2. Initially the tank contains 200-gallon of pure water. At time $t = 0$, a brine solution of 3 pounds of salt per gallon of water is added to the container at the rate of 4 gallons per minute, and the well-stirred mixture is drained from the container at the same rate. Find the number of pounds of salt in the container as a function of time.
3. At time \( t = 0 \), a 480 gallon tank is half full of a brine solution containing 2 pounds of dissolved salt per gallon of water. A brine solution of 1 pound of salt per gallon of water is pumped into the tank at the rate of 4 gallons per minute. The contents of the tank are kept uniform by stirring, and the resulting mixture is pumped out of the tank at 2 gallons per minute. How many pounds of dissolved salt are in the tank when the tank becomes full?
4. A 120-gallon tank initially contains 90lb of salt dissolved in 90 gal of water. Brine containing 2lb/gal of salt flows into the tank at the rate of 4 gal/min and the well-stirred mixture flows out of the tank at the rate of 3 gal/min. How much salt does the tank contain when it is full?
5. At time $t = 0$ the tank contains 50 gallons of brine with a concentration of 5 lbs. of salt per gallon. Pure water is added at the rate of 10 gallons per minute while the well-mixed solution is drained out, also at 10 gallons per minute. When does the tank contain exactly 100 lbs. of salt?