

Integral Calculus: Homework (**due: February 15 before class**)

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1 Riemann Sum

1. Compute the region between the graph of $y = 3x - 6$ and the x -axis, for $0 \leq x \leq 6$
2. Compute the Midpoint Riemann sum for the function $f(x) = x^2$ on the interval $[-5, 5]$ using $n = 10$ equal subintervals

2 Substitution or Integration By Parts

1. Find the derivative $\frac{dF}{dx}$ of the following function:

$$F(x) = \int_{\arctan(x)}^{\ln(x)} (t^2 + 2) dt$$

Do not simplify the answer.

2. Evaluate the following definite integrals:

(a) $\int \theta \sec^2 \theta d\theta$

(b) $\int \frac{1}{x^2 \sqrt{4-x^2}} dx$. Use trigonometric substitution with $x = 2 \sin \theta$ and the Pythagorean theorem. Use $\frac{1}{\sin \theta} = \csc \theta$ and all the tables on the lecture notes website.

(c) $\int \sin(x) \cos(x) \ln[\sin(x)] dx$

Please put your student ID and the section number on your homeworks