

MTH 3311 – Test #2

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Name _____

Directions: Do two of the three exercises.

1. A paratrooper and parachute weigh 160 lb. At the instant the parachute opens, she 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 100 lb when the velocity is $20 \frac{\text{ft}}{\text{sec}}$:

a) Determine the velocity at any time t .

b) Find the limiting velocity

2. Water at 35°F “heats up” in 30 minutes to 55°F in a room of temperature of 75°F .

a) Find the temperature of the water at time t .

b) Find the water temperature at $t = 60$ min

c) What is the temperature as $t \rightarrow \infty$?

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 units.

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

b) determine whether there is price stability and the equilibrium price if one exists.