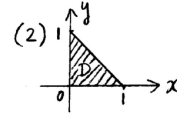
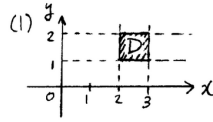


— 2重積分 —

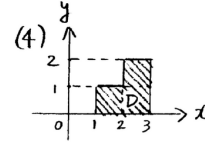
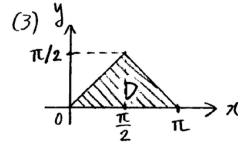
【1】

下記の (1)~(8) の 2重積分を、各小問毎に図で示した領域 D に対して求めよ。

(1) $\int \int_D \frac{y}{x} dx dy$

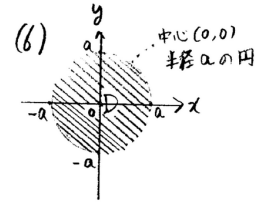
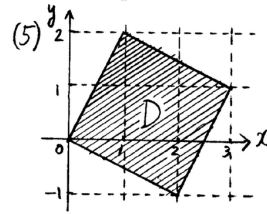


(2) $\int \int_D x^2 y dx dy$



(3) $\int \int_D \sin(x+y) dx dy$

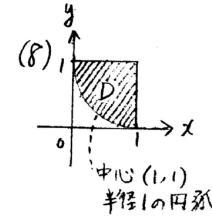
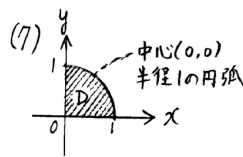
(4) $\int \int_D (x+y^3) dx dy$



(5) $\int \int_D x dx dy$

(6) $\int \int_D \frac{dx dy}{\sqrt{x^2+y^2}}$

(7) $\int \int_D xy^2 dx dy$



(8) $\int \int_D x^2 dx dy$

— 累次積分の積分順序の変更 —

【2】

下記の (1)~(4) の等式の左辺の累次積分の表す積分領域を (x, y) 平面または (r, θ) 平面上に図示し、等式が任意の関数 $f(x, y)$ に対して恒等的に成立するように右辺の積分範囲を表す四角枠内を適切な数や式で埋めよ。

(1) $\int_{-1}^1 dx \int_0^{1-|x|} dy f(x, y) = \int_{\boxed{\text{ア}}}^{\boxed{\text{イ}}} dy \int_{\boxed{\text{ウ}}}^{\boxed{\text{エ}}} dx f(x, y)$

(2) $\int_0^1 dx \int_0^{2-x} dy f(x, y) = \int_0^1 dy \int_{\boxed{\text{ア}}}^{\boxed{\text{イ}}} dx f(x, y) + \int_1^2 dy \int_{\boxed{\text{ウ}}}^{\boxed{\text{エ}}} dx f(x, y)$

(3) $\int_0^1 dx \int_0^2 dy f(x, y) + \int_1^2 dx \int_0^1 dy f(x, y) + \int_2^3 dx \int_0^2 dy f(x, y)$

$= \int_0^1 dy \int_{\boxed{\text{ア}}}^{\boxed{\text{イ}}} dx f(x, y) + \int_1^2 dy \int_{\boxed{\text{ウ}}}^{\boxed{\text{エ}}} dx f(x, y) + \int_{\boxed{\text{オ}}}^{\boxed{\text{カ}}} dy \int_2^3 dx f(x, y)$

$= \int_0^2 dy \int_0^3 dx f(x, y) - \int_{\boxed{\text{キ}}}^{\boxed{\text{ク}}} dy \int_{\boxed{\text{ケ}}}^{\boxed{\text{コ}}} dx f(x, y)$

(4) $\int_0^{\pi/2} d\theta \int_0^{\sin \theta} r dr f(r, \theta) = \int_{\boxed{\text{ア}}}^{\boxed{\text{イ}}} r dr \int_{\boxed{\text{ウ}}}^{\boxed{\text{エ}}} d\theta f(r, \theta)$