1. Was passiert, wenn a <0 und b >0 ist? (Skizzieren Sie!)

$\int_a^b f(x)dx = \int_a^0 f(x)dx + \int_0^b f(x)dx$ **= F(0) – F(a) + F(b) – F(0) =F(b) – F(a)**

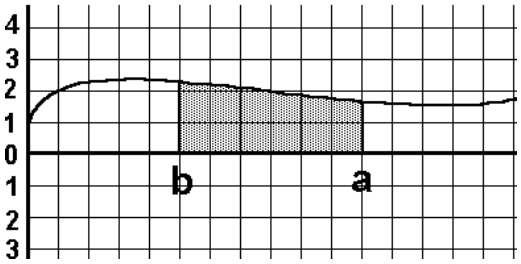
2. Was passiert, wenn a <0 und b <0 ist? (Skizzieren Sie!)

$\int_a^b f(x)dx = \int_a^0 f(x)dx - \int_b^0 f(x)dx =$ **F(0) – F(a)-[F(0)-F(b)] = F(0)-F(a) – F(0) + F(b) = F(b) –F(a)**

Zusammenfassung:

Ist a < b, so gilt: $\int_a^b f(x)dx$ **= F(b) – F(a)**

3. Was passiert, wenn a >b ist?



$\int_a^b f(x)dx$ **=** $\int_0^a f(x)dx$ **-** $\int_0^b f(x)dx$ **= F(a) –F(0) – [F(b)-F(0)] = F(a) –F(0) –F(b) +F(0) = F(a) –F(b) = - [F(b) – F(a)] =** $-\int_a^b f(x)dx$

4. Für a<c<b gilt:

$\int_a^c f(x)dx + \int_c^b f(x)dx$

= F(c) –F(a)+F(b) – F(c) = F(b) –F(a)

= $\int_a^b f(x)dx$

5. Was passiert, wenn f(x) <0 ist?

Ist f(x) $\leq$ 0 im Intervall [a;b], so gilt:

$\int_a^b f(x)dx = -\int_a^b f(x)dx$ **oder** $\left|\int_a^b f(x)dx\right|$

6. Summenregel der Integration:

$\int_a^b f(x) + g(x)dx =$ [F[x) + G(x)]$_a^b$ =[F(b) +G(b)] –[F(a)+G(a)] =

F(b) –F(a) +G(b) –G(a) =

$\int_a^b f(x)dx + \int_a^b g(x)dx$

7. Faktorregel der Integration:

$\int_a^b r \cdot f(x)dx$ = r· F(b) – r · F(a) = r [F(b) – F(a)] = $r \cdot \int_a^b f(x)dx$