Question:

Sketch the parabola $y = x^2$ and the line y = 2x - 1.

a) Show that (1, 1) is the only point where the parabola and the line intersect.

b) From the sketch, find another line that passes through (1,1) and intersects the parabola only at one point (1,1).

c) Show that any line containing (1, 1), other than y = 2x - 1 and the line in (b), must intersect the parabola in some point besides (1, 1).

Suggestion What condition guarantees that the line y = mx + b contains the point (1,1)? What condition guarantees that the quadratic equation $x^2 = mx + b$ has only one root?