



4. Given  $y = \int_{x^2}^{x^3} \frac{1 + \sin(t)}{e^{2t}} dt$ , find  $\frac{dy}{dx}$ .

5. (12 points) Suppose that  $f$  is an odd function and  $g$  is an even function, both of which are integrable on the interval  $[-5, 5]$ . Given that  $\int_0^5 f(x) dx = 8$ ,  $\int_3^5 f(x) dx = -2$ , and  $\int_0^5 g(x) dx = 3$ , evaluate the following integrals.

(a)  $\int_5^0 2g(x) dx$

(b)  $\int_5^5 4f(x) dx$

(c)  $\int_0^{-3} f(x) dx$

(d)  $\int_{-5}^5 (4 + (f(x))^3) dx$