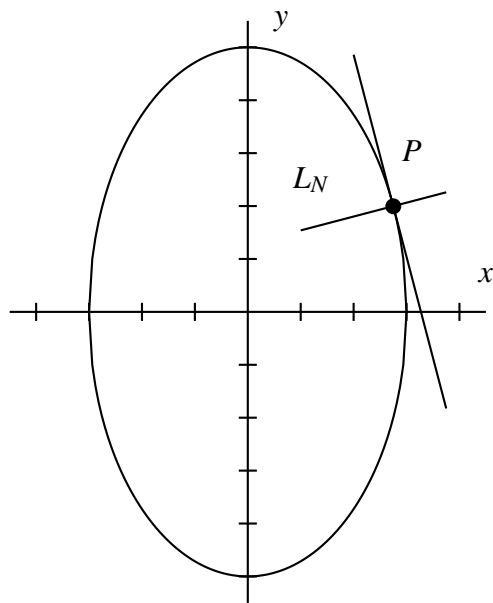


**Mathematics 124E, 124G**  
**bonus problem, due November 26**

Here is the equation of an ellipse:  $x^2/9 + y^2/25 = 1$ . Consider a point  $P$  lying on the ellipse in the first quadrant. Let  $L_N$  be the “normal line” through  $P$ . That is,  $L_N$  is the line through  $P$  which is perpendicular to the tangent line at  $P$ . Let  $x_N$  be the  $x$ -intercept of the normal line, and let  $y_N$  be its  $y$ -intercept. As  $P$  goes from  $(3,0)$  to  $(0,5)$ , how do  $x_N$  and  $y_N$  behave?

First make a guess as to their behavior, just based on the picture and your intuition. Then use calculus to solve the problem. [It’s probably easiest to use implicit differentiation.]



As with the first extra-credit problem, you may hand in joint work, collaborating in groups of at most four. In addition to your names, please include the section for each collaborator.