General hints. Organize your thoughts. Your answers should have a natural reading order and each line should be a consequence of the previous one. Make sure you clearly state what are the functions and variables you introduce in your model.

Sec. 4.1 Key concepts: exponential and logarithmic functions.
- Exponential rules (see p. 296). Try the first problems (5–12) if you do not feel confident about the exponential rules.
- Continuous compounding of interest \( B(t) = Pe^{rt} \). Try problems 38 and 40.

Sec. 4.2 Key concepts: logarithmic functions.
- Log rules (see p. 309) and relationship with exponential (p. 314). Try many from 9–36.
- Compounding applications and doubling time. Try problems 43–45.

Sec. 4.3 Key concepts: derivatives of exp and log functions. You should know how to derive \( e^x \), \( \log x \), \( e^{f(x)} \) and \( \log f(x) \). Problems: as many as you feel are needed among 1–38.
Moreover, you have to know how to differentiate functions using the technique called “logarithmic differentiation” (see example 4.3.13). Problems: 57–64.

Sec. 4.4 Key concepts: exponential growth/decay.
- Definition of exponential growth and decay (p. 343) and the behavior of the corresponding graphs. Problems 1–4.
- Percentage rate of change of exponential growth/decay functions (p. 345). Problem 41.
- Graphs and asymptotes of certain exponential models (e.g. learning curve, population growth, depreciation models). Problems: 24–26.

Sec. 5.1 Key concept: indefinite integral.
- You should know that \( \int \frac{dF}{dx} dx = F(x) + C \). In the exam you should always check your answer by deriving the result of the integral (do this for yourself, say, in a scrap page).
- Rules for integrating common functions (see p. 375).
- Algebraic rules for indefinite integration (p. 376).
- Initial value problems: determine the constant of integration given initial condition.

Try many problems from 1–42.
Sec. 5.2 Key concept: integration by substitution.

- Art of integration by substitution (p. 386). The chapter is basically a collection of examples since there is no sure way to determine when substitution will work and what should be the substitution rule. As a result, to study you should try as many problems as possible from 1–42.

Sec. 5.3 Key concept: Fundamental Theorem of Calculus (FTC).

- Area under the curve as a limit of a sum (of areas of rectangles). The definite integral as the area under the curve (p. 401).
- FTC (p. 402).
- Rules for definite integrals (p. 404).
- Net change, p. 408 (which is just the FTC in disguise).

Problems: try many from 1–30. Also try word problems like 58, 61, 64.

Sec. 5.4

- The only topic from this Section in this exam is “Area between two curves” (see box on p. 417). Problems 1–4.