

Name \_\_\_\_\_

- You have 20 minutes
- No calculators
- Show sufficient work

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

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \left( \frac{5}{n} + \frac{20k}{n^2} + \frac{100}{n^2} \right)$$

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.

$$\int_3^8 \frac{\sin x}{e^{2x}} dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n \left[ \quad \right]$$

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.

$$\int_1^4 \sqrt{x} dx$$