Physics 20 Lesson 8H Derivation Assignment

While falling asleep one night, Dr. L. thought that his honors students were not having enough fun in Physics 20. Then it came to him, an epiphany from out of the blue. Why not try deriving an equation using the three kinematics equations the students have already learned. He knew that the honors students would be euphoric with the idea of this fantastic challenge.

So here it is:

Derive the fourth equation

$$v_f^2 = v_i^2 + 2ad \qquad \text{(eq. \#4)}$$

Using only

$$a = \frac{v_f - v_i}{t} \qquad \text{(eq. \#1)}$$

$$d = \frac{v_f + v_i}{2} t \qquad \text{(eq. \#2)}$$

$$d = v_i t + \tfrac{1}{2} a t^2 \qquad \text{(eq. \#3)}$$

*Note: There are three possible solutions – get them all. Good luck, and have fun!