Pengamiran

Pengamiran boleh dilihat sebagai proses songsang untuk

Jika beza $f(x)$ memberikan $g(x)$,

Maka,

$\frac{d}{dx} f(x) = g(x) \leftrightarrow$

$\frac{d}{dx}$ → beza terhadap

$\int \ldots dx$ →

→ Mesti tulis $\int \ldots dx$

$y = 3x$

$y = 3x + 1$

$y = 3x - 4$ $\rightarrow$ $\frac{dy}{dx} =$ $\leftarrow$

$y = 3x + a^2$

$\therefore \int 3\,dx =$

$\frac{d}{dx} f(x) = g(x) \leftrightarrow$

c ialah pemalar pengamiran

$y = -\frac{1}{x}$. Cari $\frac{dy}{dx}$. Maka, cari $\int \frac{1}{x^2} dx$

$y = x^2$ $\frac{dy}{dx} = 2x$	$\int$
$y = \frac{x^3}{3}$ $\frac{dy}{dx} = x^2$	
$y = x^4 + 3x - 7$ $\frac{dy}{dx} =$	

$\frac{d}{dx}(kx) =$ $\int$

$\int 5\,dx =$

$\int -\frac{1}{7} dx =$

Pembezaan

$\frac{d}{dx} k[f(x)] = k \frac{d}{dx}[f(x)]$

$\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$

→ kalau darab pemalar, pemalar

→ kalau tambah/tolak sebutan,

Pengamiran

$\int k[f(x)]dx =$

$\int [f(x) \pm g(x)]dx =$

→ kalau darab pemalar, pemalar

→ kalau tambah/tolak sebutan

Jika $\frac{d}{dx} f(x) = g(x)$, cari

i) $\int g(x)dx =$

ii) $\int 3g(x)dx =$

iii) $\int [g(x) - 3]dx =$

Pemalar c tidak perlu dilibatkan dalam operasi algebra lain kerana mewakili sebarang nilai

Jika $\frac{d}{dx} f(x) = 2g(x)$, cari

i) $\int 2g(x)dx =$

ii) $\int g(x)dx =$

iii) $\int 5g(x)dx =$

$y = x^3$. Cari $\frac{dy}{dx}$. Maka, cari $\int 2x^2 dx$

Semak :

Kadangkala perlu sengaja masukkan pemalar

$\int f(x)dx =$

Jawapan pengamiran boleh disemak dengan membezakan jawapan untuk mendapatkan balik soalan

$\frac{d}{dx}(x^n) =$

→

→

$\int x^n \, dx =$

→

→

a) $\int x \, dx =$

b) $\int x^3 \, dx =$

c) $\int 4x^2 \, dx =$

d) $\int \frac{5}{x^2} dx =$

e) $\int (6x^2 - 3x + 2)dx$

=

Pastikan jelas langkah pengamiran VS langkah penukaran / permudahkan

Bandingkan

$\frac{d}{dx}(3) =$	$\int 3 \, dx =$
$\frac{d}{dx}(x) =$	$\int x \, dx =$
$\frac{d}{dx}(3x) =$	$\int 3x \, dx =$
$\frac{d}{dx}(x+3) =$	$\int (x+3) \, dx =$
$\frac{d}{dx}(x^2) =$	$\int x^2 \, dx =$

