

**MA 16020 LESSON 8: DIFFERENTIAL EQUATIONS –  
SEPARATION OF VARIABLES  
(PROBLEM SET)**

**Example 1: Find the general solution of the differential equation:**

$$5x^3y + y' = 2x^3$$

**Example 2: A 800 gallon tank initially contains 700 gallons of brine containing 75 pounds of dissolved salt. Brine containing 4 pounds of salt per gallon flows into the tank at the rate of 4 gallons per minute, and the well-stirred mixture flows out of the tank at the rate of 1 gallon per minute. Set up a differential equation for the amount of salt,  $A(t)$ , in the tank at time  $t$ .**

**Example 3:** In a particular chemical reaction, a substance is converted into a second substance at a rate proportional to the square of the amount of the first substance present at any time,  $t$ . Initially, 50 grams of the first substance was present, and 1 hour later only 14 grams of the first substance remained. What is the amount of the first substance remaining after 7 hours?