

Department of Mathematics and Statistics  
University of Calgary

AMAT 311 L01  
Fall 2006

**Quiz 3b**

Thursday, October 26, 13:00-13:50.  
Time: 30 min.

**Calculators are not allowed**

Name:.....

I agree that this paper may be placed at the front of the classroom for pick-up

Signature:.....

**Problem.** A tank initially contains 40 pounds of salt dissolved in 600 gallons of water. Starting at  $t_0 = 0$ , water containing  $\frac{1}{2}$  pound of salt per gallon is added at the rate 6 gallons per minute and the resulting mixture is drained from the tank at the same rate.

**a/ [3 marks]** Write a differential equation for the amount of salt  $Q$  as a function of time  $t$ .

**b/ [6 marks]** Solving the differential equation in a/ find  $Q(t)$ .

**c/ [3 marks]** Find  $\lim_{t \rightarrow \infty} Q(t)$ .