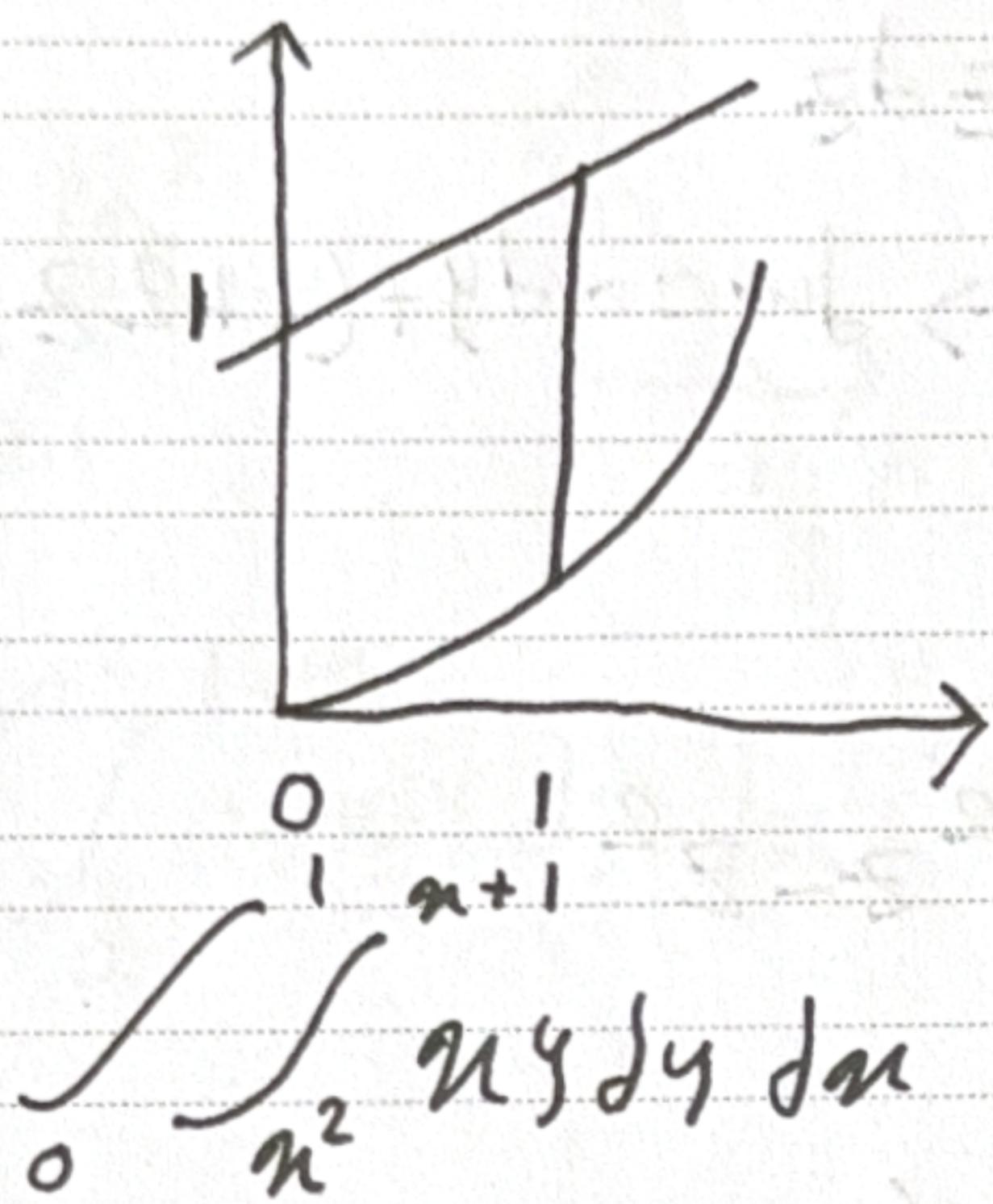


Subject: Session 48

Year. Month. Date. ()

1.



