Quiz 5

June 02 2005

Show all details.

1. Compute $\int_0^1 \int_y^{y+1} y^2(x-y)e^{(x-y)^2} dxdy$.
2. State Green's Theorem in both circulation (tangential) and flux (normal) forms.
3. Compute the area enclosed by $x = \cos^3 t$, $y = \sin^3 t$, $0 \le t \le 2\pi$.
   (Hint: check $\int \pm x dy \pm y dx$)
4. Change the integral $\int_0^{2\pi} \int_0^{\sqrt{2}} \int_r^{\sqrt{4-r^2}} r dz dr d\theta$ into integrals in Cartesian ($dzdxdy$) and spherical coordinates. Pay attention for the limits of integration in new coordinates.
5. Compute $\int_C 2x dx - y^2 dy + \frac{1}{1+z^2} dz$ where C is given by $x(t) = \cos 2\pi t$, $y(t) = \sin 2\pi\sqrt{t}$, $z(t) = x(t) - 2y(t)$, $0 \le t \le 1$. (Hint: something special about $(2x, -y^2, \frac{1}{1+z^2})$)

Calculus II, Spring 2005

Quiz 5

June 02 2005

Show all details.

1. Compute $\int_0^1 \int_y^{y+1} y^2(x-y)e^{(x-y)^2} dxdy$.
2. State Green's Theorem in both circulation (tangential) and flux (normal) forms.
3. Compute the area enclosed by $x = \cos^3 t$, $y = \sin^3 t$, $0 \le t \le 2\pi$.
   (Hint: check $\int \pm x dy \pm y dx$)
4. Change the integral $\int_0^{2\pi} \int_0^{\sqrt{2}} \int_r^{\sqrt{4-r^2}} r dz dr d\theta$ into integrals in Cartesian ($dzdxdy$) and spherical coordinates. Pay attention for the limits of integration in new coordinates.
5. Compute $\int_C 2x dx - y^2 dy + \frac{1}{1+z^2} dz$ where C is given by $x(t) = \cos 2\pi t$, $y(t) = \sin 2\pi\sqrt{t}$, $z(t) = x(t) - 2y(t)$, $0 \le t \le 1$. (Hint: something special about $(2x, -y^2, \frac{1}{1+z^2})$)