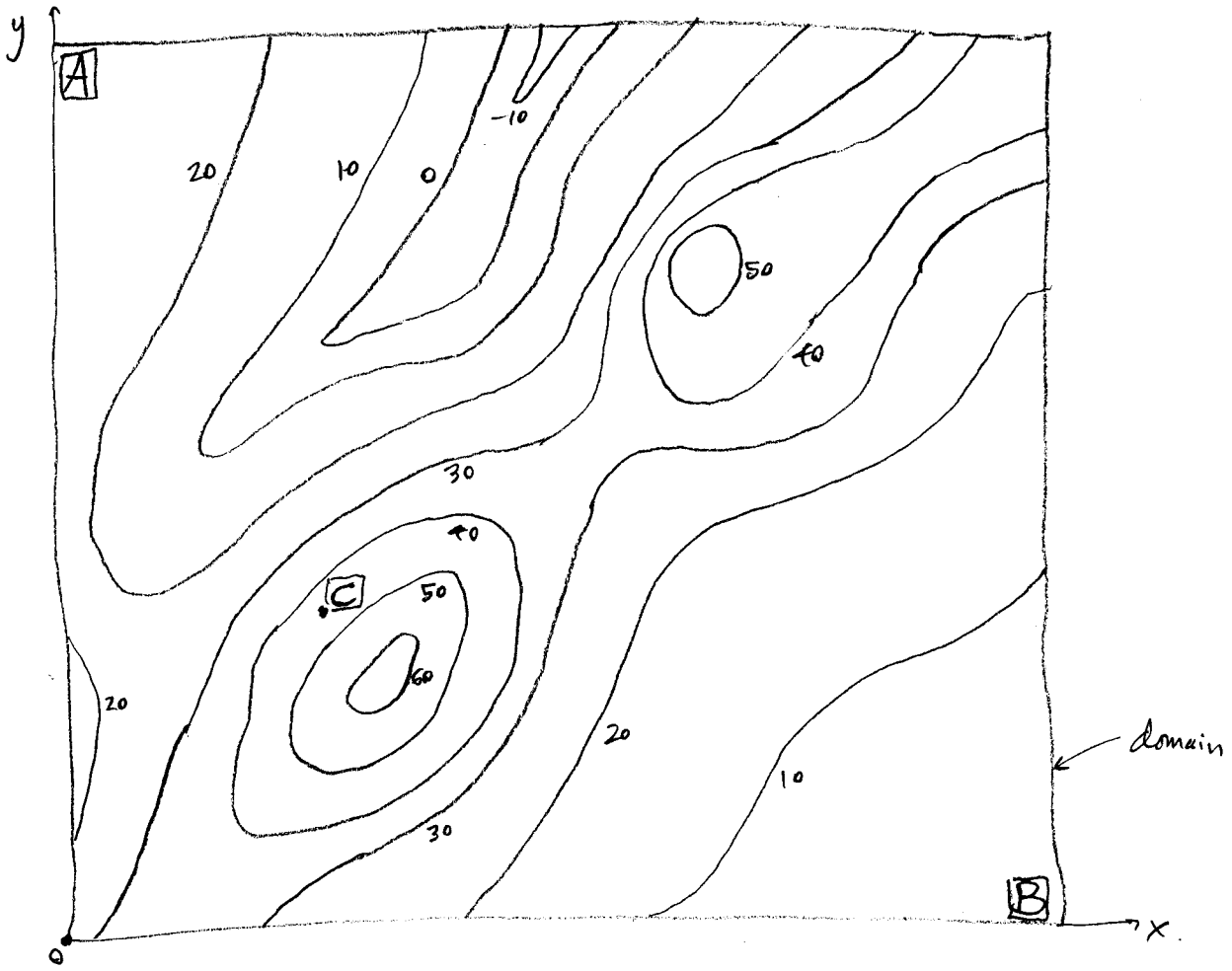
Barnett 11/9/04.

