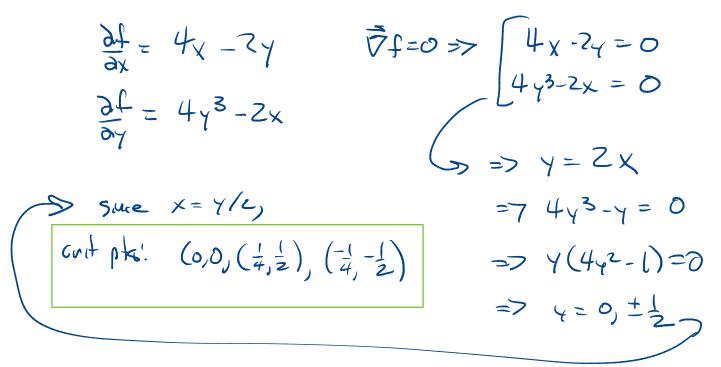
Name: Solutions

1. Find all critical points of

$$f(x, y) = 2x^2 + y^4 - 2xy.$$



2. One of the critical points you found should have y > 0. Determine if this point is a local minimum, local maximum, or saddle.

$$f_{xx} = 4 \quad f_{xy} = -2 \quad f_{yy} = 12y^{2}$$

$$f_{xx} = 4 \cdot 12y^{2} - (-2)^{2} = 48y^{2} - 4$$

$$y = 1/2 \Rightarrow 7 \quad f_{y} = 12 - 4 = 8 > 0$$

$$= 7 \quad \text{max/m.ln.}$$

Since fix 20 =7 mm.

3. Use the method of Lagrange multipliers to minimize

$$f(x,y) = xy$$

subject to the constrant

$$g(x, y) = x + 2y = 5.$$

$$\nabla f = \langle Y, x \rangle$$

$$V_g = \langle 1, 2 \rangle$$

$$\nabla f = \lambda \nabla g = \gamma \qquad \gamma = \lambda$$

x = 2

(onstruct:
$$x + 2y = 5 = 72\lambda + 2\lambda = 5$$

=7 $\lambda = 5/4$

$$=> Y = 5/4, x = 5/2$$

max at
$$(5/2, 5/4)$$

mux value $5/2 \cdot 5/4 = \frac{25}{8}$