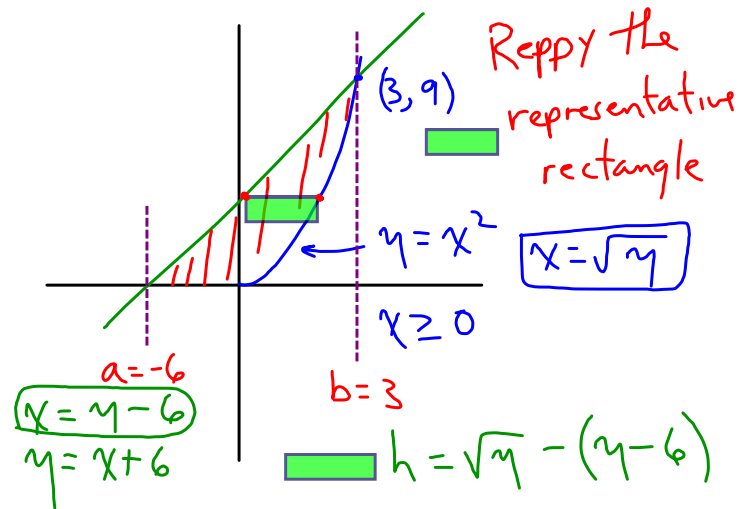
# Integral as a "Net Change"

$$\int_a^b f(x) dx = F(b) - F(a)$$

where  $F(x)$  is an  
antiderivative of  $f(x)$

$$\text{Area} = \int_a^b g(x) dx - \int_a^b f(x) dx$$





$$\begin{aligned}
 \text{Area} &= \int_0^9 \sqrt{y} - y + 6 \, dy \\
 &= \left. \frac{2}{3} y^{\frac{3}{2}} - \frac{y^2}{2} + 6y \right|_0^9 \\
 &= \frac{2}{3} 9^{\frac{3}{2}} - \frac{9^2}{2} + 6(9) \\
 &= 18 - \frac{81}{2} + 54 \\
 &= 72 - \frac{81}{2} \\
 &= \frac{63}{2}
 \end{aligned}$$