CAN YOU HEAR ME NOW?

Build a function that models a relationship between two quantities.

MMC9-12.5.BF.1 Write a function that describes a relationship between two quantities.

Understand solving equations as a process of reasoning and explain the reasoning.

MMC9-12.A.REI.6 Solve systems of linear equations exactly and approximately focusing on pairs of linear equations in two variables.

Problem: Compare and contrast the relationship between Cell phone and Residential services using the following data.
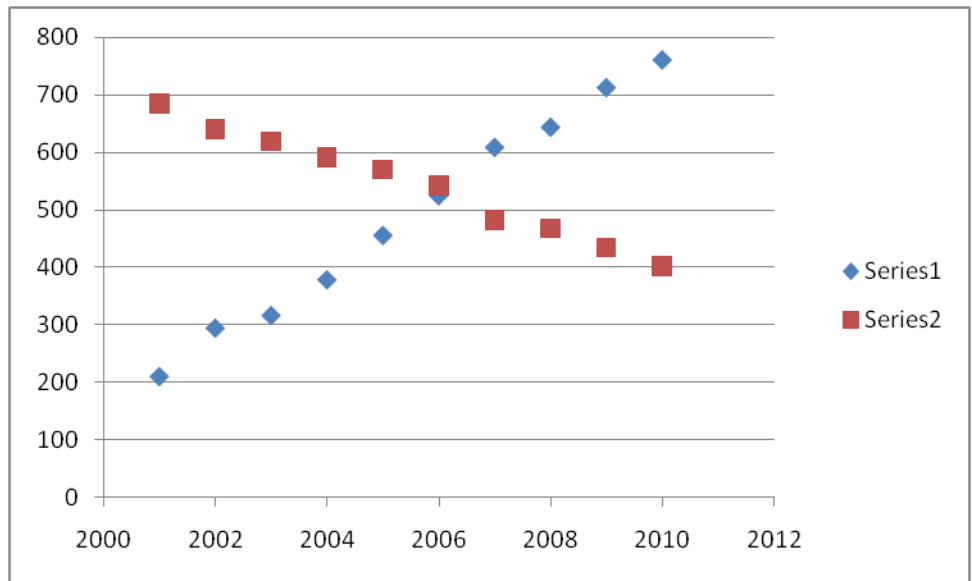
You have been asked to help prepare a report about cell phones and residential phone service usage. For the report a co-worker needs you to create a graph showing the cost of cell phone and residential service for a family. For the report your partner also would like to know equations that model each set of data. They would also like to know the point at which the cost of cell phone and residential are the same.

Year	Cell Phone Services (in dollars)	Residential Phone Services (in dollars)
2001	210	686
2002	294	641
2003	316	620
2004	378	592
2005	455	570
2006	524	542
2007	608	482
2008	643	467
2009	712	434
2010	760	401

1. Graph data using x=1 represent the year 2001:
   a) (year, cell phone service)
   b) (year, residential phone service)
2. Write an equation of the line (round to the nearest tenth) for:
   a) Cell phone service
   b) Residential phone service
3. Find the point of intersection for the two services (if possible).
4. Write a paragraph for the article comparing and contrasting the relationship between cell phones and residential services.

Solution:

Year	Cell Phone Services (in dollars) Series 1	Residential Phone Services (in dollars) Series 2
2001	210	686
2002	294	641
2003	316	620
2004	378	592
2005	455	570
2006	524	542
2007	608	482
2008	643	467
2009	712	434
2010	760	401

Cell Phone Equation
y = 61.6x + 141.1

Residential Phone Equation
y = -31.1x +714.7

Solving systems of equations:
61.6x + 141.1 = -31.1x + 714.7

Graphing Calc. Answers
(6.2, 522.3)

x = 6.2 (approximately)
y = 523.02 or 521.88 (NOTE: rounding errors are the possible cause for 2 answers)

Students may identify that the cell phone line shows a positive correlation between year and services and the other is a negative correlation (negative slope).

Lines intersect at an equilibrium point (where both phones have the same cost at that point in time (6.2 months and about $522).

Comments should include WHEN you might decided to select ONE or the other as their primary source for communication. At some point in time, you may have to change plans based on income.

Another statement may be the "convenience of use".