

# UCLA Math 31B – Practice Problems

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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  $\int_1^\infty xe^{-x} dx$  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  $|f(2.1) - T_n(2.1)| \leq 10^{-3}$ .