A MATHEMATICIAN AT PLAY

# OVERCOMING OBSTACLES, the mathematical way

**Be it in studies, work or life in general, we are often confronted with hurdles, which seem insurmountable to begin with. We then put our heart and soul into it in order to figure out a suitable solution. Daniel Finkel has two puzzles this week that are based on such interruptions. Will you be able to crack them?**

Cognitive science has a lot to say about the value of focus, and the cost of interruptions. We get a call or text while working, and then we're unable to pick up the thread of our thoughts.

I've got two classic puzzles today involving similar kinds of interruptions. Something is going somewhere, but things are in the way, or the path gets fractured. In both cases, there is an observation that will help make the solution graspable despite the obstacles.

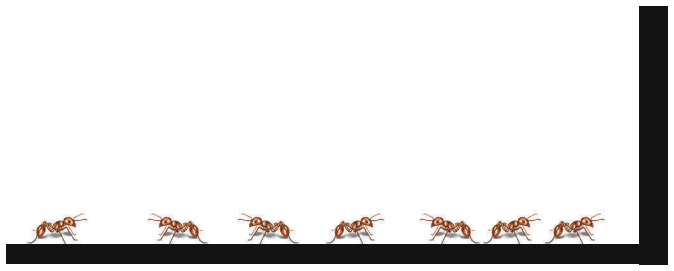
## PUZZLE 1

Two trains are heading toward each other from a distance of 1km apart, both going 30km per hour. A hummingbird leaves from the front of one train going 60km per hour. When it reaches the other train, it turns around without missing a beat, and heads back to the first train, still going 60km per hour. It keeps zig-zagging back and forth between the two trains until the moment they pass each other.

How far did the hummingbird travel?

## PUZZLE 2

There are 100 ants crawling along the edge of a metre-long side-walk leading to a wall. Each ant is crawling at the same speed, 1 metre per minute. However, some of the ants are crawling toward the wall, and some are crawling away from the wall.



When any ant meets an obstacle, be it a wall or another ant, it immediately turns around and crawls the other direction. How long will it take before all of the ants have crawled off of the side-walk?

**Dan Finkel is the founder of Math for Love, an organisation devoted to transforming how math is taught and learned. He is the creator of mathematical puzzles, curriculum, and games, including the best-selling Prime Climb and Tiny Polka Dot.**