MTH 3311 Test #2
Spring 2023

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Instructions: Do any two of the exercises below for credit

1. Water at temperature $10°$ C takes 15 minutes to warm up to $20°$ C in a room at temperature $35°$ C

   (a) Find the temperature after 20 minutes

   (b) When will the temperature be $30°$ C?

2. A paratrooper and parachute weigh 240 lb. At the instant the parachute opens, he is traveling vertically downward at 40 $\frac{\text{ft}}{\text{sec}}$. If the air resistance varies directly as the instantaneous velocity, and the air resistance is 80 lb when the velocity is 20 $\frac{\text{ft}}{\text{sec}}$:

   (a) Determine the velocity at any time t.

   (b) Find the limiting velocity

3. The demand and supply of a certain commodity are given in terms of thousands of units, respectively, by:

$$D = 50 + 12p(t) + 2p'(t); \quad S = 450 - 8p(t) - 2p'(t).$$

   At $t = 0$, the price of the commodity is 40 monetary units.

   (a) Find the price at any later time and obtain its graph.

   (b) Determine whether there is price stability. If there is, determine the equilibrium price.