1. $\int\int x\cos(y)dA, Dy=0, y=x^2, x=1$

   Tipo 1

   $\int_0^1(\int_0^{x^2} x\cos(y)dy)dx$

   - $\int_0^{x^2} x\cos(y)dy =$
     $x\sin(y)|_0^{x^2} =$
     $x\sin(x^2)$
   - $\int_0^1 x\sin(x^2)dx$
     $u=x^2, du=2xdx, dx=\frac{du}{2x} \Rightarrow$
     $x\sin(x^2)dx \equiv x\sin(u)\frac{du}{2x} =$
     $\sin(u)du\cdot\frac{1}{2} =$
     $\int\sin(u)du = -\cos(u)+C \Rightarrow$
     $\left.\frac{-\cos(x^2)}{2}\right|_0^1 =$
     $\frac{-\cos(1)}{2}+\frac{1}{2}$

2. $\int\int y^2dA, D$ triangulo con vertices $(0,1),(1,2),(4,1)$

   Parto D en dos triangulos rectangulos

   - $D_1, 0\le x\le 1 \wedge 1\le y\le x+1$
   - $D_1, 1\le y\le 2 \wedge 1\le x\le -3y+7$

   a) D_1 tipo 1

   $\int_0^1(\int_1^{x+1} y^2dy)dx =$

   - $\int_1^{x+1} y^2dy =$
     $\left.\frac{y^3}{3}\right|_1^{x+1} =$
     $\frac{(x+1)^3}{3}-\frac{1}{3}$
   - $\int_0^1 \frac{(x+1)^3}{3}-\frac{1}{3}dx =$
     $\left.\frac{(x+1)^4}{12}-\frac{x}{3}\right|_0^1 =$
     $\frac{2^4}{12}-\frac{1}{3}-\frac{1}{12} =$
     $\frac{11}{12}$

   b) D_2 tipo 2

   $\int_1^2(\int_1^{-3y+7} y^2dx)dy =$

   - $\int_1^{-3y+7} y^2dx =$
     $xy^2|_1^{-3y+7}$
     $(-3y+7)y^2-y^2 =$
     $-3y^3+6y^2$
   - $\int_1^2 -3y^3+6y^2dy =$
     $\left.\frac{-3y^4}{4}+2y^3\right|_1^2 =$
     $\frac{-3(2^4)}{4}+2^4+\frac{3}{4}-2 =$
     $\frac{11}{4}$

   $\Rightarrow A_{D_1}+A_{D_2} = \frac{11}{12}+\frac{11}{4} = \frac{11}{3}$

3. $\int\int_D xy^2dA, D: x=0 \wedge x=\sqrt{1-y^2}$

   Tipo 2

   $\int_{-1}^1(\int_{-\sqrt{1-x^2}}^{-\sqrt{1-x^2}} xy^2dy)dx$

- $\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} xy^2 dy$
  $\frac{xy^3}{3}\Big|_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} =$
  $\frac{2x(\sqrt{1-x^2})^3}{3}$
- $\int_{-1}^{2}$