MATEMATICA III scheda 8

1) Calcolare i seguenti integrali doppi

$$a)\ \iint_D (1-x^2-y^2)^{3/2}dxdy \qquad D=\{(x,y)\in \mathbf{R}^2; y\geq 0, x^2+y^2\leq 1/4\}$$

$$b)\ \iint_D \frac{x+y}{(x-y)^2+1}dxdy \qquad D=\{(x,y)\in \mathbf{R}^2; 0\leq x+y\leq 1; 0\leq x-y\leq 1\}$$

$$c)\ \iint_D xydxdy \qquad D=\{(x,y)\in \mathbf{R}^2; x\geq 0, y\geq 0, 4y\leq x^2+y^2\leq 4\}$$

$$d)\ \iint_T \frac{x^2}{y}dxdy \qquad T=\left\{(x,y)\in \mathbf{R}^2; 1/2\leq xy\leq 1, 2\leq \frac{y}{x^2}\leq 3\right\}$$

$$e)\ \iint_T \frac{1}{\sqrt{x^2+y^2}}dxdy \qquad T=\{(x,y)\in \mathbf{R}^2; 3\leq x^2+y^2\leq 2y\}$$

$$\iint_D \frac{y^2}{x^4}\log\left(\frac{y^2}{x}\right)dxdy \qquad \mathrm{D}=\left\{(x,y)\in \mathbf{R}^2;\ x^2\leq y\leq 2x^2, \sqrt{x}\leq y\leq 2\sqrt{x}\right\}$$

2) Dire se esiste l'integrale improprio esteso a $\mathbf{R}^2$ della funzione

$$f(x,y)=\frac{e^{x^2+y^2}}{\pi^{x^2+y^2}}$$

e in caso affermativo calcolarlo

3) Calcolare se esiste

$$\iint_T y^{-1}\exp\left(\frac{-x}{\sqrt{y}}\right)dxdy \qquad T=\left\{(x,y)\in \mathbf{R}^2; 0\leq y\leq 2, 0\leq x\leq \sqrt{y}\right\}$$