

Name: \_\_\_\_\_

4 Digit PIN: \_\_\_\_\_

Score: \_\_\_\_\_

**Instructions:** You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(4pts) Verify that  $u = \frac{1}{C-t}$  are solutions of the differential equation  $\frac{du}{dt} = u^2$ . Find the particular solution satisfying  $u(0) = 0.1$ .

2(3pts) Find the solution  $u(t)$  to the equation  $u'' = \cos t + t$  with initial conditions  $u'(0) = 0, u(0) = 1$ .

3(3pts) The direction field of a differential equation  $u' = f(t, u)$  is given. Sketch the solutions that satisfy (a)  $u(0) = 0$ ; (b)  $u(2) = 3$ .

