

AP Calculus BC

Chapter 6 Test Review Outline

1. Test Format
 - a. Calculator section: 3 multiple choice, 5 free-response
 - b. Non-calculator section: 9 multiple choice, 3 free-response
2. Methods of Integration (definite and indefinite)
 - a. (6.1) Basic methods (w/o u-sub) – power rule, exponentials, trig (6), inverse trig
 - b. (6.2) U-substitution
 - c. (6.3) Integration by parts
 - i. $\int u dv = uv - \int v du$
 - ii. LIPET: used to help you pick the u
 - iii. PE or PT or ET*: tabular integration
 - d. (8.4) Partial fractions: with or without the cover-up method
3. Separable differential equations – Section 6.1
4. Slope Fields (6.1)
 - a. Match a slope field to its differential equation/solution equation
 - b. Draw a slope field given a differential equation (non-calculator)
5. Exponential Growth/Decay
 - a. Rate of change of a quantity is proportional to the quantity: $\frac{dy}{dt} = ky$
 - b. Particular solution: $y = y_0 e^{kt}$ ($k > 0 =$ growth, $k < 0 =$ decay)
 - c. Half-life: $t = \frac{\ln\left(\frac{1}{2}\right)}{k}$; Doubling time: $t = \frac{\ln(2)}{k}$
 - d. Newton's Law of Cooling: $T - T_s = (T_0 - T_s)e^{-kt}$
6. Logistic Growth Model ($P =$ population, $M =$ carrying capacity)
 - a. Rate of change of a population is proportional to P and $M - P$: $\frac{dP}{dt} = \frac{k}{M} P(M - P)$
 - b. Population grows fastest when $P = M/2$
 - c. Particular solution: $P = \frac{M}{1 + Ae^{-kt}}$
7. Euler's Method
 - a. Used to approximate the solution curve for a differential equation
 - b. Assume $\frac{dy}{dx} = f'(x, y)$, $dx =$ step size
 - c. $y_{n+1} = y_n + f'(x_n, y_n)dx$

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