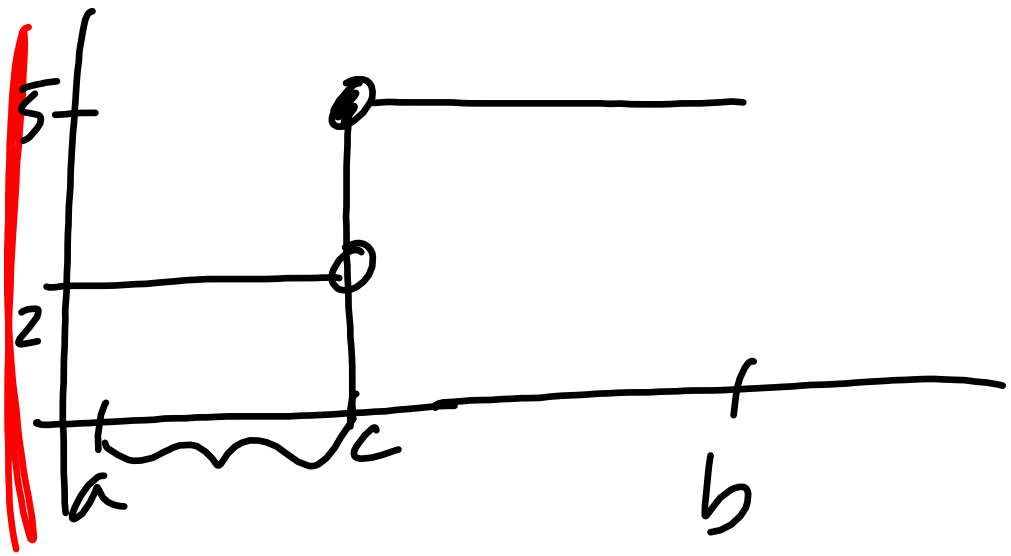
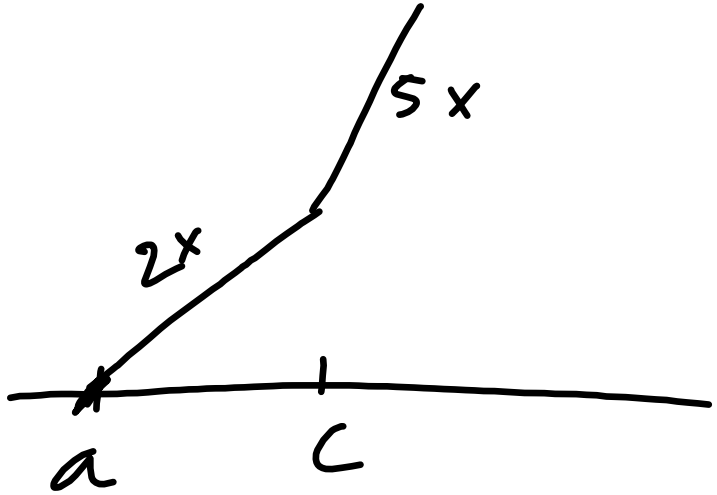
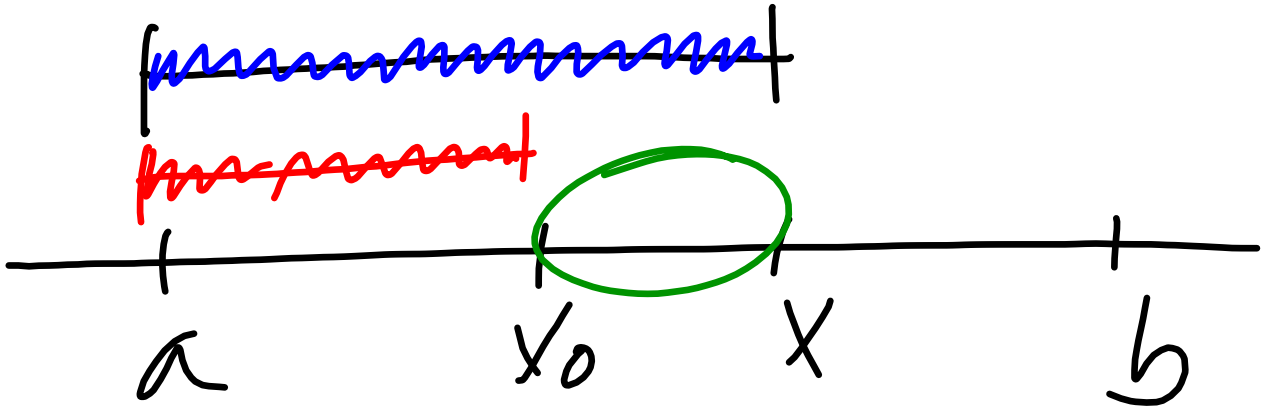
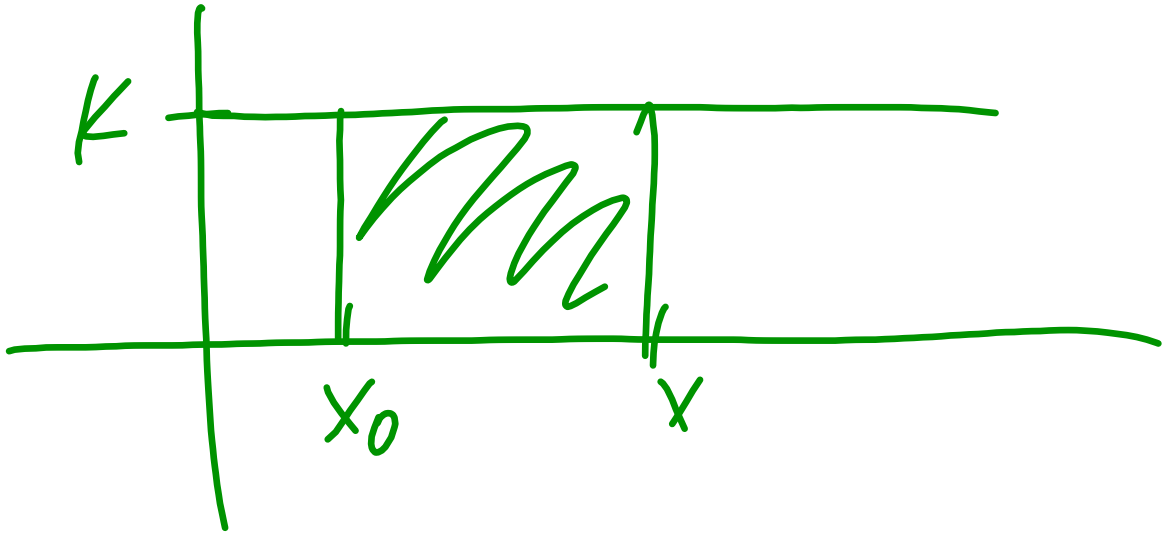
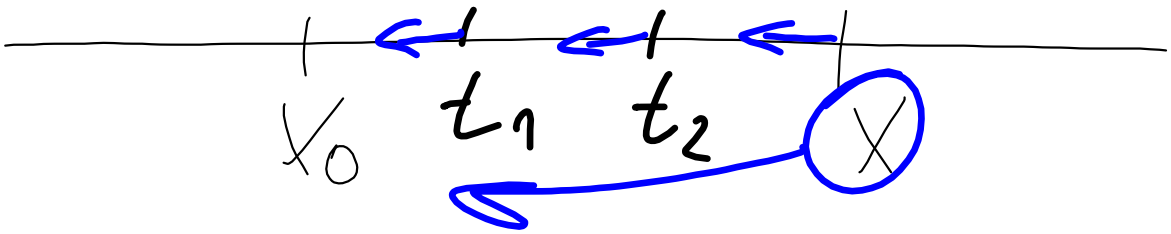

