Workshop Exercises: Techniques of Integration I

1. Calculate the anti-derivatives.
   - **a.** $5x^4$
   - **b.** $3x^3 + 3x^2 - 14x - 9$
   - **c.** $\sin(x)$
   - **d.** $\cos(x)$
   - **e.** $x^{\frac{1}{2}}$
   - **f.** $x^{\frac{3}{2}} - x^{\frac{1}{2}}$

2. Consider the function $f(x) = x^2$ defined on $[1, 3]$.
   - **a.** Find the Riemann sum of f for the partition $\{1, 1.2, 1.9, 2.4, 3\}$ choosing right-hand endpoints as sample points.
   - **b.** Write the expression for the Riemann sum of f on $[1, 3]$ with n equal subintervals using right-hand endpoints.
   - **c.** Find $\int_1^3 x^2\, dx$ using the above formulas.

3. Compute the left- and right-hand approximations to $\int_1^6 2x^3\, dx$ with $n = 4$ subdivisions.