

UCLA Math 31B – Practice Problems

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Last updated February 22, 2023

A list of practice problems for UCLA Math 31B. Solutions are provided in a separate document on my webpage. Please feel free to email me if you there is a topic you would like me to add to this list.

1. Integrate $\int \frac{3x - 1}{x^2 - 2x - 3} dx$
2. Integrate $\int \frac{2x^2 - x + 2}{(x - 2)(x^2 + 4)} dx$
3. Determine whether the integral $\int_3^6 \frac{1}{\sqrt{x - 5}} dx$ converges or diverges. If it converges, state what value it converges to.
4. Determine whether the integral $\int_1^\infty x e^{-x} dx$ converges or diverges. If it converges, state what value it converges to.
5. Find the arc length of the function $f(x) = \frac{x^2}{8} - \ln x$ on the interval $[1, e]$.
6. Find the surface area of the function $f(x) = 3x + 2$ rotated about the x -axis on the interval $[0, 4]$.
7. Let $f(x) = \frac{1}{x - 1}$, $a = 2$.
 - (a) Find the Taylor polynomial $T_4(x)$ of $f(x)$ centered about $a = 2$.
 - (b) Find the Taylor polynomial $T_n(x)$ of $f(x)$ centered about $a = 2$. Write the polynomial using sum notation.
 - (c) Find a value of n so that $|f(2.1) - T_n(2.1)| \leq 10^{-3}$.