3
2
a
c
b

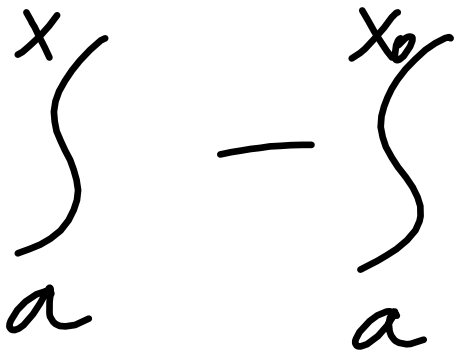

5x
2x
a
c

$$\lim_{x \to x_0} F(x) = F(x_0)$$


a
x_0
x
b

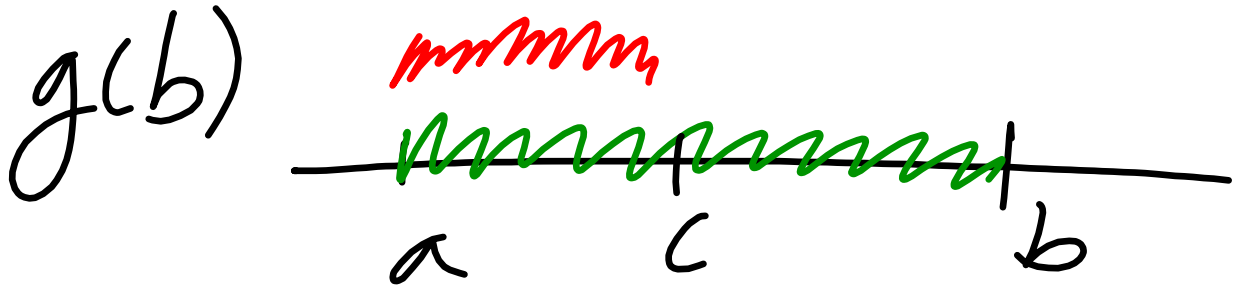

K
x_0
X

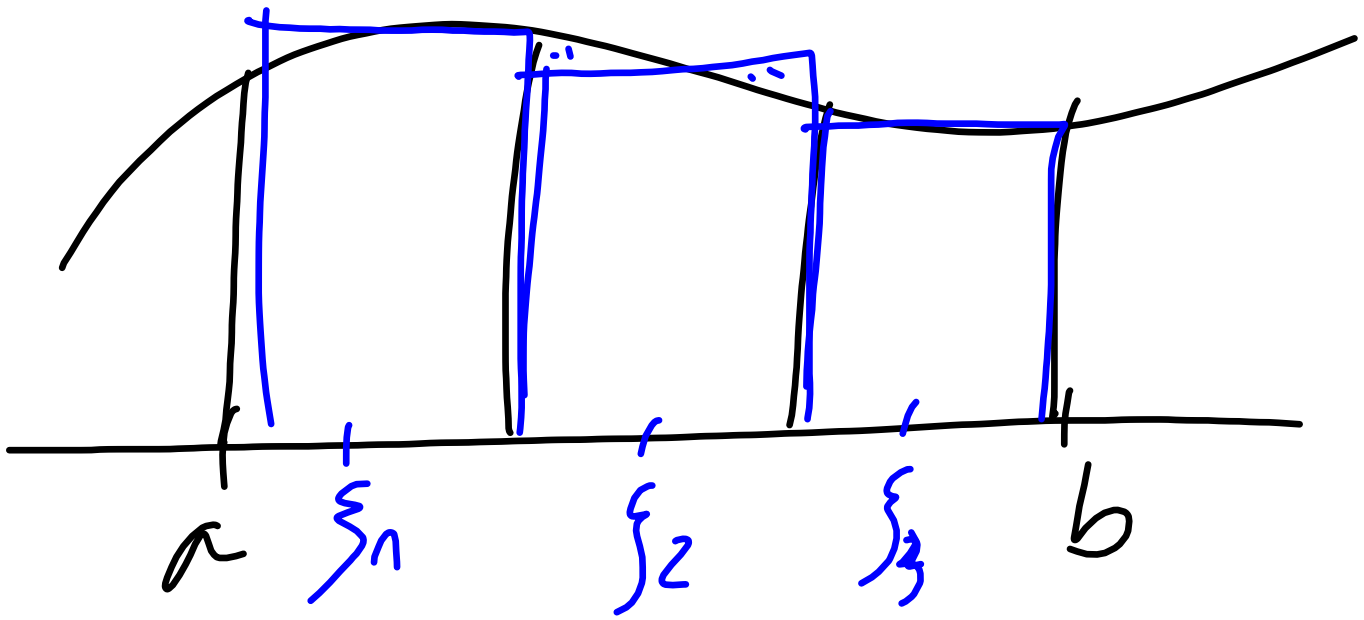

X_0
t_1
t_2
X


x
x_0
a
a

$$\left(\int_a^x t^2\,dt\right)' = x^2$$

$$\left(\int_a^{x^2} \sin t \, dt \right)' = \sin x^2 \cdot 2x$$


g(b)
a
c
b

