Monopoly™ Part 2

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Teacher Notes & Answers

7 8 9 **10** **11** 12

TI-Nspire™ | Activity | Student | 90 min

Introduction

Monopoly™ Part 1 looked at the trend in property prices as a player moves from GO. If the starting square (GO) is considered as the CBD, the trend is generally the opposite to what happens around most large cities. Given the timeless brilliance of the game, it is quite likely this was done on purpose. If the most desirable properties could be obtained on the very first roll of the dice, there would be a massive advantage to going first. Placing the more desirable properties further away from the start, combined with the advantage of acquiring all the properties from a single group, effectively eliminates any advantage of going first.

Experienced players know that rent is higher on more expensive properties, in much the same way as they are in real life. This is referred to as: "return on investment'. There is also a bonus (double mortgage value) associated with owning all the properties in a single group, even if there are no capital improvements such as houses or hotels. In this investigation you will explore which properties represent the best "return on investment" on the Monopoly board.

Equipment

- Monopoly Board
- TI-Nspire Calculator

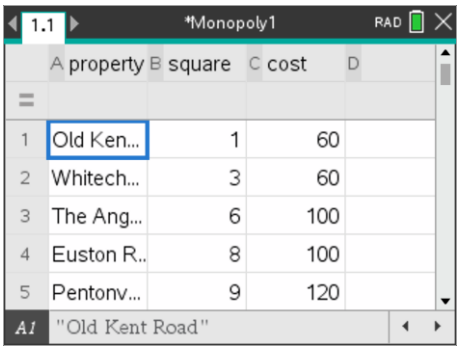
Instructions

Open your TI-Nspire document from Par 1 and navigate to the spreadsheet application. The spreadsheet should already contain the Property names, where they are on the board and the mortgage value.

Insert the following list names:

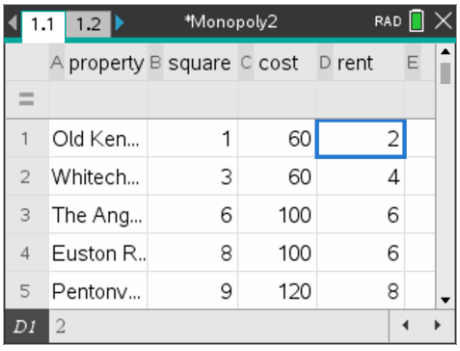
- Rent
- ROI [Return on Investment]

Save the file as: "Monopoly2"



Record the nominated RENT on each property card. House rentals are explored in Part 3.

Rental returns vary within property sets so make you match each card with the property title.



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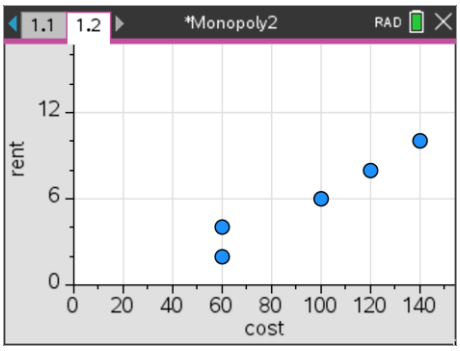
Question: 1.

Based on this initial data collection, are the any *obvious* variations in value?

Navigate to the Data & Statistics application and produce a scatter plot with ***cost*** on the independent (horizontal) axis and ***rent*** on the dependent (vertical) axis.

Data for the first couple of properties on the board is shown opposite, the axis have been adjusted using the Window Zoom option so as to include the origin.



Question: 2.

There are fewer visible points than there are properties in the complete scatterplot.

a) Explain why there are fewer visible points.

b) Explain why this might cause confusion (visually) when a *line of best fit* is added.

Question: 3.

Are there any properties that stand out?

Question: 4.

Determine the equation to the Least-Squares regression line.

Question: 5.

Explore the difference in actual RENT and estimated rent using your Least Squares regression, comment on the results.

Question: 6.

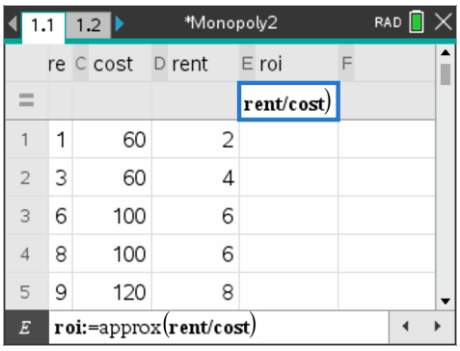
What is the meaning of the gradient for this Least-Squares regression line?

