Parametric Functions Sample Work (Unit 6, Lesson 7)

Directions: Complete the following problems on a ***separate sheet of paper***. Be sure to show all of your ***handwritten*** mathematical steps. Scan your completed work or take a clear picture and submit through the Sample Work drop box link**. Note: Typed work will not be accepted. Your work must be handwritten**.

1. Explain how you would graph the following set of parametric equations by plotting points and describing the orientation.

$$x = t \text{ and } y = t^2 - 3$$

2. The following two sets of parametric functions both represent the same ellipse. Explain the difference between the graphs.

$$x = 2\cos(t) \quad and \quad y = 3\sin(t)$$

$$x = 2\cos\left(\frac{1}{3}t\right) \quad and \quad y = 3\sin\left(\frac{1}{3}t\right)$$

3. A relief agency drops food containers from an airplane on a war-torn famine area when the plane is half a mile from a village (1 mi = 5280 ft). The parametric equations that describe the horizontal & vertical position of the containers as a function of time are $x(t) = 330t$ and $y(t) = -16t^2 + 1000$. How long does it take the containers to reach the ground? If the agency wants the containers to land within 50 feet of the village, will they succeed?
Remember to show all of the steps that you used to solve the problem.

4. Orlando is launching yard darts at a velocity of 25 ft/sec at a height of 4 ft. and an angle of 55°. If his target is 20 ft away, how long should it take the dart to reach the target? Will the dart reach the target? Acceleration due to gravity is 32 ft/s^2. Round your answer to the nearest hundredth.