Contour plots

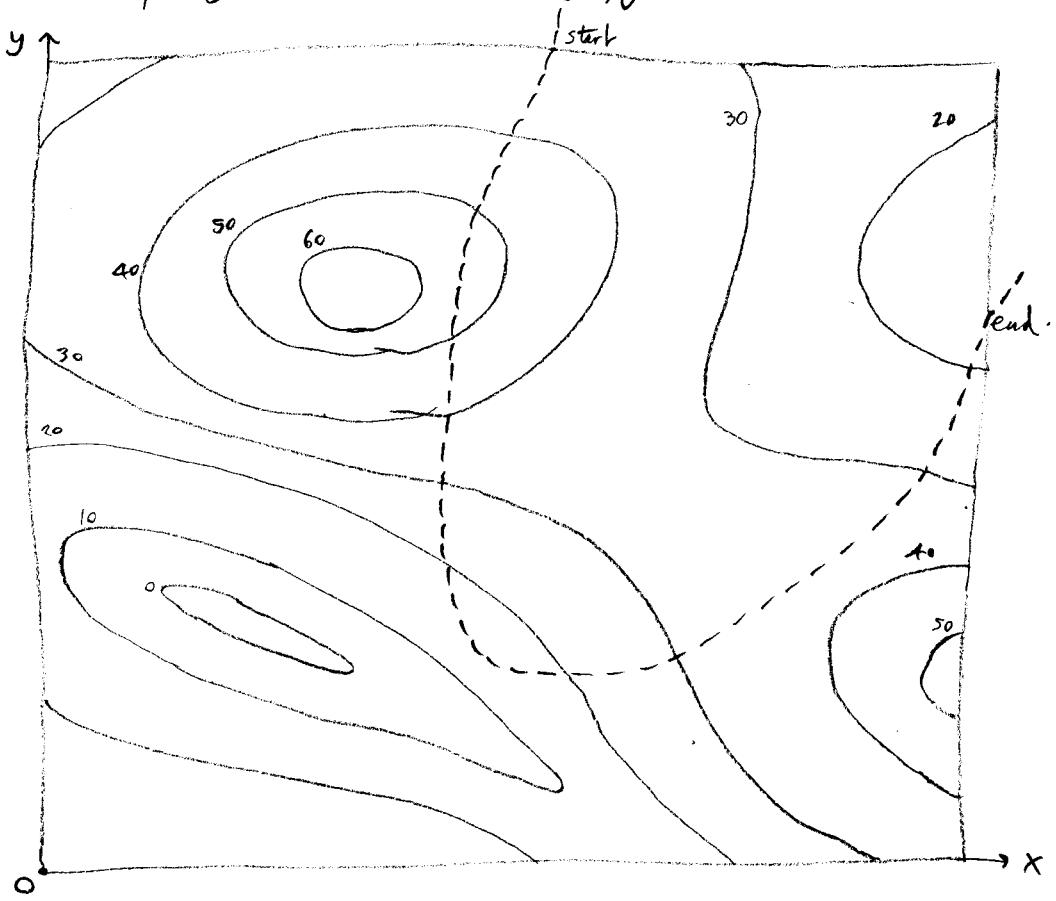


* Where is absolute max. height ? Estimate its value :
* Where is absolute min. height ? Estimate its value :
* Show where terrain is steepest & draw the 'uphill' direction there
* Show where terrain is flattest
* How many local maxima are there ? Label them.
* Estimate height at point C :
* Is there 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
Bandtlow

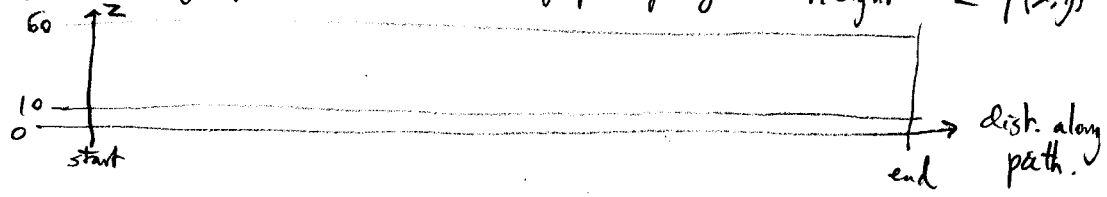
Contours of $f(x,y)$: constraint $g(x,y) = c$



Domain is the square

a) Label the absolute max & min of $f(x,y)$, unconstrained (ie in full domain)

b) Imagine walking along 'path' $g(x,y) = c$. Sketch graph of your 'height' $z = f(x,y)$ along this path:



c) Label the absolute max & min of $f(x,y)$ constrained to path $g(x,y) = c$.

d) 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].

e) Are $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ zero at the constrained extrema?