

**Problem 6)**

a) 
$$D = 4N\sqrt{(p/4)^2 + A^2} = \sqrt{(Np)^2 + (4NA)^2} = \sqrt{L^2 + (4NA)^2} = L\sqrt{1 + (4NA/L)^2}.$$

b) With  $N$  kept constant, when  $A \rightarrow 0$ , the above formula indicates that  $D \rightarrow L$ .

c) With  $NA$  kept constant, when  $A \rightarrow 0$  while  $N \rightarrow \infty$ , the distance  $D$  remains constant, as given by the expression obtained in part (a). The value of  $D$  is thus seen to be independent of the specific choices of  $A$  and  $N$ ; it is only a function of  $L$  and of the product  $NA$ , and it is always greater than  $L$ . If  $NA$  happens to be much greater than  $L$ , then  $D \cong 4NA \gg L$ , despite the fact that the drunkard keeps very close to the straight line and always moves forward.

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