Problem 1 (20 points): Mixture problem: A 200-gal tank is half full of distilled water. At time \( t = 0 \), a solution containing 0.5 lb/gal of concentrate enters the tank at the rate of 5 gal/min, and the well-stirred mixture is withdrawn at the rate of 3 gal/min.

1. At what time will the tank be full?

2. At the time the tank is full, how many pounds of concentrate will it contain?
Problem 2 (20 points): Find the order 3 Taylor polynomial at $x = 0$ for the following functions:

1. $e^{-x^2}$
2. $x^{10} + 4x^5 - 2x^3 + 1$