1. (1 pt) The following differential equation is exact.
Find a function $F(x,y)$ whose level curves are solutions to the differential equation

$$y \, dy - x \, dx = 0$$

$F(x,y) =$

2. (1 pt) Use the “mixed partials” check to see if the following differential equation is exact.
If it is exact find a function $F(x,y)$ whose level curves are solutions to the differential equation

$$(-1x^3 + 3y) \, dx + (3x + 4y^3) \, dy = 0$$

$F(x,y) =$

3. (1 pt) Use the “mixed partials” check to see if the following differential equation is exact.
If it is exact find a function $F(x,y)$ whose level curves are solutions to the differential equation

$$(1xy^2 + 1y) \, dx + (1x^2y + 1x) \, dy = 0$$

$F(x,y) =$

4. (1 pt) Use the “mixed partials” check to see if the following differential equation is exact.
If it is exact find a function $F(x,y)$ whose level curves are solutions to the differential equation

$$\frac{dy}{dx} = \frac{+1x^2 + 3y}{0x + 4y^2}$$

$F(x,y) =$

5. (1 pt) Use the “mixed partials” check to see if the following differential equation is exact.
If it is exact find a function $F(x,y)$ whose level curves are solutions to the differential equation

$$(2e^s \sin(y) + 2y) \, dx + (2x + 2e^s \cos(y)) \, dy = 0$$

$F(x,y) =$

6. (1 pt) Check that the equation below is not exact but becomes exact when multiplied by the integrating factor.

$$x^2y^3 + x(1 + y^2) \, y' = 0$$

Integrating factor: $\mu(x,y) = 1/(xy^3)$.

Solve the differential equation.

You can define the solution curve implicitly by a function in the form

$F(x,y) = G(x) + H(y) = K$

$F(x,y) =$

7. (1 pt) Find an explicit or implicit solutions to the differential equation

$$(x^2 + 1xy) \, dx + x \, dy = 0$$

$F(x,y) =$