Mathematical Modeling Worksheet

Charlie has just developed the self-contained tabletop taffy factory! Each kit contains a taffy factory, 20 pounds of sugar, and an Oompa-Loompa. Now he has to figure out how much to charge for it. Here are the sales he managed in his London test markets:

Price (£)	300	350	400	450	500
Sales per week	103	89	75	55	48

1. Plot the data on the axes below and draw a line of best fit.

2. Use the line of best fit you drew in problem 1 to develop a mathematical model for the number of units sold per week at a given price. At what price will people stop buying taffy factories?

3. Now suppose the number of units sold per week is decaying exponentially in the price instead of linearly. Estimate the half-life, and use it to develop a mathematical model.

4. If the number of units sold per week is decaying exponentially, when will people stop buying them entirely? (This may be a trick question.)

5. Do you think the units sold decays exponentially or linearly? There is no correct answer to this – it's your justification that I'm interested in! You may find your answer to 4 helpful.