1. (2 points) Evaluate the following limit. Be sure to use proper notation throughout your evaluation of this limit.

$$\lim_{{n \to \infty}} \sum_{{k=1}}^{{n}} \left( \frac{5}{n} + \frac{20k}{n^2} + \frac{100}{n^2} \right)$$
2. (2 points) Fill in the missing information to show that the given definite integral can be expressed as the limit of a Riemann sum. The only variables appearing in your limit should be \( n \) and \( k \). You do not need to evaluate this limit.

\[
\int_{3}^{8} \frac{\sin x}{e^{2x}} \, dx = \lim_{n \to \infty} \sum_{k=1}^{n} \left[ \right]
\]

3. (2 points) Suppose \( f \) is a polynomial for which \( \int_{1}^{7} f(x) \, dx = 12 \) and \( \int_{5}^{7} f(x) \, dx = 4 \). What is the value of \( \int_{5}^{1} f(x) \, dx \)?
4. (2 points) Evaluate the following indefinite integral.

\[ \int \frac{(\sin x - \cos x)^2 + \sin (2x)}{\cos^2 x} \, dx \]

5. (2 points) Evaluate and simplify the following definite integral.

\[ \int_{1}^{4} \sqrt{x} \, dx \]