Math 1220-3

Notes of 2/13/18

7.4 Rationalizing Substitutions

• Radicals in an integrand can be a nuisance.

• We can sometimes get rid of them by a suitable substitution.

• Today: some examples
\[ I = \int \frac{1}{x - \sqrt{x}} \, dx \]
• Suppose
  \[ I = \int x(x + 1)^{2/5} \, dx \]

• Compute the integral in different ways:
  - Substitute \( u = x + 1 \)
  - Substitute \( u = (x + 1)^{1/5} \)
  - Use integration by parts
    \[ u = x + 1 \]
\[ I = \int x(x + 1)^{2/5} dx \]
\[ u = (x + 1)^{1/5} \]
\[ I = \int x(x + 1)^{2/5} \, dx \]

- Integration by parts.
\[ I = \int_{-1}^{1} \sqrt{1 - x^2} \, dx \]
• However, what about the indefinite integral

$$I = \int \sqrt{1 - x^2} \, dx$$