Navigate to the spreadsheet and add a new column of data: ROI [ROI = Return On Investment]

Insert a formula: = approx(rent/cost)

Note:

Variable names can be recalled without typing by using the VAR key.



Question: 7.

Determine the average (mean) return on investment (ROI) for the properties.

Question: 8.

Based on the ROI, which properties represent the best value for money? Explain

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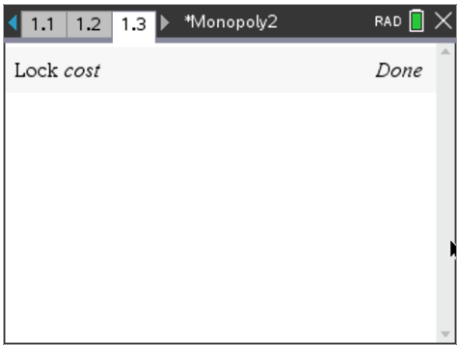
Use a calculator application to “lock” the cost variable.

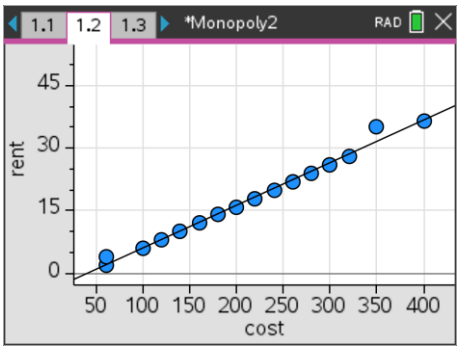
The next item under exploration is a revised rental value for the last two properties.



Navigate to the Data and Statistics application.

Use the navigation pad to grab the last property (Mayfair) and drag it until it sits nicely on the Least Squares regression line. You will notice that the line also moves as the calculator continues to re-evaluate.

Next, move the second last property (Park Lane) so it too falls on the Least Squares regression line. You may need to readjust Mayfair.



Question: 9.

Based on the new locations of these two properties, suggest a revised rental value for each to bring them ‘inline’ with other rental values.

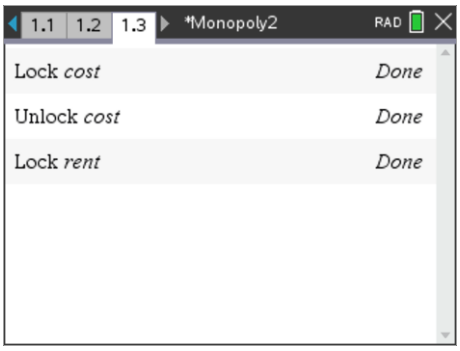
Question: 10.

Using the ROI calculations in the spreadsheet, what are your new values for the ROI for these two properties?

Navigate to Spreadsheet application and return the two rental values to their original amounts: $35 and $50.

Return to the Calculator application, unlock the COST list and lock the RENT.

It’s now time to ‘revalue’ the properties based on the rent.

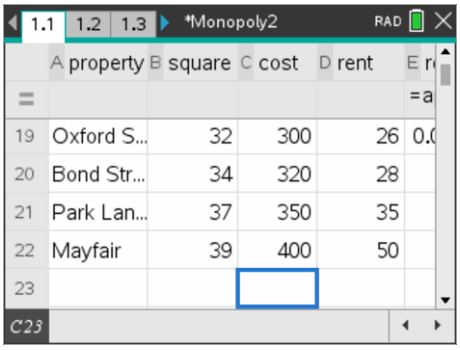


Question: 11.

Navigate to the Data and Statistics application and move the last two rental properties (changing their cost) until they fall onto the line of best fit. What price ‘should’ these properties be, based on the typical ROI, bringing them in line with the other properties?
Note: You will need to change the Window settings for the Data and Statistics application.

Navigate to Spreadsheet application and return the two property values to their original amounts: $350 and $400.

The RENT can now be unlocked.



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Investigation

Rental values are doubled when an entire property group is owned by a single player. Write a report, supported with data, graphs and calculations explaining which properties represent the best Return On Investment, based on the new rental values and total cost of the properties in each group.

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