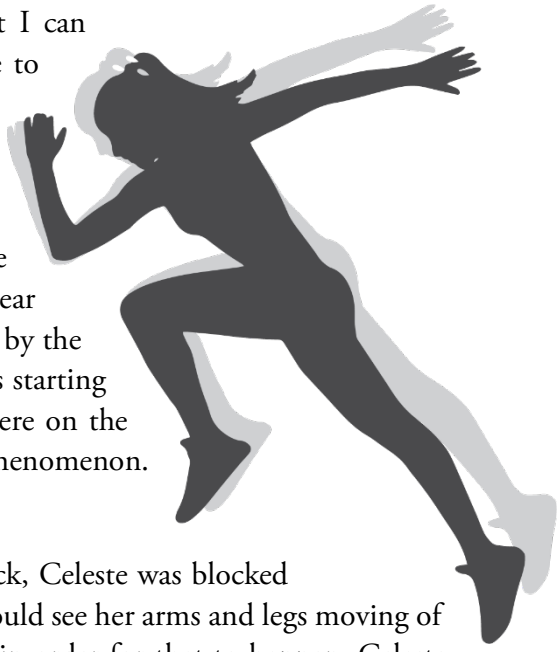
# Invisible Runner

The Challenge Zone



I like going to my friend Celeste's track meets so that I can support her. I think her parents work so they're unable to come to the meets. She is soo fast… much faster than I could ever dream of being even if I was being chased by a tiger.

For one of Celeste's meets, I stood about 2 m from the east edge of the track to watch her run the 400. I was near the 50-yard line of the football field that was surrounded by the track. It was a standard eight-lane track, and Celeste was starting on my side of the track in lane 6. When the runners were on the west side of the track, I observed an interesting math phenomenon. I'm like that; I see math everywhere.

Along the entire length of the straight section of the track, Celeste was blocked almost completely from my view by the girl in lane 2. I could see her arms and legs moving of course, but I couldn't see her body at all. I figured that in order for that to happen, Celeste had to be running faster than her opponent in the closer lane. I took note of all this and watched Celeste take first in the race and later first in the 4 x 400 relay. I figured out the math part later at home.

1. How much faster was Celeste running than the girl in lane 2?

2. If Celeste maintained this speed difference throughout the race, by about how much time would she beat the opponent in lane 2?