Math Diversion Problem 874

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> Not only is the Universe stranger than we think,
> it is stranger than we can think.
> — Werner Heisenberg

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1 Problem

A distillate flows into an empty 64-gallon drum at spout A and out of the drum at spout B. If the influx at A is 2 gallons per hour, what is the outflux rate at B so that the drum is full in 96 hours?

2 Solution

This is a simple 'total is the sum of parts', except that that outflux rate gets a minus sign.

$$64 \text{ gallons} = (\text{contribution at } A) - (\text{contrary outflux at } B)\,. \tag{1}$$

$$64 \text{ gallons} = R_A T - R_B T = (R_A - R_B)T = (2 - R_B)96\,, \tag{2}$$

which as solution $R_B = 4/3$ gallons/hour.