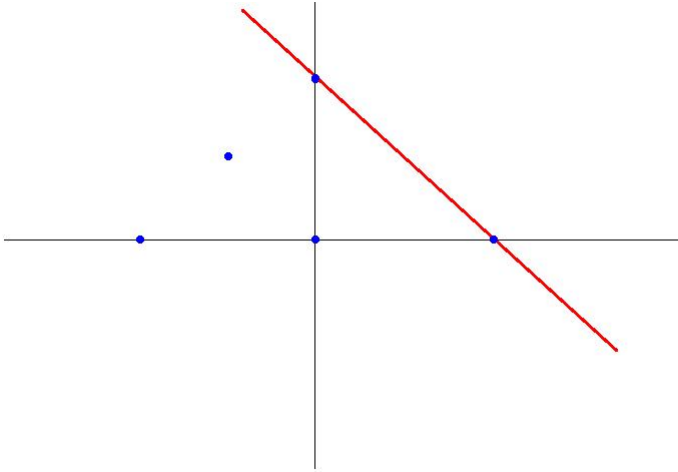


PROBLEM OF THE WEEK - FALL 2014 - WEEK 2

QUESTION 1

Say someone plots finitely many points x_1, x_2, \dots, x_n in the plane such that they don't all lie on the same line. Show that you can always find a line that passes through exactly two and no more points.

For example, in this plot, the blue points don't all lie on a common line, and we can find the red line which passes through exactly two of them:



QUESTION 2

Suppose there are four particles, a, b, c, d such that a is pursuing b at $0.1m/s$ likewise b is pursuing c at the same rate, c after d , and d after a . Furthermore, suppose that $\|a - b\|_2 = \|b - c\|_2 = \|c - d\|_2 = \|d - a\|_2 = 5$ meters. Compute the time it take for the four particles to collide and the arc length any one particle traverses. The initial velocities are depicted below. (Hint: the velocity is a function of position and is constantly being updated)