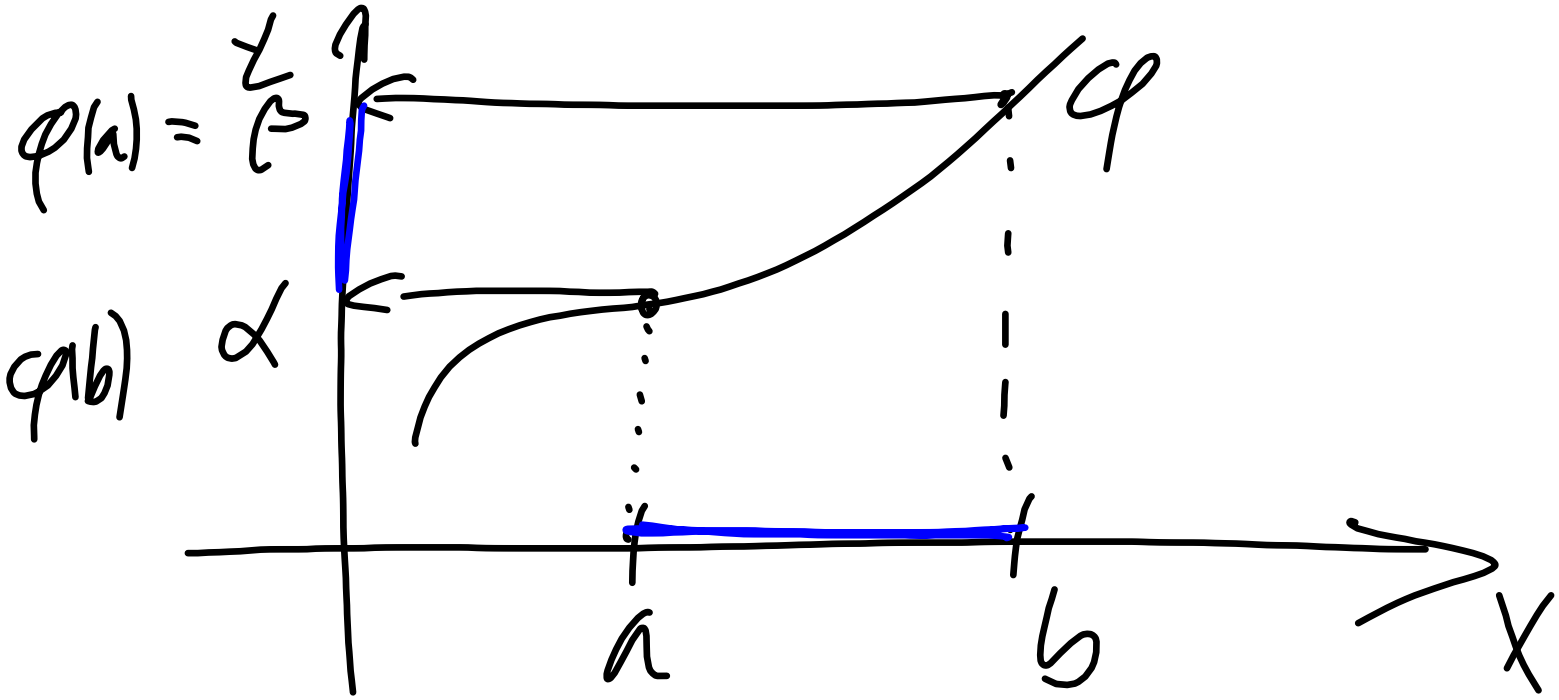

a
ξ_1
ξ_2
ξ_3
b

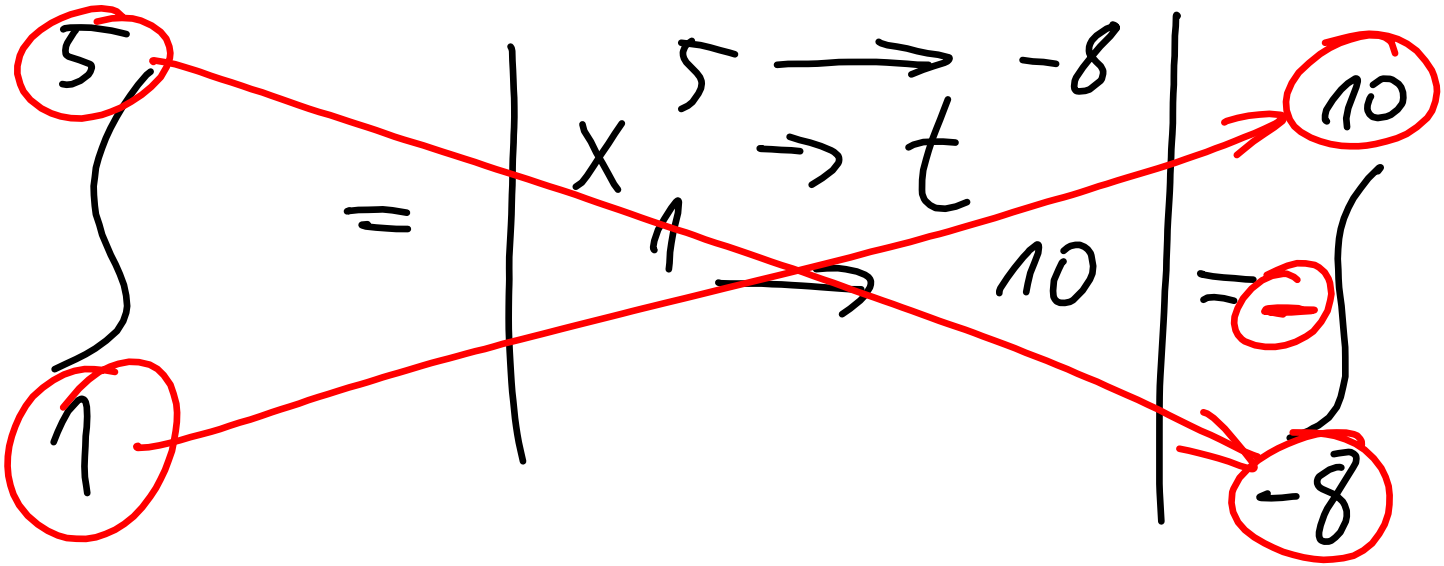
$$F'(c) = \frac{F(b) - F(a)}{b - a}$$

$$\int_a^b f(\varphi(x)) \cdot \varphi'(x)\,dx = \left| \begin{array}{l} t = \varphi(x) \\ dt = \varphi'(x)\,dx \end{array} \right| =$$

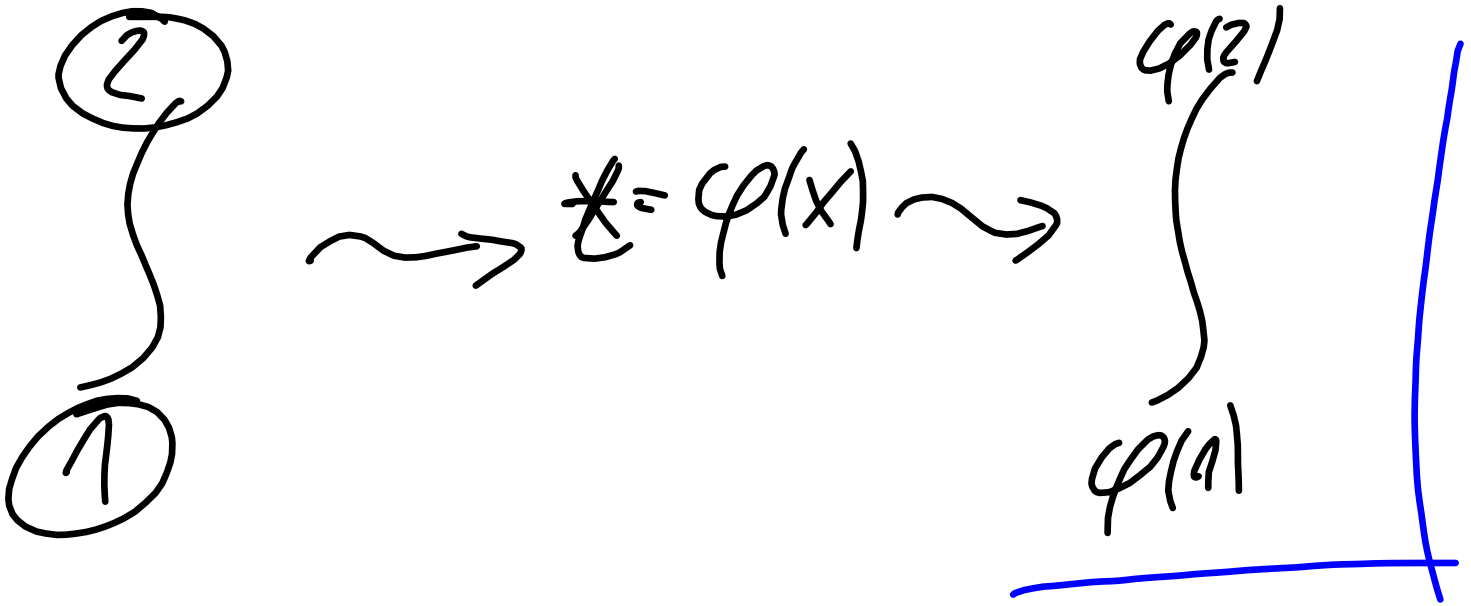
$x = b \Rightarrow t = \varphi(b)$

$$= \int_{\varphi(a)}^{\varphi(b)} f(t)\,dt$$


φ(a) = c
φ
φ(b)
α
a
b
X


5
1
=
x
5 → -8
1 → 10
10
=
-8

$$\left(F(\varphi(x))\right)' = \left(\int_{\alpha}^{\varphi(x)} f(t)\,dt\right)' = f(\varphi(x))\cdot\varphi'(x)$$


2
1
$x = \varphi(x)$
$\varphi(2)$
$\varphi(1)$

P. $\sin / \cos x / e^x$ / $\sin(a \cdot x)$

P. $\ln x$, $\operatorname{arctg} x$

$\int e^{5x} \cdot \sin 3x \, dx = \ldots$ 2x p.p.

