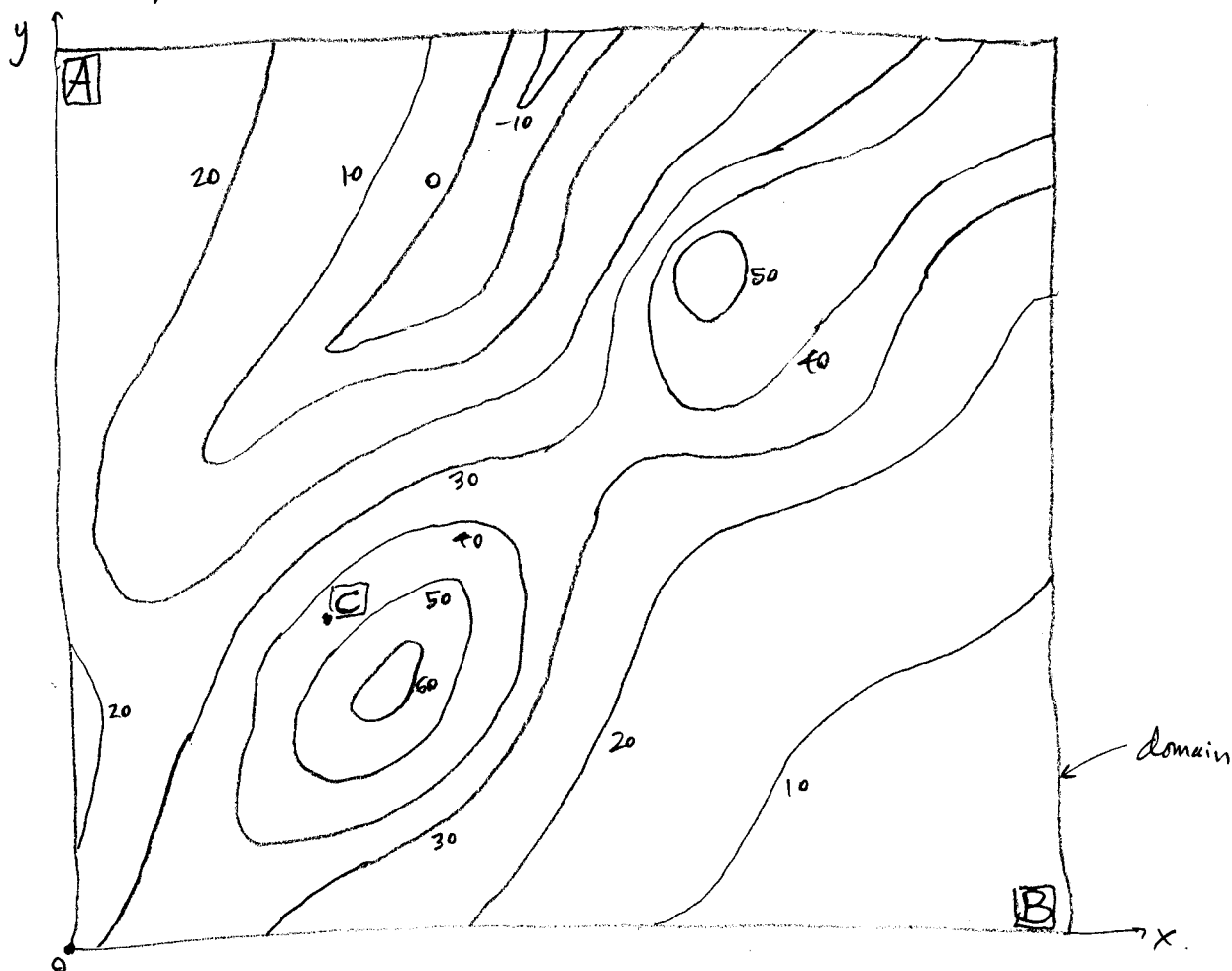


Barnett 11/9/04.

