Домашнее задание по теме "Двойные и тройные интегралы"

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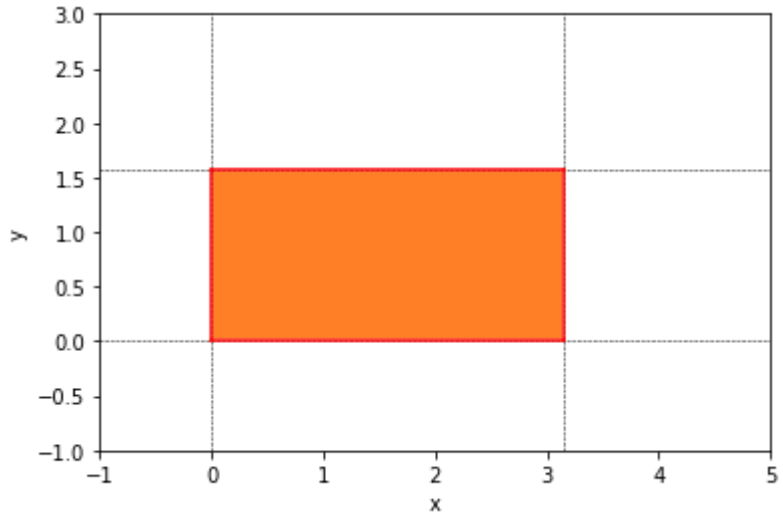
$$\iint_D e^{x+\sin y}\cos y dxdy \quad \{(x,y)|0 \le x \le \pi, 0 \le y \le \pi/2\}$$



$$\int_0^{\pi/2} dy \int_0^{\pi} (e^{x+\sin y}\cos y)dx = \int_0^{\pi/2} (e^{\pi+\sin y} - e^{\sin y})d(\sin y) =$$

$$(e^{\pi+\sin y} - e^{\sin y})\Big|_0^{\pi/2} = \underline{(e^{\pi+1} - e) - (e^{\pi} - 1)}$$

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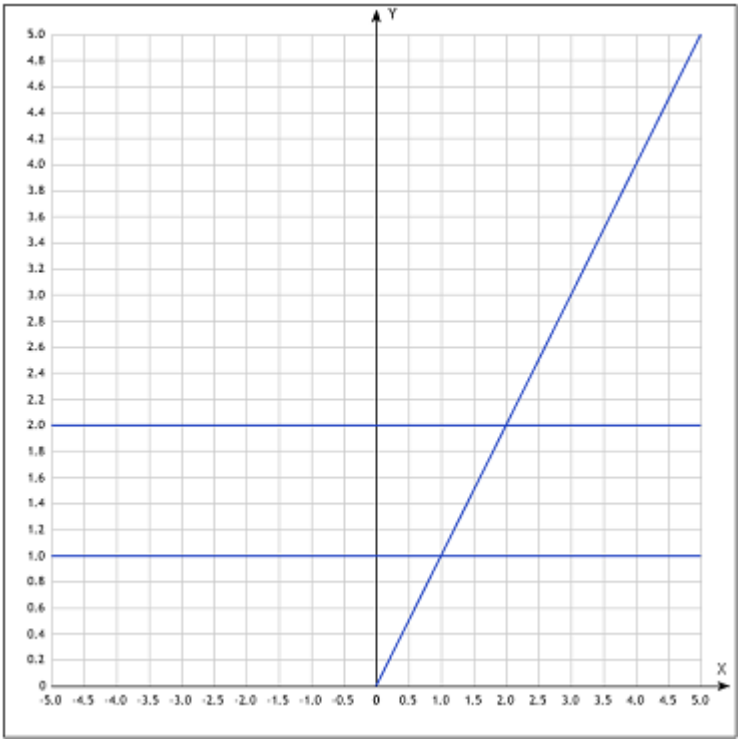
$$\iint_D (x^2 + y^2)dxdy \quad y = x, x = 0, y = 1, y = 2$$



$$\int_1^2 dy \int_0^2 (x^2+y^2)dx = \int_1^2 (\frac{8}{3}+2y^2)dy = \frac{8}{3}+\frac{16}{3}-\frac{8}{3}-\frac{2}{3} = \underline{\frac{14}{3}}$$

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$$\iint_D \frac{dxdy}{x^2+y^2+1} \quad y=\sqrt{1-x^2}, y=0$$

$$\int_0^\pi d\theta \int_0^1 \frac{rdr}{r^2(\cos^2\theta+\sin^2\theta)+1} = \frac{r}{r^2+1}\Big|_0^1 \cdot \theta\Big|_0^\pi = \underline{\frac{\pi}{2}}$$

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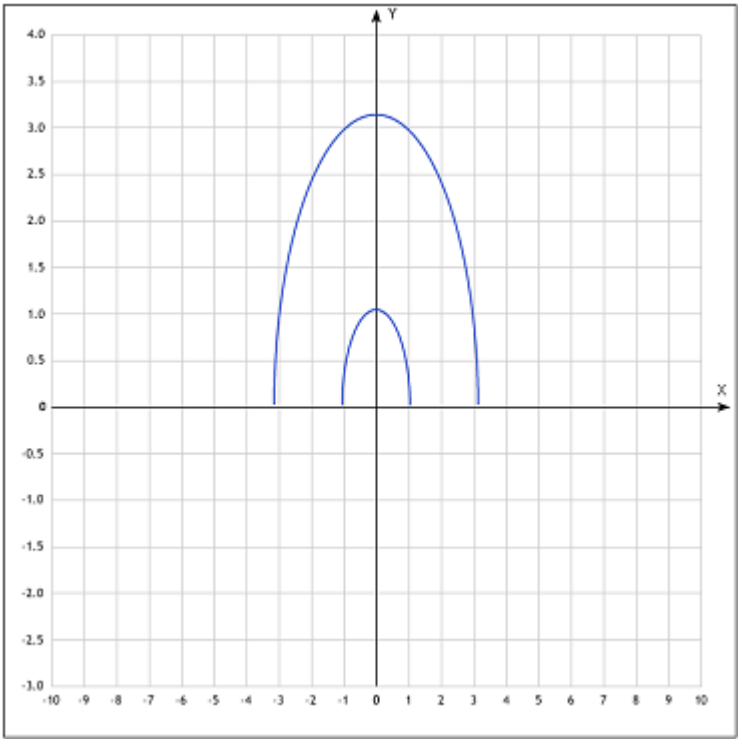
$$\iint_D \frac{\sin\sqrt{x^2+y^2}}{\sqrt{x^2+y^2}} dxdy \quad x^2+y^2=\pi^2/9, x^2+y^2=\pi^2$$



$$\int_0^{\pi} d\theta \int_{\frac{\pi}{9}}^{\pi} \frac{\sin\sqrt{r^2}}{\sqrt{r^2}} r dr = \frac{r\sin r}{r}\Big|_{\frac{\pi}{9}}^{\pi} \cdot \theta\Big|_0^{\pi} = \frac{\pi\pi\sin\pi}{\pi} - \frac{\pi\frac{\pi}{9}\sin\frac{\pi}{9}}{\frac{\pi}{9}} =$$

$$\underline{-\pi\sin\frac{\pi}{9}}$$