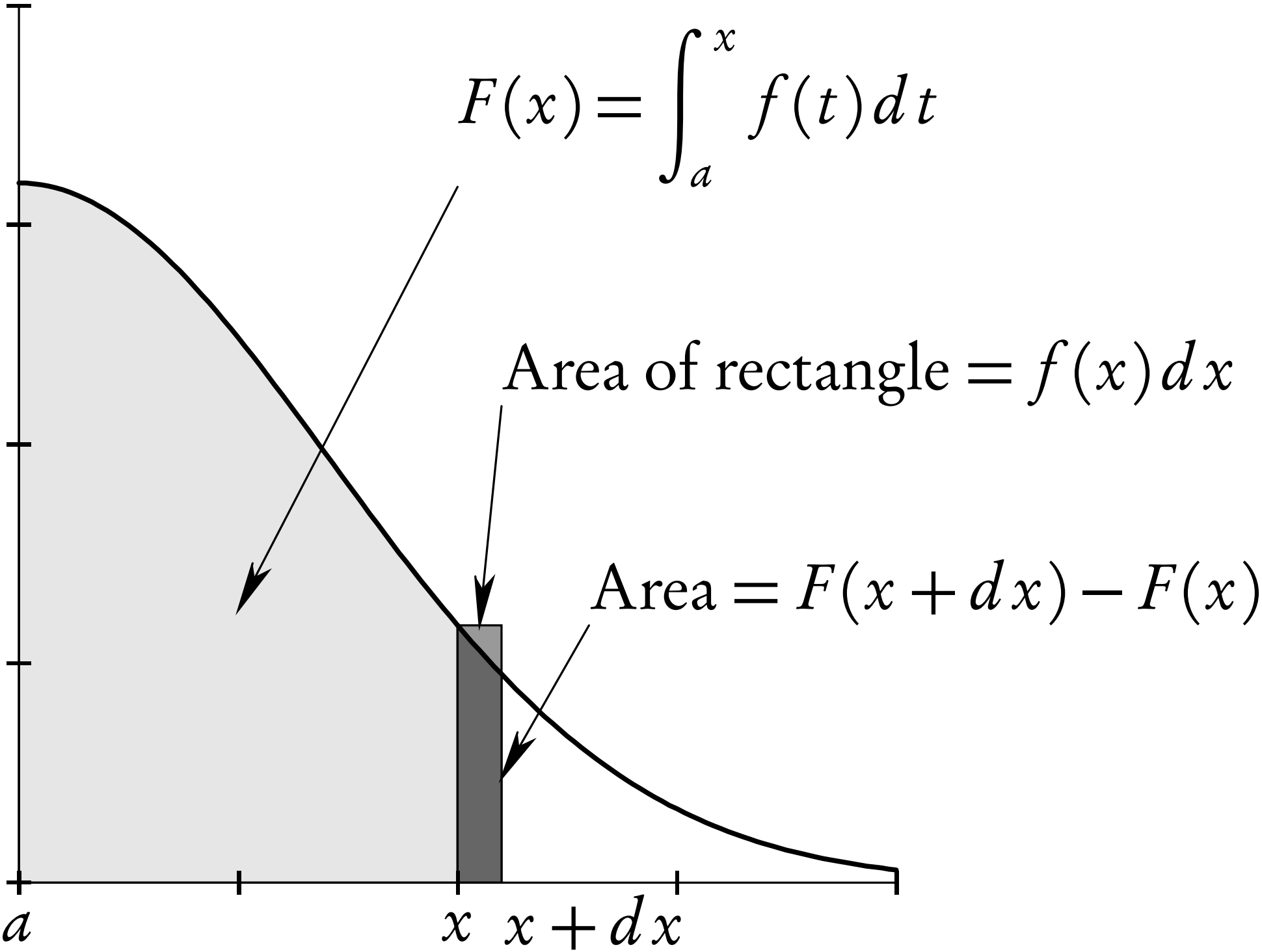
$F(x) = \int_a^x f(t)\,dt$
Area of rectangle $= f(x)\,dx$
Area $= F(x + dx) - F(x)$
a
x
$x + dx$