

Problem Set 1

For each indefinite integral, identify what (if any) u -substitution(s) need to be made to evaluate each integral. Furthermore, for each indefinite integral, compute an antiderivative.¹

(a) $\int x \sin(x^2) dx$

(b) $\int \sqrt{x}(x+3) dx$

(c) $\int x\sqrt{x+3} dx$

(d) $\int \frac{\sqrt{\ln x}}{x} dx$

¹Adapted from “Active Calculus Colorado” by CU Boulder, CC BY-NC-SA 4.0

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

(f) $\int \frac{e^x}{\sqrt{1-e^{2x}}} dx$

(g) $\int \frac{x^2}{\sqrt{1-x^3}} dx$

(h) $\int \sin x (3 \cos^4 x + 4 \sin^3 x - 9) dx$