Homework 1, due Friday 1/20

1. p. 21, problems 1, 2, 4, 5, 7

2. Consider the line given by the equation $x = 1 + 2t, y = 2 - 3t$.
   
   (a) Determine whether the point (3, 5) lies on the line.
   
   (b) Sketch the line.

3. Let $P = (2, 3, -1)$ and $Q = (8, 6, -4)$. Check whether the point $R = (4, 4, -2)$ lies on the line segment $PQ$ or not.

4. p. 22, problems 13, 15, 20, 21

5. p. 36, problems 1, 3, 4, 11, 16, 17

6. Let $l$ be the line through $P = (2, 1)$ and $Q = (0, -3)$. Find the point $R$ on the line $l$ such that the vector $0R$ is orthogonal to the vector $v = (1, -1)$. More precisely, do the following steps:
   
   (a) Sketch $P, Q$ and $v$ (starting at 0). Also sketch $R$ in the picture.
   
   (b) Write down the equation of the line $l$, i.e. write down the points $(x, y)$ on the line in terms of the parameter $t$.
   
   (c) For a point $R = (x, y)$ on the line $l$ write down the vector $OR$.
   
   (d) Determine for which $t$ we have $v \cdot OR = 0$. 