Name: ID #: Section #:

Q1) [**2pts**] Determine a region R of the xy-plane for which the differential equation $(1+y^3)y' = x^2$ has a unique solution whose graph passes through a point (x_0, y_0) in R.

Q2) [**4pts**] Solve the initial value problem $\sin 3x\ dx + 2y\cos^3 3x\ dy = 0, \quad y(0) = 1.$

Q3) [**4pts**] Find the general solution of the differential equation

$$(1+x)\frac{dy}{dx} - xy = x + x^2.$$

Give the largest interval I over which the general solution is defined.

Name: ID #: Section #:

Q1) [**2pts**] Determine a region R of the xy-plane for which the differential equation $(y-x)y' = y+x$ has a unique solution whose graph passes through a point (x_0, y_0) in R.

Q2) [**4pts**] Solve the initial value problem $(e^y+1)^2e^{-y}dx+(e^x+1)^3e^{-x}dy = 0, \;\; y(0) = 0.$

Q3) [**4pts**] Find the general solution of the differential equation

$$(x^2-1)\frac{dy}{dx} + 2y = (x+1)^2.$$

Give the largest interval I over which the general solution is defined.