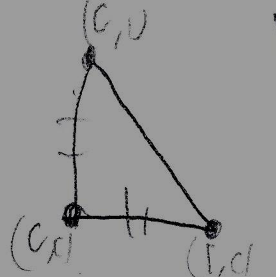
(17) $F(x,y) = \langle x(x+y),\ xy^2 \rangle$ $\quad (0,0)\ (1,0)\ (0,1)$



$P = 2x^2 + 2yx \qquad Q = xy^2$

$P_y = 2x \qquad Q_x = y^2$

$\frac{x+y}{1} = 1 \qquad y = 1-x$

$$\int_0^1\int_0^{1-x} y^2 - x\,dy\,dx = \int_0^1 \left[\tfrac{1}{3}y^3 - xy\right]_0^{1-x} dx = \int_0^1 \tfrac{1}{3}(1-x)^3 - x(1-x)\,dx$$

$$= \int_0^1 \frac{(1-x)^3}{3} - x + x^2\,dx = -\frac{(1-x)^4}{12} - \frac{x^2}{2} + \frac{x^3}{3}\Big]_0^1$$

$$= 0 - \frac{1}{2} + \frac{1}{3} + \frac{1}{12} + 0 + 0 = \boxed{\frac{-1}{12}}$$

(19) $x = t - \sin t \qquad y = 1 - \cos t \qquad A = \frac{1}{2}\oint_C -y\,dx + x\,dy$

$\frac{dx}{dt} = 1 - \cos t \qquad \frac{dy}{dt} = \sin t$

$$A = \frac{1}{2}\int_{C_2} -y\,dx + x\,dy = \frac{1}{2}\int_{2\pi}^{0} -(1-\cos t)(1-\cos t) + (t - \sin t)(\sin t)\,dt$$

$$= \frac{1}{2}\int_{2\pi}^{0} (-2 + 2\cos t + t\sin t)\,dt = \frac{1}{2}\left(4\pi - t\cos t\Big|_{2\pi}^{0} + \int_{2\pi}^{0}\cos t\,dt\right)$$

$$= \frac{4\pi + 2\pi}{2} = \boxed{3\pi}$$