Contour plots



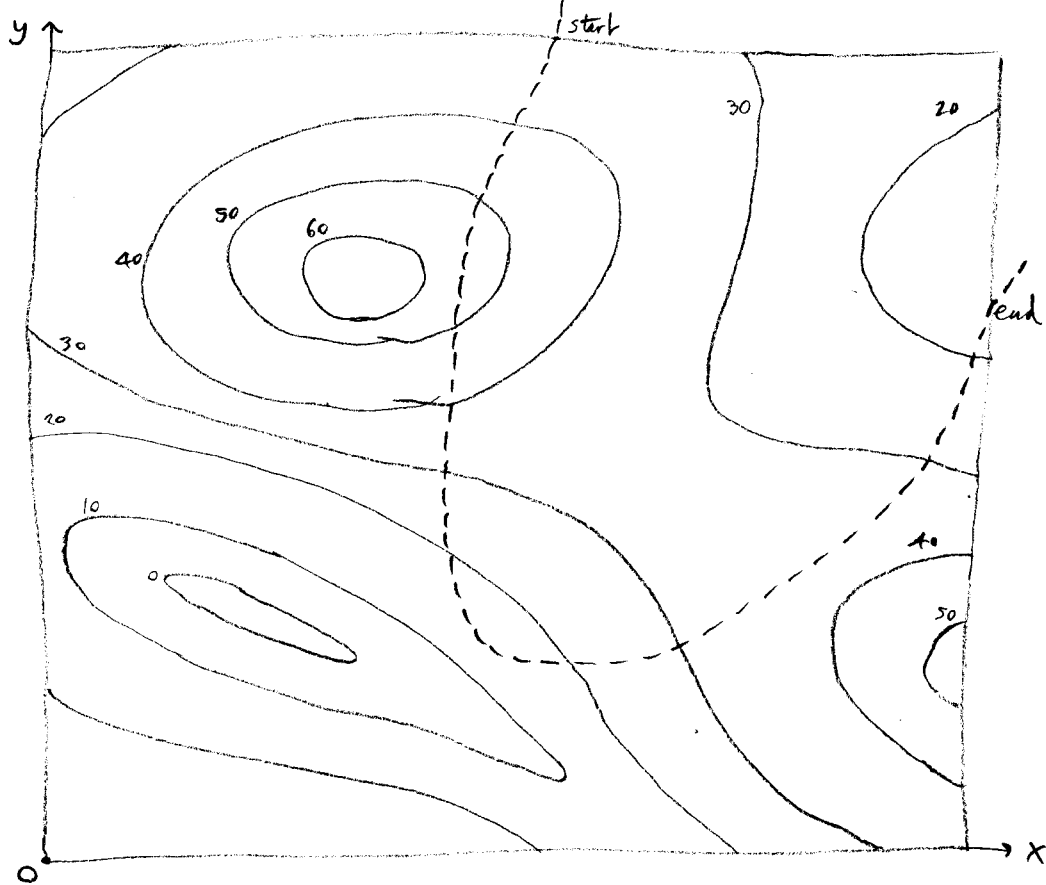
- * Where is absolute max. height? Estimate its value:
- * Where is absolute min. height? Estimate its value:
- * Show where terrain is steepest. & draw the 'uphill' direction there
- * Show where terrain is flattest.
- * How many local maxima are there? Label them.
- * Estimate height at point C:
- * Is there a locally flat place that is not a local max or min?
[Hint: there is a mountain pass from A to B - where do you stop climbing?]

Constrained Optimization — graphically only

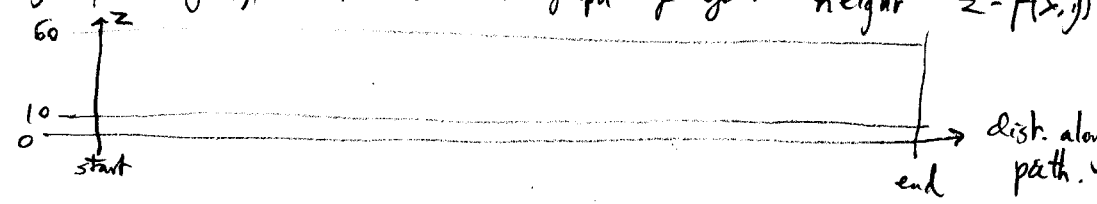
11/30/04
Barrett

Contours of $f(x,y)$:

constraint $g(x,y) = c$



Domain is
the square

- Label the absolute max & min of $f(x,y)$, unconstrained (ie in full domain)
- Imagine walking along 'path' $g(x,y)=c$. Sketch graph of your 'height' $z=f(x,y)$ along this path:

- Label the absolute max & min of $f(x,y)$ constrained to path $g(x,y)=c$.
- At the constrained extrema, how does the local direction of contour lines compare to the direction of the path? [Sketch closer contour lines to help].
- Are $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ zero at the constrained extrema?