Instructions. Please work on the following problems in groups, while the TAs circulate. While you will not need to submit your answers, make sure to show your progress to the TAs on every problem.

(1) Compute the following indefinite integrals. Recall that indefinite integral is the same as general anti-derivative.

(a) \( \int 7 \, dx \)

(b) \( \int \sqrt[3]{x} \, dx \)

(c) \( \int \frac{1}{t^3} \, dt \)

(d) \( \int \cos z \, dz \)

(e) \( \int e^y \, dy \)

(2) Use the Fundamental Theorem of Calculus to compute the following definite integrals:

(a) \( \int_{\pi/6}^{\pi/2} \sin x \, dx \)

(b) \( \int_{2}^{3} \frac{2}{t^3} \, dt \)

(c) \( \int_{-1}^{-4} \frac{1}{x} \, dz \)

(d) \( \int_{0}^{1} (y^2 + 3e^y - 4) \, dy \)

(3) Use integration by substitution (also known as \( u \)-substitution) to compute the following indefinite integrals:

(a) \( \int x^2 \cdot \sqrt{5x^3 + 2} \, dx \)
(b) $\int \frac{4}{(t-3)^7} \, dt$

(c) $\int \frac{\cos(\ln z)}{3z} \, dz$

(d) $\int e^{-6w} \, dw$

(e) $\int \frac{e^x}{e^x + 4} \, dx$

(f) $\int \frac{1}{x \ln x} \, dx$

(4) Use integration by substitution (also known as $u$-substitution) to compute the following definite integrals:

(a) $\int_1^4 x \sqrt{5 - x} \, dx$

(b) $\int_0^1 \frac{1}{2x + 5} \, dx$

(c) $\int_0^1 \frac{1}{(2x + 5)^2} \, dx$

(d) $\int_0^1 \frac{x}{(2x^2 + 5)^3} \, dx$

(e) $\int_0^1 \frac{x + 4}{2x + 3} \, dx$

(f) $\int_1^9 \frac{1}{\sqrt{x}} e^{\sqrt{x}} \, dx$

(g) $\int_1^9 e^{\sqrt{x}} \, dx$