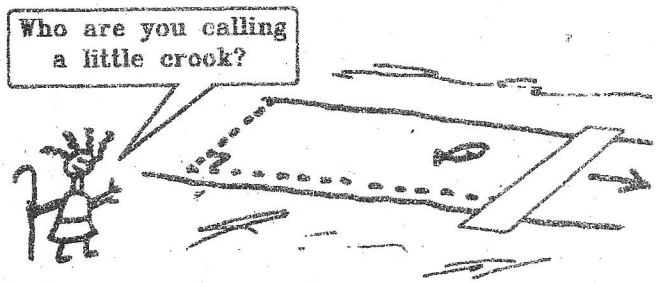
SIN Relative Velocity Problems

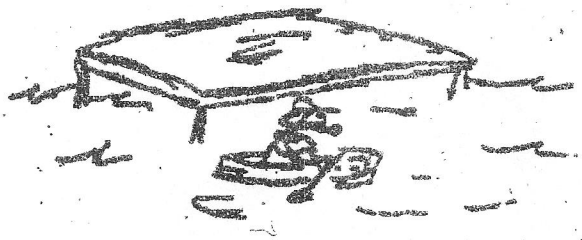
84-10. Little Bo Peep has trained her sheep to always swim at a constant speed of 2.5 m/s through the water. She has two of them beside a straight river flowing downstream with a steady velocity of 1.5 m/s. The two sheep jump into the water at the same time and swim away. One sheep swims directly downstream to a bridge located 500 m from the starting point. He immediately turns around and swims back to Bo Peep. The other sheep swims in a direction such that she moves in a straight line across the river to a point directly opposite her starting point (see sketch). She immediately turns and swims back to Bo Peep, once again tracing a path over the river bottom that is perpendicular to the shore. If both sheep arrive back at the same time, how wide is the river? (Answers in m.)

(A) 410
(B) 500
(C) 630
(D) 780
(E) 1300



93-4. Popeye the Sailorman works on a square offshore oil drilling platform, 100 m on each side, which is supported above the water surface by thin posts. Every day he rows a small boat around the outer edge of the platform, always maintaining the same speed with respect to the water and turning the corners in negligible time. It takes him 13 minutes and 20 seconds to complete one lap around on a calm day with no water current flowing. One day there is a tide flowing at 0.2 m/s parallel to one side of the platform. How long does it take for him to row one lap? Answers in minutes and seconds (m,s).

A) 12 m 47s
B) 13 m 20 s
C) 14 m 13 s
D) 15 m 13 s
E) 15 m 47 s



This isn't a SIN question but it's still a good challenge....

A pilot wishes to fly from Toronto to a small town which is 500 km away at a bearing of 40 ° east of north. The plane can travel at an air speed of 400 km/h relative to still air. The wind speed is 50 km/h from the west. Find the heading the pilot must take and the plane's resultant speed relative to ground.

A. Heading is [34 ° E of N] and the resultant ground speed is 370 km/h
B. Heading is [55 ° N of E] and resultant ground speed is 430 km/h
C. Heading is [45 ° E of N] and the resultant ground speed is 434 km/h
D. Heading is [45 ° E of N] and the resultant ground speed is 366 km/h

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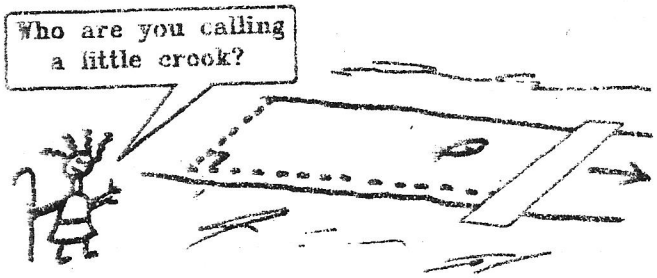

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