Ashraful, Doghonay:

1. I will be away at the övning Wednesday. Please write on the board in Q17 so they (there were not many, around 15) go to Q22 or Q21 instead. I will inform students at lecture today
2. d:o, redovisning on thursday 15-17. I have added more slots. Note that the slots are 10 minutes but the bookings include .15 and .45 so the actual time for a group may not be exactly the booked time. There will be you two and Cem and Marco and I hope I can convince someone senior to preside too.

Themes:
Integrals, Extrapolation, Sensitivity (as usual)
EXS 6.1
Compute trapezoid rule results for h = 1,1/2, 1/4, 1/8 and extrapolate as far as possible.
Discuss why the once extrapolated values don't allow another extrap. (rounding errors)
Show that the errors (0.005 in B) dominate the error in the integral.

EXS 6.3 Mention EulerMcLaurin (book p 61) – be sure to explain the asymptotic nature of the series.

(EXS 6.4 – was shown in Lecture, don't do)

EXS 6.8
Show by integration by parts that the integrals converge as u -> infty. Note that the convergence is not absolute, the integrands do not vanish at t = infty!
Estimate C(infty)-C(N), compute C(infty) …
If time allows discuss the matlab code below to plot the Cornu spiral

x = C(u),y =S(u):

Can it be done smarter?
Mention that the Cornu spiral

xdot = cos(t2), ydot =sin(t2)

has the property that curvature is proportional to arclength. Pieces of Cornu were used in a Norwegian CADsystem "KURGLA" as basic curve elements, way back when, before NURBS.
Curvature = dfi/ds (fi = angle of tangent to curve)
fi = arctan(ydot/xdot),
xdot^2 + ydot^2 = 1
gives
curvature = ydotdot xdot – ydot xdotdot = cos t2 2t cos t2 + sin t2 sint2 2t = 2t
and since xdot^2 + ydot^2 = 1, t is arclength QED

```
% Cornu spiral
clear all
figure(1)
clf
fC = @(x) cos(pi*x.^2/2);
```

```
fS = @(x) sin(pi*x.^2/2);
n = 200;
ulist = linspace(0.1,6,n);
Clist = [0];
Slist = [0];
uold = 0;
for k = 1:n
    u = ulist(k);
    Clist = [Clist,Clist(end)+quadgk(fC,uold,u,'abstol',1e-8)];
    Slist = [Slist,Slist(end)+quadgk(fS,uold,u,'abstol',1e-8)];
    uold = u;
end
plot(Clist,Slist)
```

EXS 6.5, a) and c). For c, explain how to use Newton's method – the task is to find the t-value, i.e., solve non-lin equation. Use quadgk.