Name: _____ Date: _____

Chapter 8 Unit 4 Project

Section 8.1

1. Two groups of ducks are leaving a field and heading for a water source 50 km away. The green-winged teals leave 25 min before the canvasback ducks. Green-winged teals fly at a speed of 48 km/h.

    a) How far do the green-winged teals fly during the 25 min?

    b) Canvasback ducks fly at a speed of 115 km/h. The distance, d, in kilometres, travelled by each species is related to time, t, in hours, by the following equations:

    Green-winged teals: $d = 48t + 20$

    Canvasback ducks: $d = 115t$

    What does time, $t = 0$ represent? Justify your answer. Then, sketch a graph of the system of linear equations.

    c) Use the graph to describe the trip to the water source for the two groups of ducks. Explain your reasoning.

Section 8.2

2. The Benoit family is deciding whether to replace their conventional shower head with a low-flow model. Their current shower head uses 170 L of water per 10-min shower. A typical low-flow shower head costs $25 to purchase. It uses 85 L of water per 10-min shower. Heating the water with electricity costs approximately $0.002 per litre.

    a) If n represents the number of 10-min showers, write an expression for the cost of n showers using their current shower head.

    b) Write a system of linear equations to represent the cost of showering using each type of shower head.

    c) Graph the system of linear equations.

    d) What is the solution to your linear system? What does it represent?

    e) How would your solution change if each shower was reduced to 8 min? Justify your answer with a graphical analysis.

3. A nearby wetland is estimated to have 100 ducks and 300 fish. A source of pollution seems to have contaminated the water. A local environmental group realizes that the number of ducks is decreasing at an average rate of 5 per year. The number of fish is decreasing at an average rate of 20 per year. Suppose the situation is considered critical if the number of fish equals the number of ducks in the area.

    a) Write a system of linear equations to represent the numbers of fish and ducks in the wetland. Create a graph of your system.

    b) Will the decreasing rates of fish and ducks become critical? If so, when? Justify your answer.