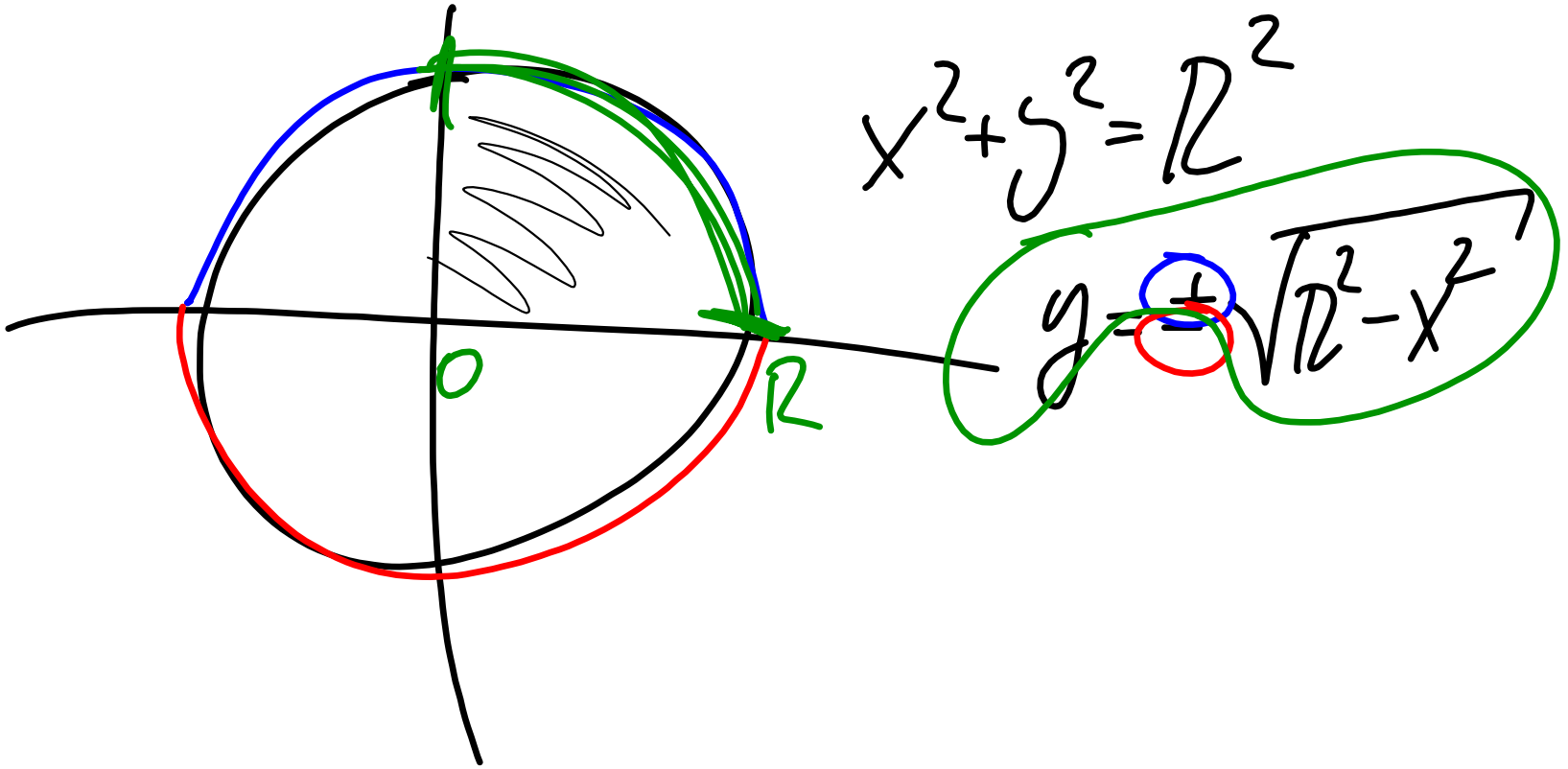
$$I = \int - \text{const.} \cdot I$$

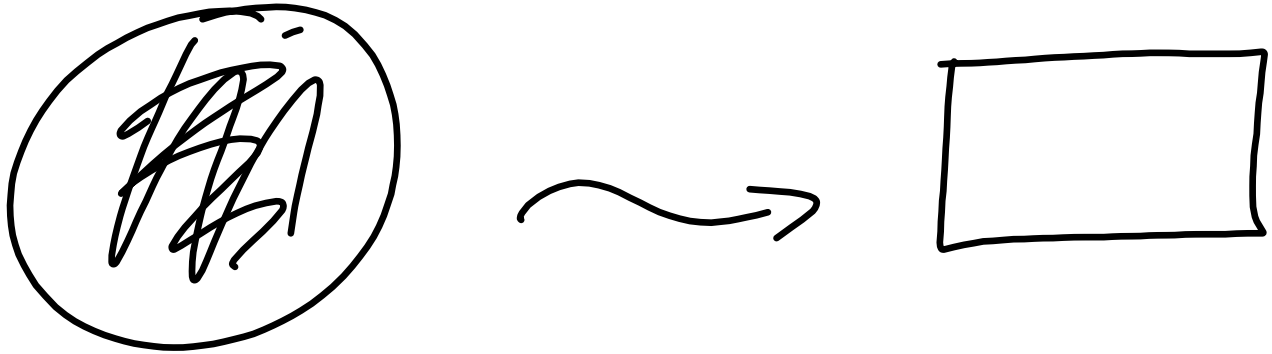
$$1 + x^2 = t^2$$

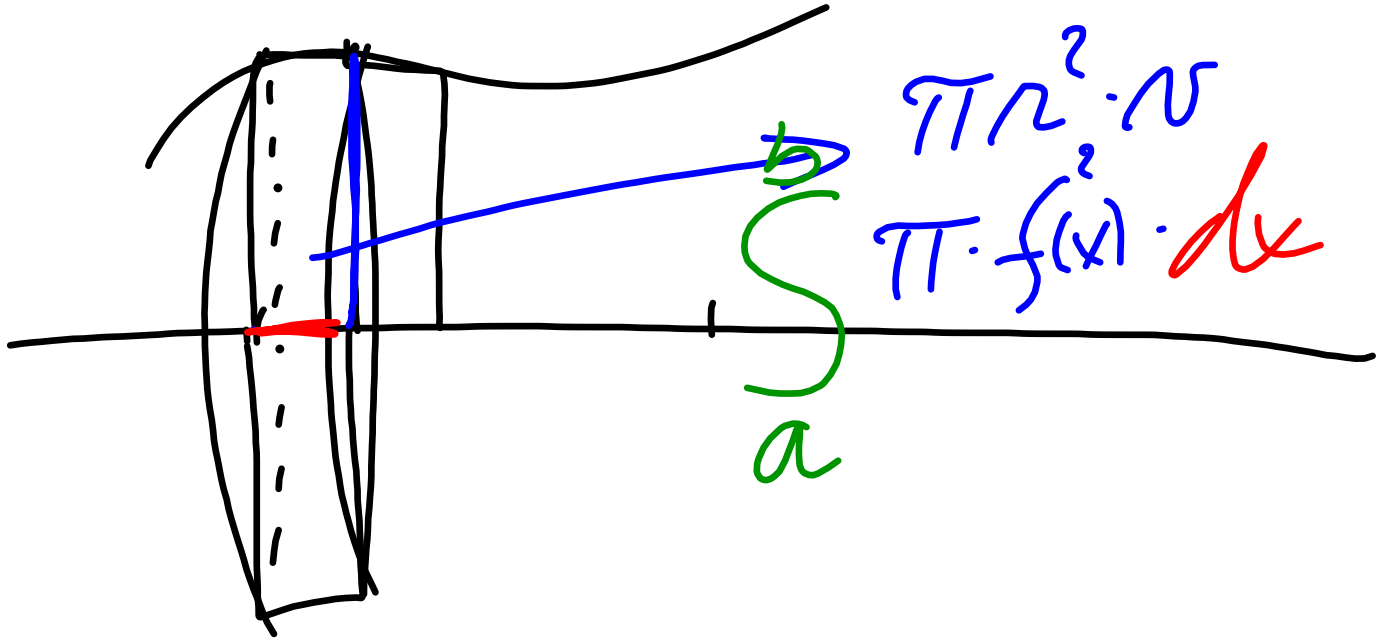
$$\int_a^b \sqrt{(\psi'(t))^2 + (\varphi'(t))^2}\, dt$$