Inner:

$$\int_{n^2}^{n+1} n y dy = \left[\frac{n y^2}{2} \right]_{n^2}^{n+1}$$

$$= \frac{n(n+1)^2}{2} - \frac{n^5}{2}$$

Outer:

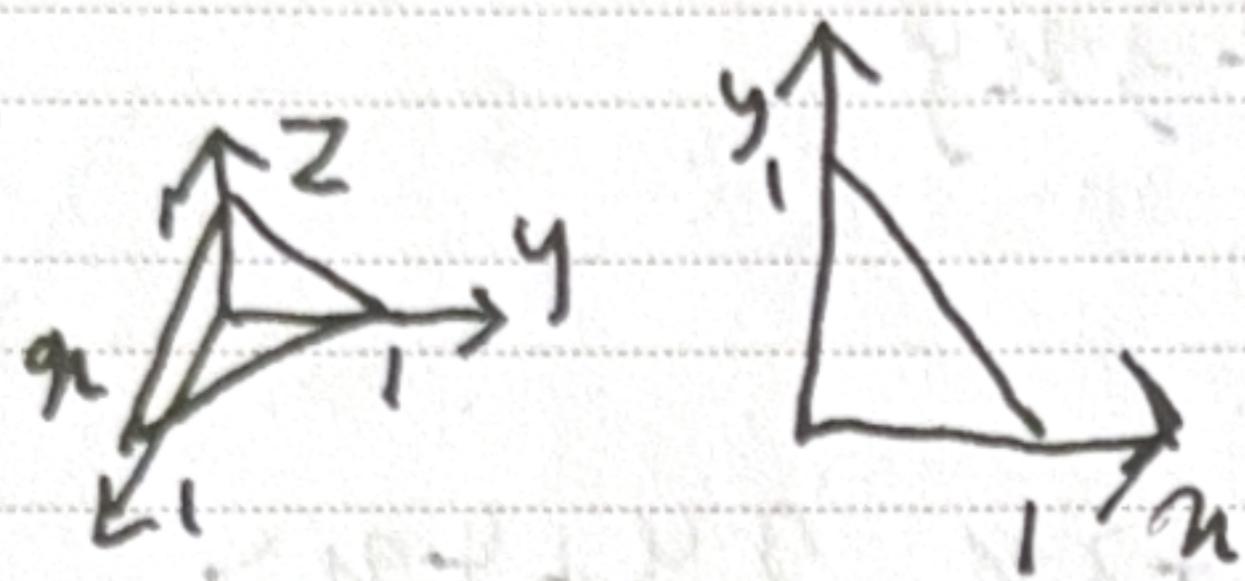
$$\int_0^1 \frac{n(n+1)^2}{2} - \frac{n^5}{2} dn = \left[\frac{n^4}{8} + \frac{n^3}{3} + \frac{n^2}{4} - \frac{n^6}{12} \right]_0^1$$

$$= \frac{1}{8} + \frac{1}{3} + \frac{1}{4} - \frac{1}{12} = \frac{5}{18}$$

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2.



$$\int_0^1 \int_0^{1-u} 1-u-y \, dy \, du$$

Inner:

$$\begin{aligned} & \int_0^{1-u} 1-u-y \, dy \\ &= y - yu - \frac{y^2}{2} \Big|_0^{1-u} \\ &= 1-u-u(1-u) - \frac{(1-u)^2}{2} \end{aligned}$$

Outer:

$$\begin{aligned} & \int_0^1 1-u-u+u^2-\frac{1}{2}(1+u^2-2u) \, du \\ &= \cancel{\frac{u}{2}} + \cancel{\frac{u^2}{2}} + \cancel{\frac{u^3}{3}} + \cancel{\frac{u^3}{2}} - \cancel{\frac{u^3}{6}} + \cancel{\frac{u^2}{2}} \Big|_0^1 \end{aligned}$$

$$\begin{aligned} & \cancel{\frac{1}{2}u^2} + \cancel{\frac{1}{2}u^3} + \cancel{\frac{1}{6}u^4} - \cancel{\frac{1}{2}u^4} + \cancel{\frac{1}{6}u^5} \\ &= \frac{1}{2}u - \frac{u^2}{2} + \frac{u^3}{6} \Big|_0^1 = \frac{1}{6} \end{aligned}$$