To show that two perpendicular lines, neither of which is vertical, have slopes with a product of −1, go through the following steps. Let line 𝐿1 have equation 𝑦=𝑚1𝑥+𝑏1, and let 𝐿2 have equation 𝑦=𝑚2𝑥+𝑏2, with 𝑚1>0 and 𝑚2<0. Assume that 𝐿1 and 𝐿2 are perpendicular, and use right triangle 𝑀𝑃𝑁 shown in the figure. Prove each of the following statements:

a) 𝑀𝑄 has length 𝑚1

b) 𝑄𝑁 has length −𝑚2

c) Triangles 𝑀𝑃𝑄 and 𝑃𝑁𝑄 are similar.

d) 𝑚1:1=1:−𝑚2 and 𝑚1𝑚2=−1