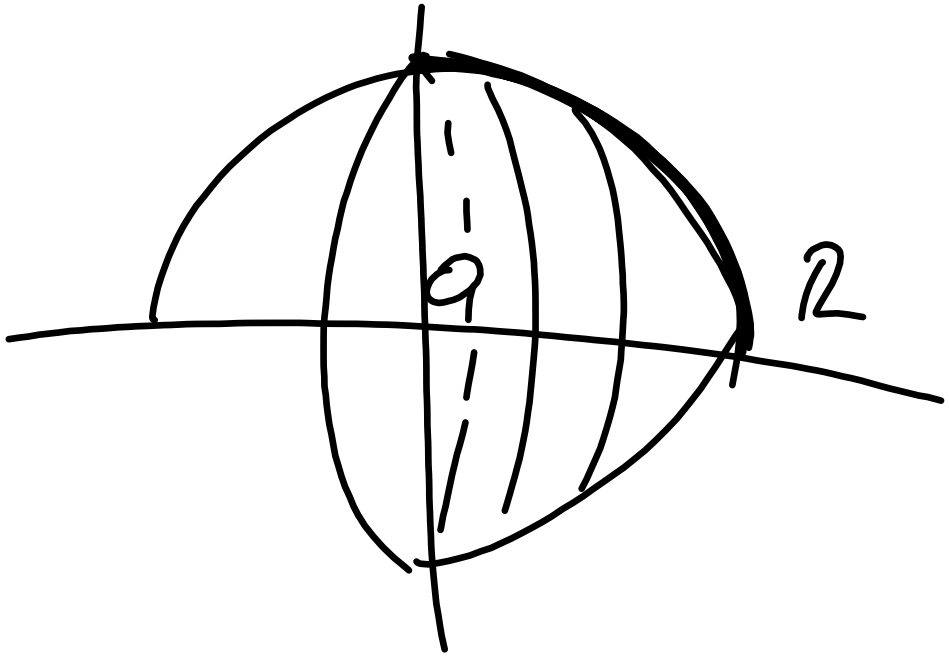
$x = \varphi(t)$

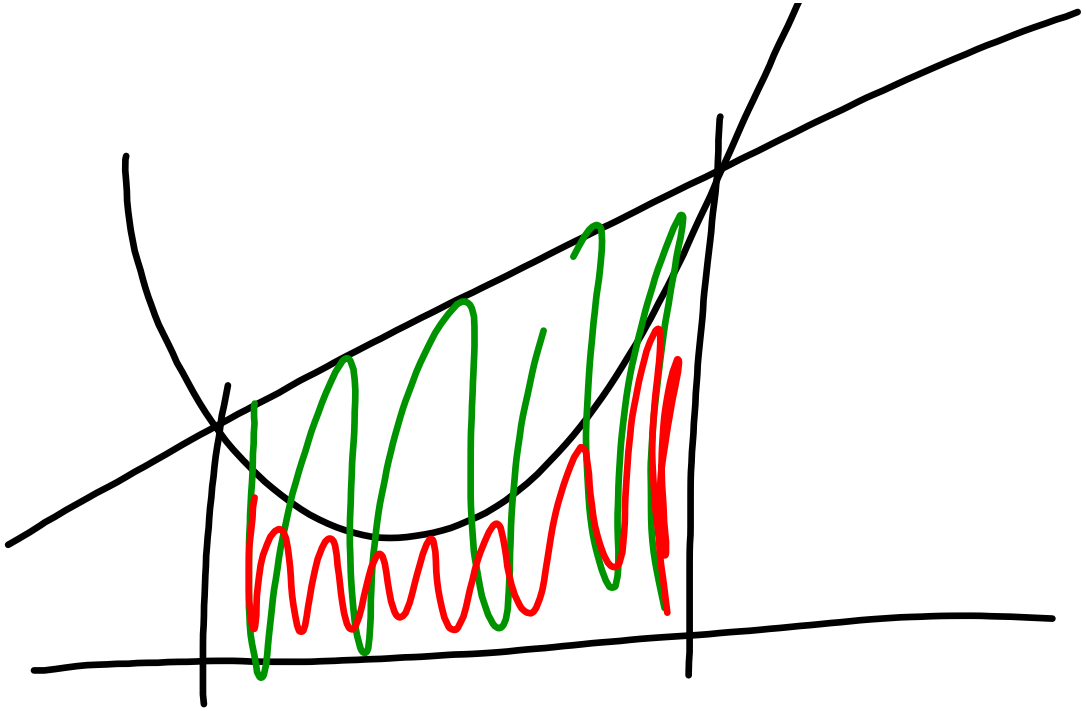
$y = \psi(t)$, $t \in [a, b]$

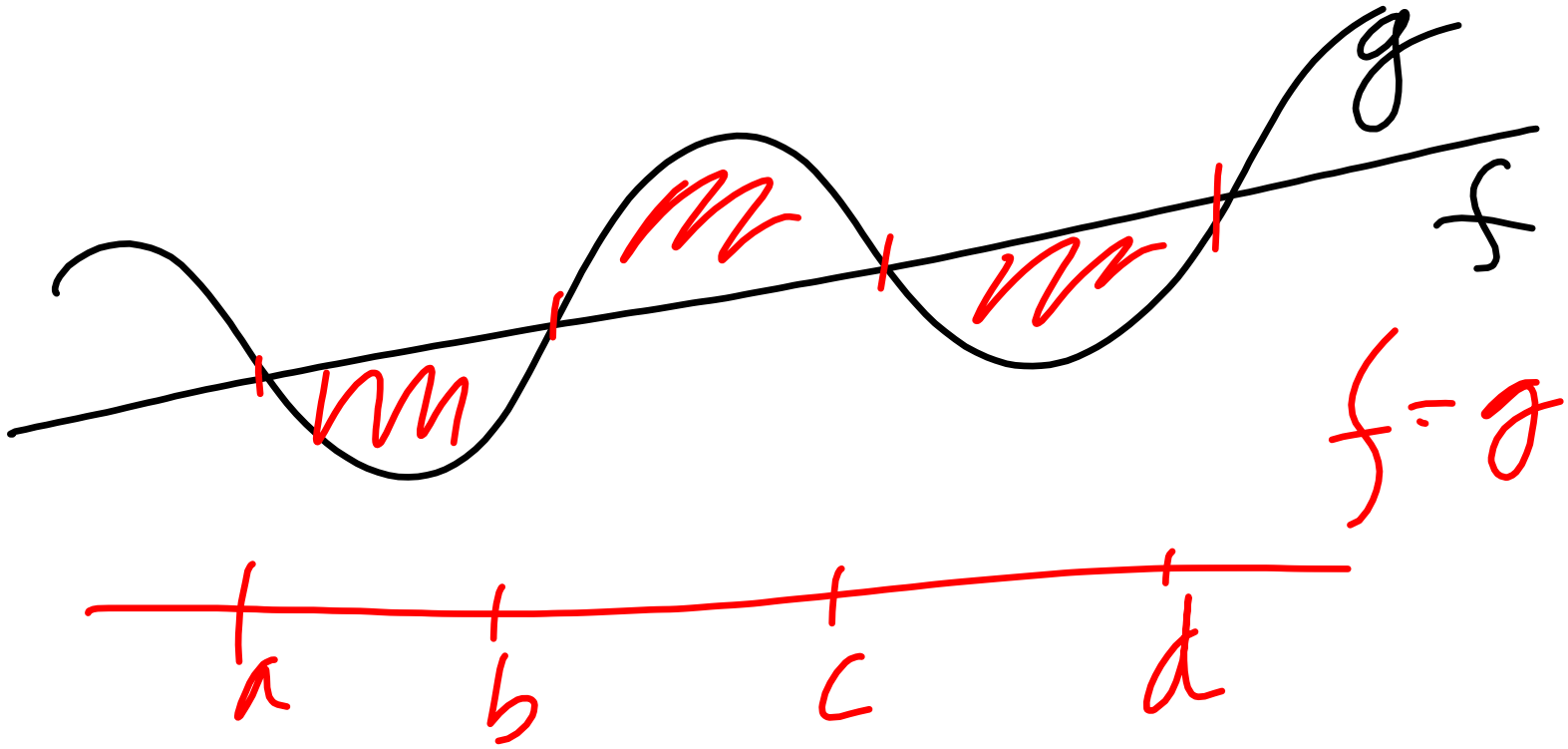

