Homework #7
Solve Kepler's equation with Newton's method.

The Kepler equation is $M = E - e \sin E$, where M is the mean anomaly (linear in time), E the eccentric anomaly, and e the eccentricity. The distance from the sun is $r = a(1 - e \cos E)$. Use a reasonable criterion to decide how many iterations are necessary. Test the program with exact solutions. Use $e = 0.9671$, appropriate for Halley's comet. Calculate the time average of $(a/r)^2$, which the mean solar flux is proportional to. (This average can be obtained analytically, but the task here is to obtain it numerically.)

Exercise
(Not for credit, but a preparation for next week's homework.)
This is a quick familiarization exercise for one of the computational resources we have at IfA and for basic Linux.

Log into `node31`
`ssh username@node31.ifa.hawaii.edu`
The login credentials are the same as on `galileo`, and the home directory is the same as well.
Copy your program onto `node31`, e.g. with
`scp filename username@node31.ifa.hawaii.edu:`
The colon at the end indicates that the last argument is not a filename but a remote machine.
Run the program (here called `a.out`), redirect the output to a temporary file `tmp`, and send the job in the background with `&`
`a.out > tmp &`
Copy the output back to your machine.