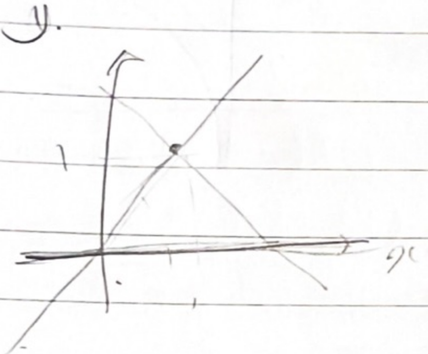
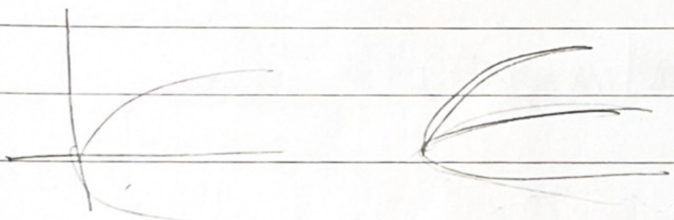
DATE. NO. 12.01.金 _ 가공수2 과제

#14.2.6

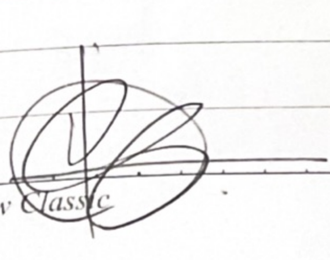




a. (y, 2−y)
y. (0, 1)

$$V = \int_0^1 \int_y^{2-y} (x+2y^2)\,dx\,dy$$
$$= \int_0^1 \left[\tfrac{1}{2}x^2 + 2y^2\right]_y^{2-y} dy$$
$$= \int_0^1 \left(\tfrac{1}{2}(\cancel{y^2} - 4y + 4 - \cancel{y^2}) + 2y^2\right) dy$$
$$= \int_0^1 (2y^2 - 2y + 2)\,dy$$
$$= \left[\tfrac{2}{3}y^3 - y^2 + 2y\right]_0^1$$
$$= \tfrac{2}{3} - 1 + 2 = \tfrac{5}{3}$$

#14.3.6(2)



New Classic

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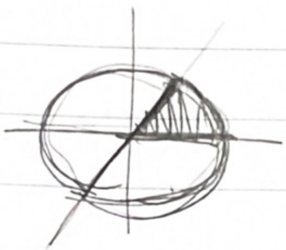


$\sqrt{1-y^2} = y$

$\frac{1}{2}\ \cancel{1-y^2} = \cancel{y^2}+y^2$

r. (0, 1).

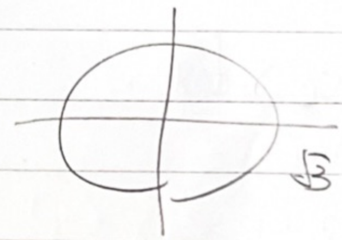
θ. (0, $\frac{1}{4}\pi$).

$\int_0^1 \int_0^{\frac{1}{4}\pi} \frac{1}{2} e^{r^2}\ 2r\, d\theta\, dr$

$= \frac{1}{4}\pi \left[\frac{1}{2} e^{r^2} \right]_0^1$

$= \frac{1}{8}\pi \left(e^1 - \cancel{e^0}\ 1 \right) = \frac{1}{8}\pi (e-1)$

#14.4.9



$x^2+y^2+\cancel{1} = \cancel{4}\sqrt{3}$.

$S = \iint_S \sqrt{f_x^2+f_y^2+1}\ dA$. $f(x,y) = z = \sqrt{4-x^2-y^2}$.

$f_x = \frac{\cancel{2}\cdot(-1)\, x}{\cancel{2}\sqrt{4-x^2-y^2}}$. $f_x^2 = \frac{x^2}{4-x^2-y^2}$.

$S = \iint_S \sqrt{\frac{\cancel{x^2+y^2} + 4 - \cancel{x^2-y^2}}{4-x^2-y^2}}\ dA$.

DATE. NO.

$$= \iint_S \frac{2}{\sqrt{4-x^2-y^2}}\, dA$$

$$= \int_0^{\sqrt{3}} \int_0^{2\pi} \frac{-2}{\sqrt{4-r^2}} \cdot r \cdot d\theta\, dr \quad (-1) \times 2)$$

$$= -4\pi \left[\sqrt{4-r^2} \right]_0^{\sqrt{3}}$$

$$= -4\pi \cdot (1-2) = 4\pi$$

#14.5.1(3)

$$\int_0^{\frac{1}{2}\pi} \int_x^{\frac{1}{2}\pi} \int_0^{xy} \cos\frac{z}{x}\, dz\, dy\, dx$$

$$= \int_0^{\frac{1}{2}\pi} \int_x^{\frac{1}{2}\pi} \left[x \cdot \sin\frac{z}{x} \right]_0^{xy} dy\, dx$$

$$= \int_0^{\frac{1}{2}\pi} \int_x^{\frac{1}{2}\pi} x \cdot \sin y\, dy\, dx$$

$$= \int_0^{\frac{1}{2}\pi} x \left[-\cos y \right]_x^{\frac{1}{2}\pi} dx$$

$$= \int_0^{\frac{1}{2}\pi} x(-0+\cos x)\, dx$$

$$= \int_0^{\frac{1}{2}\pi} x\cos x\, dx$$

D	I
x	$\cos x$
1	$\sin x$

$x\sin x - \int \sin x\, dx$

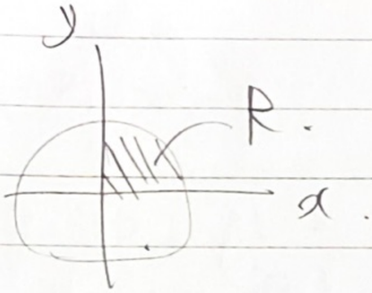
$= x\sin x + \cos x$

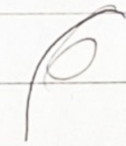
$$\left[x\sin x + \cos x \right]_0^{\frac{1}{2}\pi}$$

$$= \left(\tfrac{1}{2}\pi \cdot 1 - 0 \cdot 0\right) + (0-1) = \tfrac{1}{2}\pi - 1$$

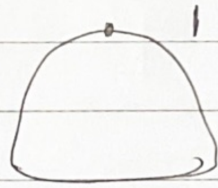
DATE. NO.

#14.6.2 (1)





$z = 1 - (x^2+y^2).$



$$\begin{aligned}
V &= \iint_A z \, dA \\
&= \iint_A (1-r^2) \, dA \\
&= \int_0^1 \int_0^{\frac{\pi}{2}} (-r^3+r) \, d\theta \, dr. \\
&= \frac{1}{2}\pi \left[-\frac{1}{4}r^4+\frac{1}{2}r^2\right]_0^1 \\
&= \frac{1}{2}\pi \left(-\frac{1}{4}+\frac{1}{2}\right) \\
&= \frac{1}{2}\pi \cdot \frac{1}{4} = \cancel{\frac{3}{16}\pi} \quad \frac{1}{8}\pi.
\end{aligned}$$