Winter/Spring 2010
MATHCOUNTS Newsletter Poster Problem

Wanting some exercise, Alli decides to swim from the tree to the boulder and back. From the point where Alli enters the stream (at the tree) to the point downstream where Alli turns around (at the boulder) it is 0.5 miles. When swimming back from point B to point A, Alli is swimming against the current which is moving at a rate of 2 miles per hour. If Alli's swimming speed (in still water) is 3 miles per hour on both the trip from point A to point B and on the trip from point B to point A, how many minutes will the entire trip take Alli?

Solution

Alli is swimming at a rate of 3 mph (in still water). When swimming from the tree (point A) to the boulder (point B) Alli is going with the 2 mph current, which means her actual rate, r, is 3 + 2 = 5 mph from point A to point B. We are told that the distance, d, from point A to point B is 0.5 mi. We can substitute $d = 0.5$ and $r = 5$ into the equation $d = rt$ and solve for t. So, $0.5 = 5t$ and $t = 0.5/5 = 0.1$ hour. This is equivalent to 0.1(60) = 6 minutes. Now on the way back from the boulder (point B) to the tree (point A) Alli is swimming against the 2 mph current which means her actual rate, r, is 3 – 2 = 1 mph from point B to point A. The distance is still 0.5 mi so we have $0.5 = 1t$ and $t = 0.5/1 = 0.5$ hour. This is equivalent to 0.5(60) = 30 minutes. Therefore, the entire trip from the tree to the boulder, then back to the tree will take Alli 6 + 30 = 36 minutes.