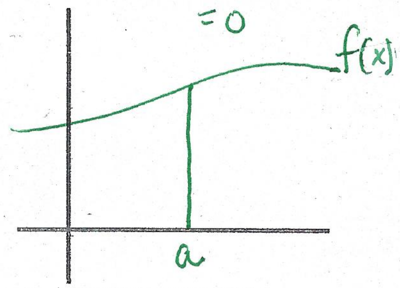
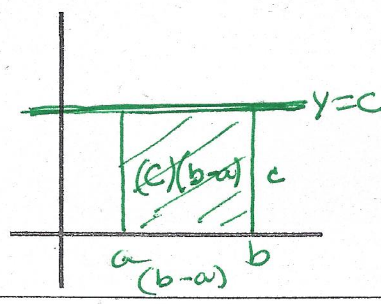
Visualize Definite Integral Properties Graphically

Key

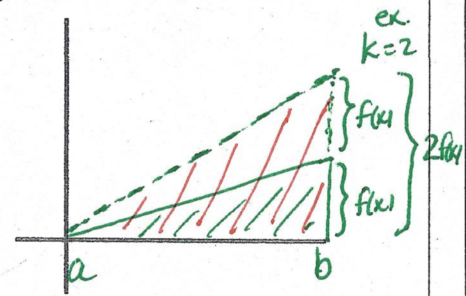
$\int_a^a f(x)dx = 0$ $= (f(x))(a-a)$ $= f(x)(0)$ $= 0$



$\int_a^b c\,dx = (b-a)\cdot c$

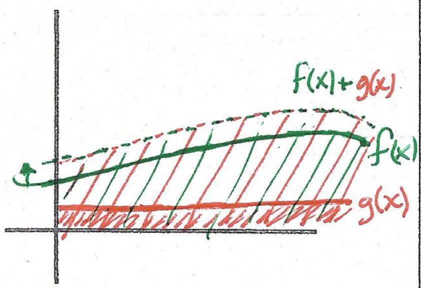


$\int_a^b k\cdot f(x)dx = k\int_a^b f(x)dx$



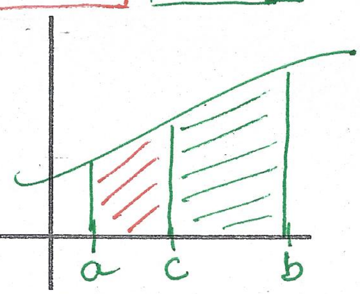
$\int_a^b \left(f(x)+g(x)\right)dx$

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



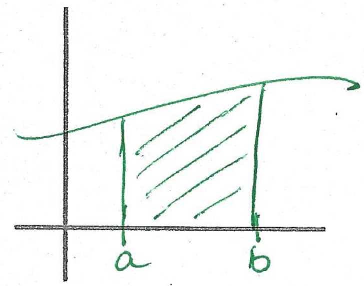
$\int_a^b f(x)dx$ $a<c<b$

$= \boxed{\int_a^c f(x)dx} + \boxed{\int_c^b f(x)dx}$



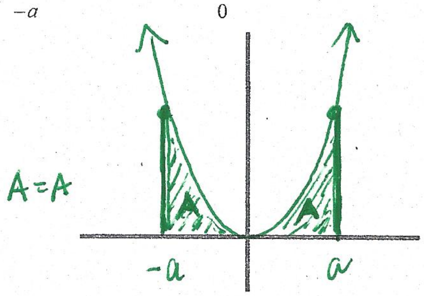
$\int_a^b f(x)dx = -\int_b^a f(x)dx$

$(b-a)f(x)$ vs $-(a-b)f(x)$



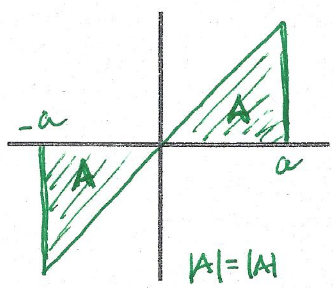
if $f(x)$ *is EVEN,*

$\int_{-a}^{a} f(x)dx = 2\int_0^a f(x)dx$



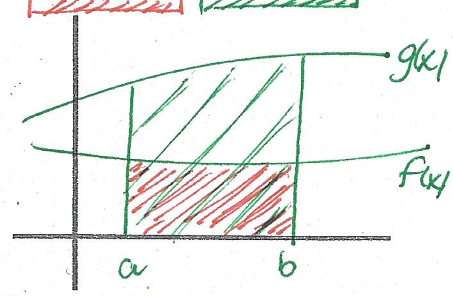
if $f(x)$ *is ODD,*

$\int_{-a}^{a} f(x)dx = 0$

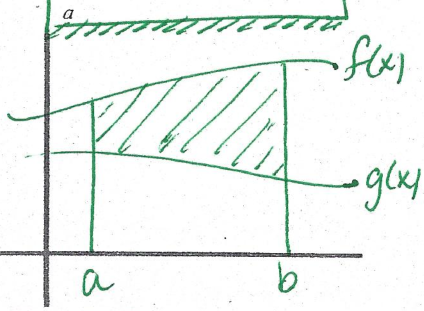


if $f(x)\le g(x)$ *on* $a\le x\le b$,

then $\boxed{\int_a^b f(x)dx} \le \boxed{\int_a^b g(x)dx}$

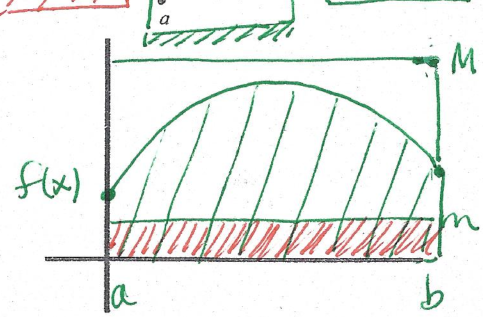


if $f(x)$ *lies above* $g(x)$ *on* $a\le x\le b$*, then the area btwn* f & g $= \boxed{\int_a^b \left(f(x)-g(x)\right)dx}$



if $m\le f(x)\le M$ *for* $a\le x\le b$*, then*

$\boxed{m(b-a)} \le \boxed{\int_a^b f(x)dx} \le \boxed{M(b-a)}$



Average Value of f *from* a *to* $b =$

$\frac{1}{(b-a)}\int_a^b f(x)dx$