

### Answer on Question #51360-Physics-Mechanics-Kinematics-Dynamics

Two trains, each having a speed of  $38 \frac{km}{h}$ , are headed at each other on the same straight track. A bird that can fly  $76 \frac{km}{h}$  flies off the front of one train when they are 76 km apart and heads directly for the other train. On reaching the other train it flies directly back to the first train, and so forth. (We have no idea why a bird would behave in this way.) What is the total distance the bird travels?

#### Solution

The easiest way to think about and do this problem is to note that the bird flies at a constant speed for the entire time that the trains travel until colliding. The distance the bird travels is thus

$$d = vt = 76 \frac{km}{h} t.$$

We need to compute the time that the trains run before colliding. By symmetry, we can argue that the trains will collide in the middle, at  $\frac{76 km}{2} = 38 km$ . The time to collision is easy to compute - it's just the time for either time to travel 38 km, which is 1 hour. Now that we know how long the trains will run, we can see that the distance the bird will travel is

$$d = 76 \frac{km}{h} \cdot 1h = 76 km.$$

**Answer: 76 km.**