$\frac{d}{dx}(ax+b)^n =$

→

→

→

→

$\int (ax+b)^n \, dx =$

→

→

→

→

→

Bandingkan

$\frac{d}{dx}(2x-7)^4$ =

$\int (2x-7)^4 \, dx$ =

a) $\int (3x+2)^2 \, dx =$

b) $\int 5(x+3)^6 \, dx =$

c) $\int (1-x)^4 \, dx =$

d) $\int \frac{5}{(7-2x)^2} \, dx =$

Bandingkan

$\int (x+1)^2 \, dx =$

$\int (x^2+1) \, dx =$

$\int x^n \, dx$ → x kuasa n

$\int (ax+b)^n \, dx$ →

a) $\int (x^2-1)^2 \, dx =$

BUKAN $\int (x^2-1)^2 \, dx = \frac{(x^2-1)^3}{3(2x)} + c$

$\int [f(x)]^n \, dx$

→ Tiada formula mudah jika

$\int [f(x)g(x)]dx$, $\int \frac{f(x)}{g(x)} dx$

→ Tiada formula mudah

b) $\int x(x^2-1)dx =$

c) $\int \frac{x^4-5x^2}{x} dx =$

Kadangkala perlu kembang /
pisahkan pecahan SEBELUM pengamiran

Bandingkan

$\int (x+1)dx$ →

$\int x(x+1)dx$ →

$\int (x+1)^2 dx$ →

$\int (x^2+1)dx$ →

$\int (x^2+1)^2 dx$ →

$\int (x+1)(x-2)dx$ →

$\int 2(x+1)^2 dx$ →

$\int 2(x+1)dx$ →

$\int 2x(x+1)dx$ →

$\int 5(3x-2)^2 dx$ →

$\int x(3x-2)^2 dx$ →

$\int 5x(3x-2)^2 dx$ →

$\int \frac{(3x-2)^2}{4} dx$ →

$\int \frac{3x^2-2x}{x} dx$ →

Fungsi kecerunan

$y = ...$ $\frac{dy}{dx} = ...$

pers. lengkung fungsi kecerunan

Suatu lengkung mempunyai fungsi kecerunan $3x-4$, dan melalui titik $(2,7)$.
Cari persamaan lengkung tersebut.

fungsi kecerunan pers. lengkung

$\frac{dy}{dx} = ...$ $y =$

Kamiran Tentu

Jika $\int f(x)dx = g(x)+c$

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

→ Jawapan kamiran tentu ialah

Mengapakah tidak perlu tulis c ?

$\int_a^b f(x)dx = [g(x)+c]_a^b$

a) $\int_1^3 2x\,dx =$

Nilai kamiran tentu boleh di SEMAK dengan kalkulator

Kamiran Tentu

→

→

→

b) $\int_{-1}^{1}\left(x^3+1\right)dx=$

c) $\int_{0}^{4}\left(2x+1\right)^3\,dx=$

$\left[kg\left(x\right)\right]_a^b=$

$\left[f\left(x\right)\pm g\left(x\right)\right]_a^b=$

→ boleh keluarkan pemalar

→ boleh pisahkan sebutan

Bandingkan

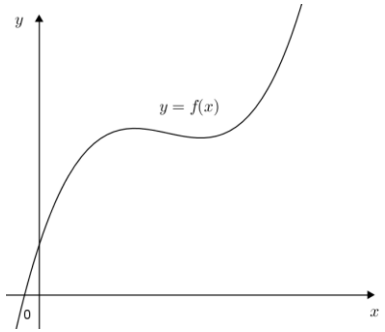
$\int x^3\,dx=$ $\int_0^1 x^3\,dx=$

Kamiran tentu $\int_a^b f\left(x\right)dx$ sebenarnya

mewakili

→ luas di bawah graf

→ dari



Katakan $\int f\left(x\right)dx=g\left(x\right)+c$

i) $\int_a^a f\left(x\right)dx=$

$\int_a^a f\left(x\right)dx$ → luas dari

→

ii) $\int_a^b f\left(x\right)dx=$

$\int_b^a f\left(x\right)dx=$

$\therefore$

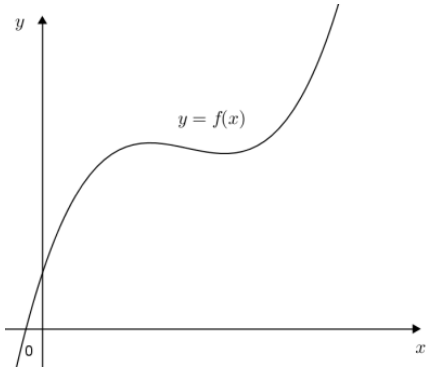
iii) $\int_a^b f\left(x\right)dx+\int_b^c f\left(x\right)dx$ \

