Problem of the Week

Problem C and Solution

See You No More

Problem

Two boats are travelling away from each other in opposite directions. One boat is travelling east at the constant speed of 8 km/h and the other boat is travelling west at a different constant speed.

At one point, the boat travelling east was 200 m east of the boat travelling west, but 15 minutes later they lose sight of each other.

If the visibility at sea that day was 5 km, determine the constant speed of the boat travelling west.

Solution

We will call the boat travelling east Boat $A$, and the boat travelling west Boat $B$. Boat $A$ is travelling at a constant speed of 8 km/h.

Using the formula, distance = speed $\times$ time, in 15 minutes Boat $A$ will travel

$$8 \text{ km/} h \times \frac{15}{60} \text{ h} = 2 \text{ km}.$$ 

The visibility at sea is 5 km. Thus, Boat $A$ and Boat $B$ will be in sight of one another until they are 5 km apart. We are given that Boat $A$ and Boat $B$ are in sight of one another for 15 minutes. Thus, after 15 minutes Boat $A$ and Boat $B$ must be 5 km apart.

Since Boat $A$ and Boat $B$ start out 200 m = 0.2 km apart and Boat $A$ travels 2 km in 15 minutes, Boat $B$ must travel $5 - 0.2 - 2 = 2.8$ km in 15 minutes.

Since Boat $B$ travelled 2.8 km in 15 minutes, using the formula

speed = distance $\div$ time, Boat $B$ must have been travelling at a speed of

$$2.8 \text{ km} \div \frac{15}{60} \text{ h} = 2.8 \times \frac{60}{15} = 11.2 \text{ km/h}.$$ 

Therefore, Boat $B$ was travelling at a speed of 11.2 km/h.