0
R
$x^2+y^2=R^2$
$y=\pm\sqrt{R^2-x^2}$

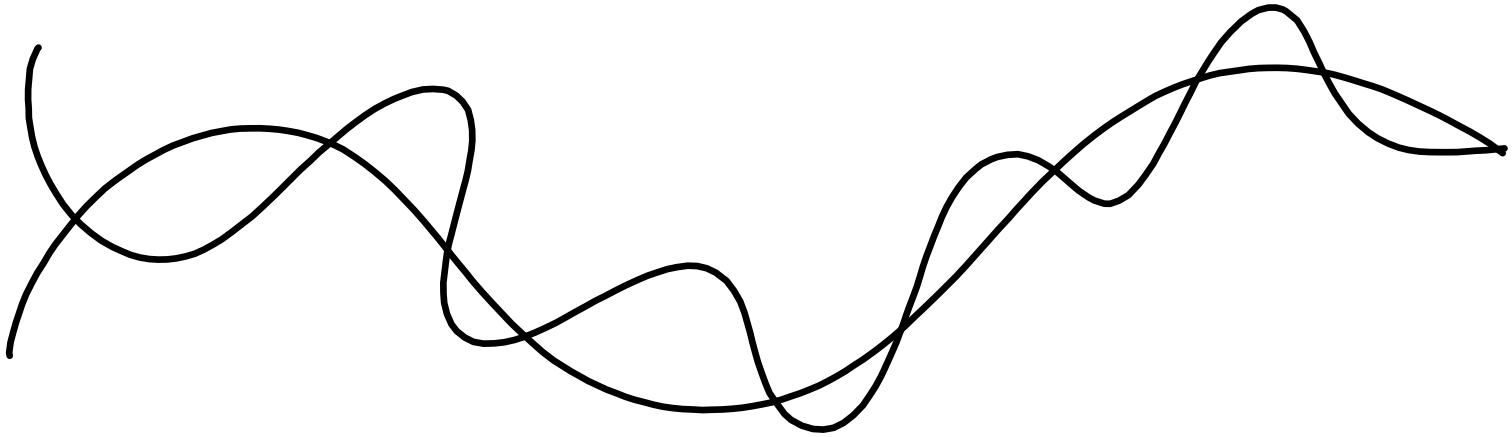



b
a
$\pi r^2 \cdot w$
$\pi \cdot f(x)^2 \cdot dx$

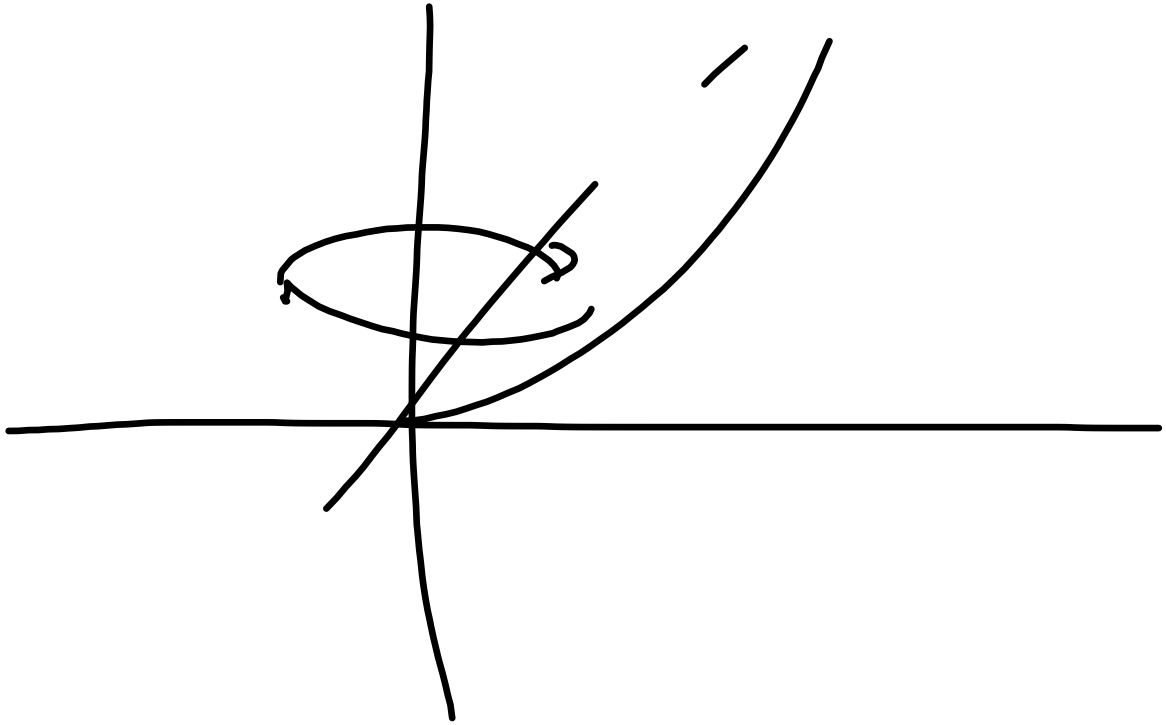

