

Help is legal.

Section \_\_\_\_\_

1. Extreme points can only occur at critical points, points where both  $f_x$  and  $f_y$  are 0.

Show  $f(x, y) = xe^{-xy}$  has no critical points and so has no extreme points as follows:

i) Find  $f_x$  and  $f_y$ .

ii) Solve  $f_y = 0$ . In that case, what is  $f_x$ ?

2. Find and classify the critical point of

$$f(x, y) = -3x^2 + 3xy - 4x - y^2 - 5y + 100$$

3. Find and classify the critical points of  $f(x, y) = -x^4 + xy^2 - 4xy$ .  
Show all work.