

Two Trains – London to Liverpool

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This is another train puzzle from H. E. Dudeney, which is fairly straight-forward. ([1] p.12)

68.—THE TWO TRAINS – LONDON TO LIVERPOOL.

I put this little question to a stationmaster, and his correct answer was so prompt that I am convinced there is no necessity to seek talented railway officials in America or elsewhere. Two trains start at the same time, one from London to Liverpool, the other from Liverpool to London. If they arrive at their destinations one hour and four hours respectively after passing one another, how much faster is one train running than the other?



<https://www.jwjonline.net/pencil.php>

Solution

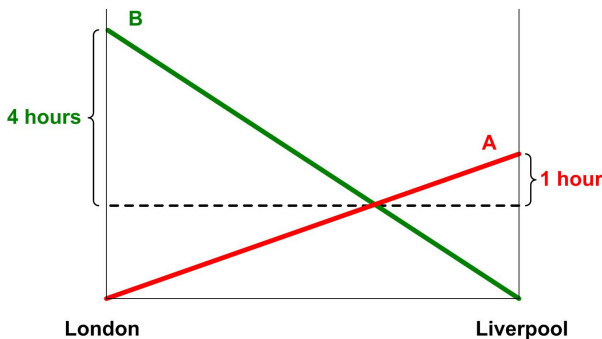


Figure 1 Problem Statement

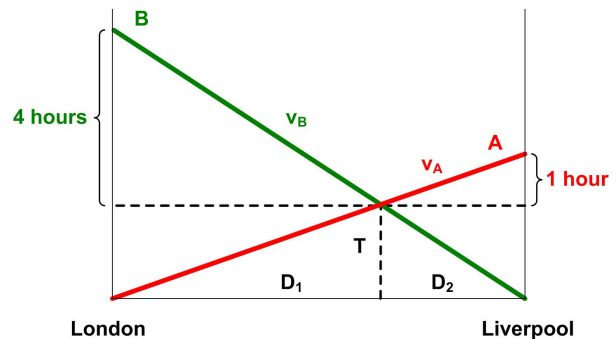


Figure 2 Problem Solution

Figure 1 represents the problem statement. Figure 2 shows definitions of variables from which we get the following relationships for the speeds of the two trains, v_A and v_B .

$$v_A = D_1 / T \quad \text{and} \quad v_B = D_2 / T$$

$$v_A = D_2 / 1 \text{ hr} \quad \text{and} \quad v_B = D_1 / 4 \text{ hr}$$

so

$$v_A / v_B = D_1 / D_2 = 4 v_B / v_A$$

which implies

$$(v_A / v_B)^2 = 4 \quad \text{or} \quad v_A = 2 v_B$$

Therefore the London to Liverpool train is going twice as fast as the Liverpool to London train.

References

[1] Dudeney, Henry Ernest, *Amusements In Mathematics*, 1917

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