=

$\int_a^b f\left(x\right)dx+\int_b^c f\left(x\right)dx=\int_a^c f\left(x\right)dx$

↓ ↓ ↓

luas + luas =



iv) $\int_a^b kf\left(x\right)dx=$

$\int_a^a f(x)\,dx =$

$\int_a^a f(x)\,dx$ $\int_a^b f(x)\,dx$

$\int_a^b f(x)\,dx + \int_b^c f(x)\,dx =$

$\int_a^b kf(x)\,dx =$

Diberi $\int_1^4 f(x)\,dx = 4$. Cari

a) $\int_4^1 f(x)\,dx =$

b) $\int_1^4 [4f(x) - 3]\,dx =$

c) Diberi $\int_1^4 [kf(x) - 4x]\,dx = 54$. Cari nilai

k

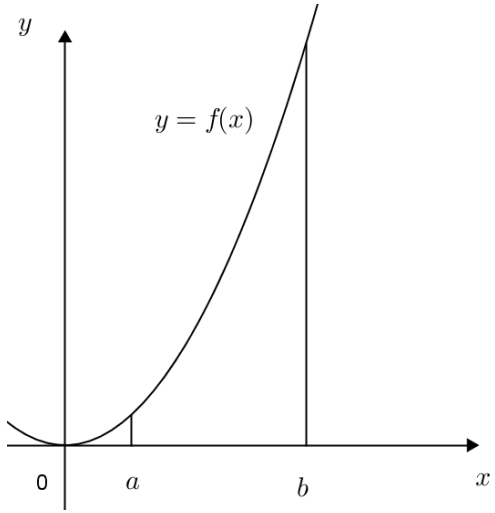
Bandingkan

$\int_a^b kf(x)\,dx =$

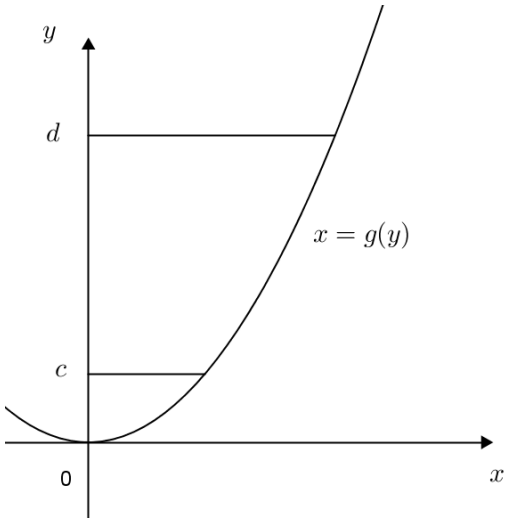
$\int_a^b [f(x) + k]\,dx =$

Definisi sebenar

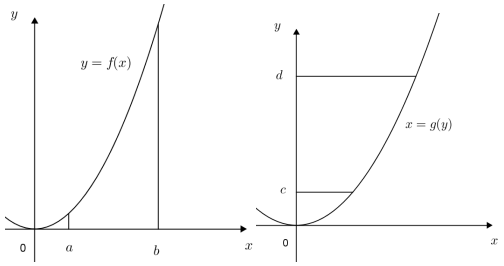
$$\int_a^b y\,dx = \underset{\delta x \to 0}{\text{had}} \sum y\delta x$$



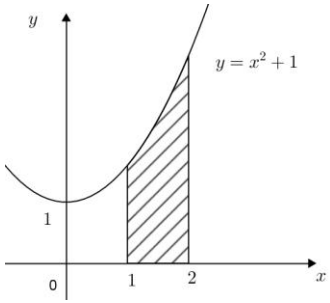
$$\int_c^d x\,dy = \underset{\delta y \to 0}{\text{had}} \sum x\delta y$$



