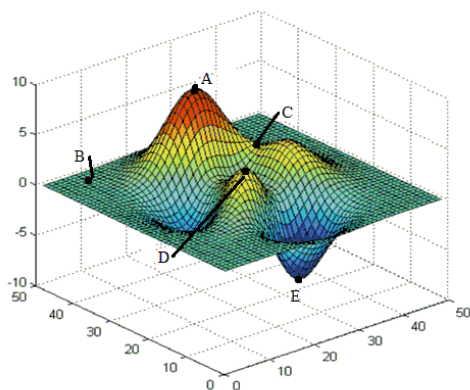


234 Quiz 6-15 minutes

Section:

Name:

1. (7) (a). In the figure below, $B(8, 42, 0)$ and for all $(x, y), x \leq 8, y \geq 42$, the function value is 0 (namely the function is all zero on the left-upper corner of B). For points A, B, C, D, E , classify them into local maxima, local minima and saddle points (Hint: a global maximum is definitely a local maximum).



(b). Suppose the gradient of f exists everywhere. Mark true or false for the following. No need to explain.

- If $\nabla f(a, b) = 0$, (a, b) is either a local maximum or a local minimum.
 - If f achieves the global maximum at (a, b) , $f_x(a, b) = 0, f_y(a, b) = 0$.
 - If f achieves the global minimum at (a, b) which is an interior point, then $\nabla f(a, b) = 0$.
 - If (a, b) is an interior local maximum and $(x(t), y(t))$ is a parametrized smooth curve so that $x(1) = a, y(1) = b$, then $g(t) = f(x(t), y(t))$ has a local maximum at $t = 1$ and $g'(1) = 0$.
2. (3) Find all critical points for $f(x, y) = xye^{-x-y}$.