Warm-up Problems - January 20, 2006

1. Are the following “integral computations” correct? If not, why not and what is the correct integral?

   (a) \( \int x^3 \, dx = \frac{x^4}{4} + C \)

   (b) \( \int 3^x \, dx = \frac{3^{x+1}}{\ln 3} + C \)

   (c) \( \int \ln x \, dx = \frac{x \ln x - x}{2} + C \)

   (d) \( \int x^3(x^2 + 1) \, dx = \frac{x^4}{4} \left( \frac{x^3}{3} + x \right) + C \)
Lecture Problems

2. (a) Compute the integral using the Fundamental Theorem of Calculus:
\[ \int_4^8 \sqrt{2x - 7} \, dx \]

(b) Compute an approximation for the previous integral using a left hand sum with 3 rectangles.