9
2

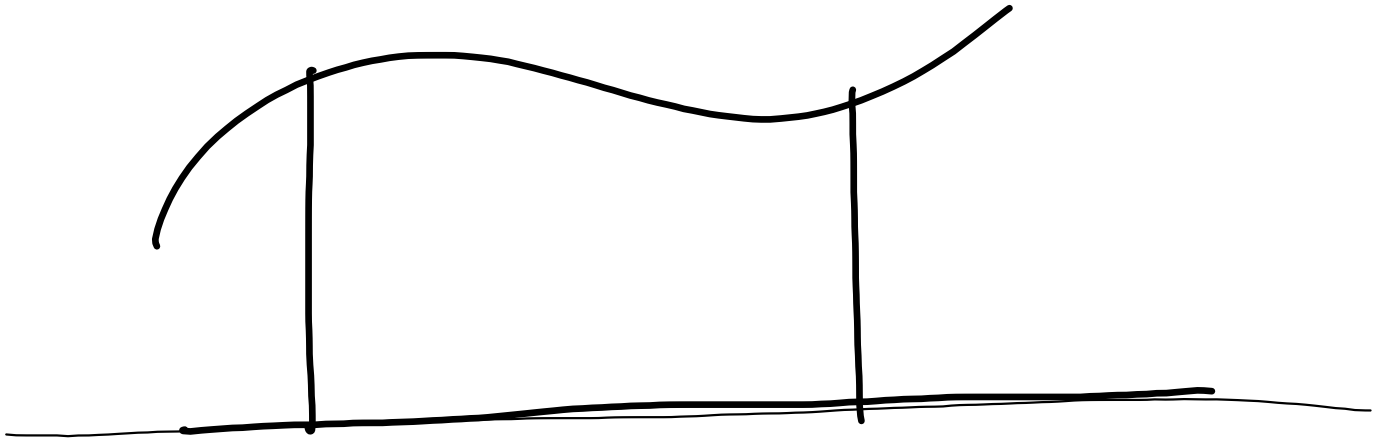



g
f
f - g
a
b
c
d



$$\pi \int f^2 - g^2 \, dx$$





$x = t$

$y = f(t)$ $\longleftrightarrow$ $y = f(x)$