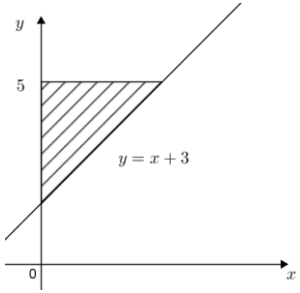
Bandingkan



Cari luas kawasan berlorek



Cari luas kawasan berlorek



Perhatikan

$\int (x+1)\,dx =$

$\int (y+1)\,dy =$

Bandingkan

$\int x\,dx =$

$\int y\,dx \rightarrow$

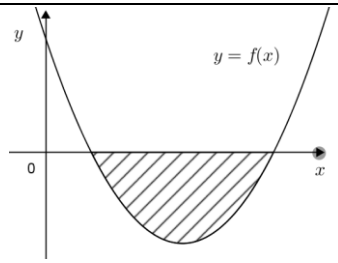
$\int y\,dy =$

$\int x\,dy \rightarrow$

Bandingkan

$\int_a^b y\,dx$

$\int_c^d x\,dy$



$$\int_a^b y\,dx = \underset{\delta x \to 0}{\text{had}} \sum y\delta x$$

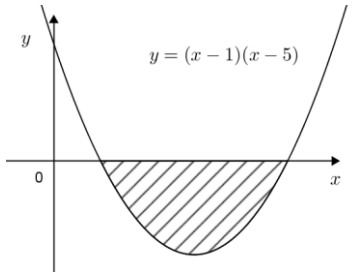
Jadi jika graf di bawah paksi - x ,

→ y akan bernilai

→ $\int_a^b y\,dx$ akan bernilai

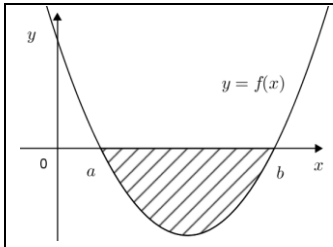
→ tetapi kita menganggap luas adalah

Cari luas kawasan berlorek



Jika luas dibawah paksi - x

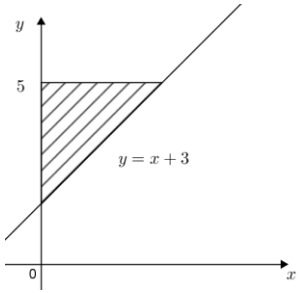
→ $\int_a^b y\,dx$ → Luas

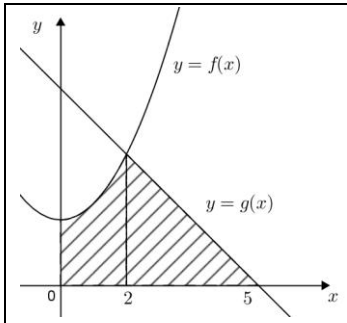


Diberi luas kawasan berlorek ialah 5 unit^2

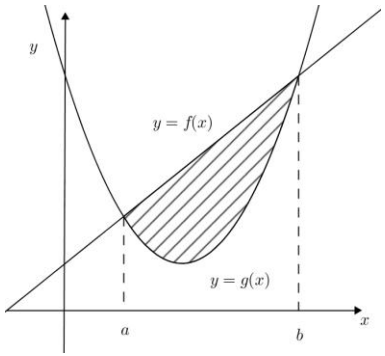
Jadi $\int_a^b f(x)\,dx =$

Kita juga boleh guna formula-formula luas untuk bentuk geometri tertentu

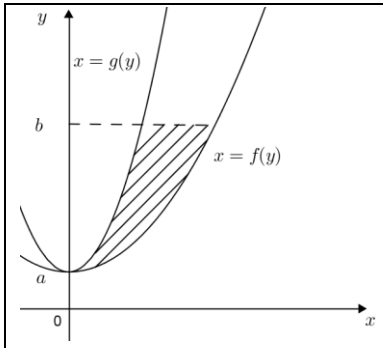




