

Provide a clear and organized presentation. Show all and simplify your work. Provide exact values only.

My cat *Pythagoras*, I mean ... my pet alien, *Euclid*, who is missing home, restructured my kitchen sink to look like how it is at home. He has installed two additional faucets in addition to the one I already had. One faucet supplies clean water at a rate of 1 mL/min, the second supplies water at a rate of 2 mL/min, but contains 0.1 g/mL of lemon oil, and the third supplies water at a rate of 3 mL/min, but contains 0.05 g/mL of lemon oil. He has put a stop plug at the drain, but it is defective and allows 2 mL/min of fluid to drain. How much lemon oil is in the sink at time t if the sink has a 300 mL capacity, is initially half full, and initially contains 5 g of lemon oil. Allow this experiment to run up to the time the sink fills.