NAME_____

INSTRUCTIONS:

- WRITE YOUR SOLUTIONS ON THE EXAM PAGES.
- IF YOU NEED MORE SPACE, USE THE BACK OF A PAGE.
- YOU CAN REFER TO THE EQUATIONS BELOW.

REMINDERS:

- Euler's problem
  - Consider $A[\, y(x) \,] = \int_{x0}^{x1} f\,(\, y(x)\,,\, y'(x)\,;\, x\,)\, dx$
    - $y(x_0) = y_0$ and $y(x_1) = y_1$ are fixed
  - Find y(x) such that $\delta A = 0$.
  - The Euler-Lagrange equation, $\partial f / \partial y = (d/dx)\, \partial f / \partial y'$

- Lagrangian mechanics
  - $S[\, q[t] \,] = \int_{t0}^{t1} £(\, q(t)\,,\, dq(t)/dt\,;\, t\,)\, dt$
    - $q(t_0) = q_0$ and $q(t_1) = q_1$ are fixed
  - $£ = T - U$
  - Hamilton's principle $\delta S = 0$ implies

    $\partial £ / \partial q \;=\; (d/dt)\;\; \partial £ / \partial (dq/dt)$ (Lagrange's equation)