TMA4110, Fall 2012, Test 13, week 47

Exercise group number:

Name:

NTNU username:_____@stud.ntnu.no

You have 20 minutes to solve the 3 problems. Each problem is worth 10 points, and you need at least 15 points to pass the test. Your answers must be written on this sheet of paper (you can use additional sheets if you need more space for your answers). You are allowed to use a Citizen SR-270X or Hewlett Packard HP30S calculator, and Rottman's "Matematisk formelsamling", but no books or notes.

Problem 1   Let $A = \begin{bmatrix} 1 & -1 \\ 1 & 3 \\ 1 & -2 \end{bmatrix}$ and $\mathbf{y} = \begin{bmatrix} -1 & 4 & 3 \end{bmatrix}$.

Write $\mathbf{y}$ as the sum of a vector in $\mathrm{Col}(A)$ and a vector in $\mathrm{Nul}(A^T)$.

Problem 2   Find a QR factorization of the matrix $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 0 \end{bmatrix}$.

Problem 3   Find the equation $y = \beta_0 + \beta_1 x$ of the least-squares line that best fits the data points (2,3), (3,2), (5,1) and (6,0).