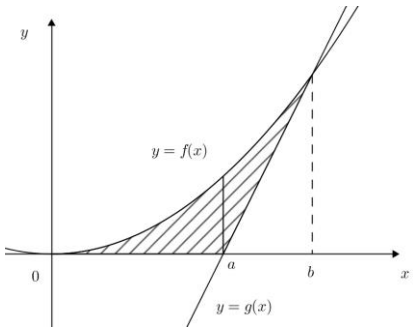
Luas =



Luas =

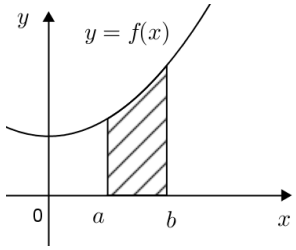


Luas =



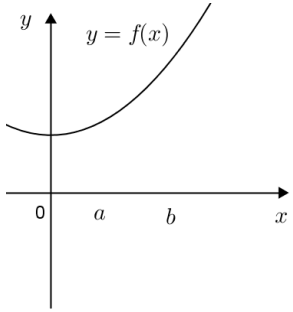
Luas =

Isipadu kisaran



↓ Dikisarkan 360˚

melalui paksi- x

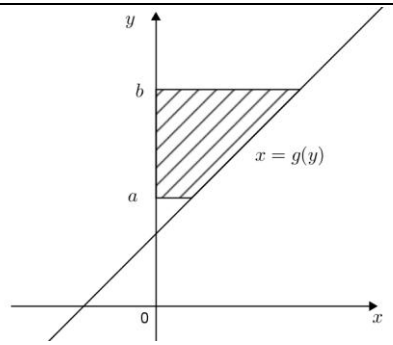


Bongkah boleh dipotong menjadi banyak

→setiap mempunyai isipadu

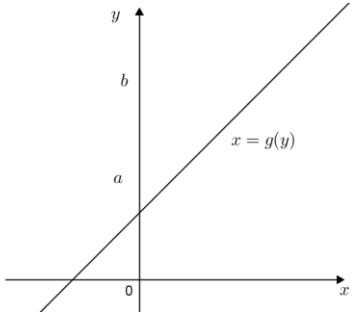
Isipadu kisaran =

(melalui paksi- x)



↓ Dikisarkan 360˚

melalui paksi- y

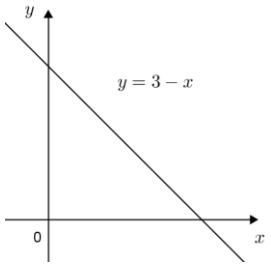


→setiap mempunyai isipadu

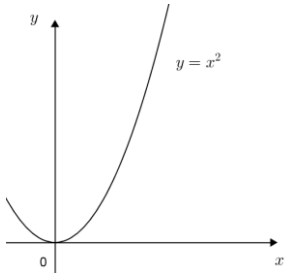
Isipadu kisaran =

(melalui paksi- y)

Cari isipadu kisaran bila kawasan yang yang dibatasi garis lurus, paksi- y dan paksi- x dikisarkan 360° melalui paksi- x



Cari isipadu kisaran bila kawasan yang dibatasi lengkung, paksi- y , dan garis $y = 3$ dikisarkan 360° melalui paksi- y



Bandingkan

$\int x^2\ dx =$ $\int y^2\ dx \rightarrow$

$\int y^2\ dy =$ $\int x^2\ dy \rightarrow$

Jika $y = x + 1$	Jika $y = x^2 + 1$
$y^2 \rightarrow$	$x^2 \rightarrow$
$x \rightarrow$	$y^2 \rightarrow$
$x^2 \rightarrow$	$x \rightarrow$