

1. (3pts) Find $\int 5z \cos(2z^2) dz$.

Let $u = 2z^2$ then $du = 4z dz$ so

$$\begin{aligned} \int 5z \cos(2z^2) dz &= \frac{5}{4} \int \cos(u) du = \frac{5}{4} \sin(u) + C \\ &= \frac{5}{4} \sin(2z^2) + C \end{aligned}$$

2. (3pts) Find $\int \sin(1-x)(2-\cos(1-x))^4 dx$.

Let $u = 2 - \cos(1-x)$ then $du = \sin(1-x) dx$ so

$$\begin{aligned} \int \sin(1-x)(2-\cos(1-x))^4 dx &= - \int u^4 du = -\frac{1}{5} u^5 + C \\ &= -\frac{1}{5} (2-\cos(1-x))^5 + C \end{aligned}$$

3. (4pts) Find $\int_3^5 (2t-5)^2 dt$.

Let $u = 2t-5$ then $du = 2 dt$, when $t=3$, $u=1$ and when $t=5$, $u=5$.

$$\text{So } \int_3^5 (2t-5)^2 dt = \int_{u=1}^{u=5} \frac{1}{2} u^2 du = \frac{1}{6} u^3 \Big|_{u=1}^{u=5} = \frac{1}{6} [5^3 - 1^3]$$

$$= \frac{1}{6} [125 - 1]$$

$$= \frac{124}{6} = \frac{62}{3}$$