Introduction
An economic bubble occurs when a commodity (such as housing) is traded in high volumes at prices that exceed its intrinsic value. Prices and volume eventually rise to unsustainable levels and the bubble "bursts," with a sharp decline in both. The US housing bubble began to develop in 2000, peaked in 2005, and declined over the next three years. Currently, the market is recovering, but not at the growth rates of the early 2000's when the bubble was forming. With data from the National Association of Realtors (www.realtor.org) we explore the bubble and the burst, considering sales and median sale price of preexisting single family homes in four quadrants of the US from 2000 to 2013.

Sales
1. In the February 2014 Marketplace Money podcast, "This won't make you feel better about the housing recovery," reporter Sarah Gardner offers the following:

   Big picture: The U.S. housing market is recovering, but that recovery is weakening.

PodCast (2 minutes) http://www.marketplace.org/topics/economy/wont-make-you-feel-better-about-housing-recovery

a. Let \( S(t) \) represents the number of houses sold as a function of the year \( t \). (Circle one) According to Gardner's report, in February 2014, \( S(t) \) is increasing / decreasing, and \( S'(t) \) is increasing / decreasing.

b. Add points to the graph for 2014 and 2015 to show a recovering market for which the recovery is weakening.

c. To check that the sales level you chose do show a weakening recovery, estimate the average rates of change in sales for each interval below. To show a weakening recovery, the average rates of change should be positive / negative and should increase / decrease.

   between 2012 and 2013 | between 2013 and 2014 | between 2014 and 2015
Prices
2. In the January 2014 Marketplace Money podcast entitled, "What will the housing market look like in 2014?" Economist Svenja Gudell, director of economic research at Zillow, says she does not expect another housing crash. She says, "You have more banks selling their foreclosures and you have more people freed from being underwater [allowing them to sell without remaining in debt], so supply will increase."

Gudell says as housing supply increases, growth in home prices will slow. She predicts a 3% to 5 percent growth in 2014.

PodCast (2 minutes 17 seconds) http://www.marketplace.org/topics/economy/what-will-housing-market-look-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Median sale price of Preexisting homes in the US</th>
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<tbody>
<tr>
<td>2011</td>
<td>$166,100</td>
</tr>
<tr>
<td>2012</td>
<td>$176,800</td>
</tr>
<tr>
<td>2013</td>
<td>$197,100</td>
</tr>
<tr>
<td>2014</td>
<td></td>
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a. Let $P(t)$ represents the median home price as a function of the year $t$. (Circle one) When Gurdell asserts that growth in home prices will slow, she says $P(t)$ will be increasing / decreasing, and $P'(t)$ will be increasing / decreasing.

b. Find the percentage increase in median home prices in the US between 2011 and 2012, and between 2012 and 2013.

c. Give an example of a median price for 2014 that is consistent with Gudell's predicted 3 to 5 percent increase. Add your value to the table above. What is the percent increase for your prediction?

Reading the charts
3. Excel allows you to display two different vertical axes in the same chart. For example, the chart below shows the number of homes sold, plotted against the scale on the left, and the median sale price, plotted against the scale on the right.

Check your understanding:
Estimate the median sale price of existing homes in 2010 from the graph.

Estimate the number of sales of existing homes in 2010 from the graph.

What does the intersection of these two graphs (between 2003 and 2004) represent?