

**Beverly Hills High School -- AP Calculus BC -- Test #6a -- 100 points**

Be clear and neat in all your presentations. Leave the test examiner no excuse for not understanding exactly what you mean to get across to them. SHOW WHAT YOU KNOW. Most problems are ten points.

1) Find  $y = f(x)$  when  $f(1) = 5$  for  $2y - x \frac{dy}{dx} = -x^3$

2) Find  $y = f(x)$  when  $f(\frac{\pi}{2}) = 2\sqrt{2}$  for  $\frac{dy}{dx} = \cos 2x - \sin \frac{x}{2}$

Evaluate the following integrals as indicated:

3)  $\int_{\ln 2}^{\ln 4} t^2 e^{-2t} dt$

4)  $\int_{\pi/3}^{\pi} \frac{-3}{2} \cos^2 k \, dk$

5)  $\int 24x^5 e^{3x^6} \, dx$

- 6) Suppose \$10000 is invested in a money market account that pays 6.75% interest, compounded continuously.
- DERIVE the formula that computes the amount of money present in the account at  $t$  years from now.
  - Solve for the time  $t$ , in years, when \$50000 will be present in the account.

7) Evaluate the integral:  $\int \frac{-7}{\cot 4t} dt$

8) Show how  $\int e^x \sin x dx = \frac{1}{2}(e^x \sin x - e^x \cos x)$

9) Easy five points...show how we derive the expression for integration by parts, i.e.,  $\int u dv = uv - \int v du$  for two integrable functions  $u(x)$  and  $v(x)$ .

10) Fifteen points on this one. Evaluate the integral

$$\int \frac{5x^2 + 4}{x^3 - x^2 - 4} dx$$

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SCRATCH AREA -- Nothing here will be graded.