Inspect
CCR Performance Tasks

Algebra I: Interpret Data

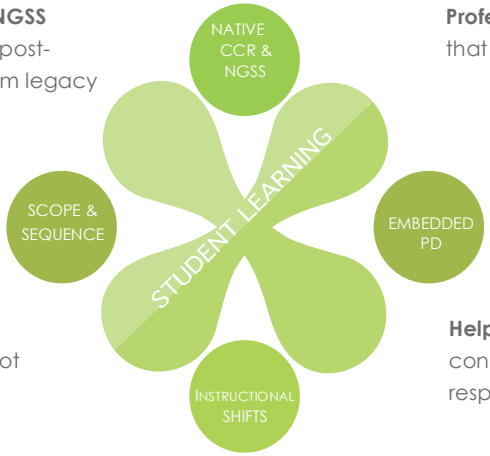
Inspect offers the following assessment products:

Content Bank for English/Language Arts and Math Grades 2 – High School	▪ More than 36,000 items ▪ More 1500 complex texts, including authentic permissioned texts ▪ Includes Literacy in History, Social Science, Science, and Technical Subjects
Quick Checks for English/Language Arts and Math Grades 2 – High School	▪ Fixed-form assessments with five to seven items including constructed response ▪ Key instructional concepts embedded in standards (clusters for Math, staircase of text complexity for ELA)
Focused Interim Assessments for English/Language Arts and Math Grades 3 – High School	▪ Prebuilt assessments with up to 15 items that focus on groups of related standards within a Claim or domain ▪ More focused than summative assessments ▪ Flexible and customizable ▪ Mirrors SBAC IAB blueprints
NGSS Formative Assessments Grades 5 – High School	▪ Prebuilt assessments with items linked to experimental contexts that assess the three dimensions of science learning ▪ Flexible and customizable ▪ Addresses the California Course Models and NGSS Bundles
Observational Tasks for English/Language Arts and Math Grades K - 1	▪ Developmentally appropriate for individual students and small groups

Inspect Assessment Content is available through a variety of assessment administration and data analysis platforms.

Inspect assessment content offers these benefits:

Native college- and career-ready and NGSS content prepares students to meet their post-secondary goals. Content re-aligned from legacy standards cannot do this.



Professional development embedded within content that

- shows the relationship between specific skills and higher-order thinking
- includes authentic, permissioned texts of appropriate complexity
- and documents student progress using DOK and learning progressions

Content that addresses your scope and sequence so that your assessments do not waste valuable instruction time

Help for teachers addressing the instructional shifts with content that elicits evidence of learning from each response

We constantly update our content. Ask us about what's new!

info@illuminateed.com **www.illuminateed.com**

CCR Performance Tasks

Algebra I: Interpret Data

Student Test Booklet

Name:

Student Rubric

This problem is meant to test if you can:
- Use technology to create scatter plots with lines of best fit;
- Use technology to calculate summary statistics and correlation statistics;
- Analyze data to look for correlations and trends;
- Construct a logical argument based on data to support a claim.

Your teacher will rate your answer as a level 4, 3, 2, 1, or 0. The descriptions below explain the types of answers expected at each level.

Level 4:
Your answer is correct and complete. Your answer includes:
- Correct and complete scatter plots with lines of best fit;
- A correct and complete analysis of the strength of the correlations among the graphed variables;
- A correct and complete argument that uses data, including calculated statistics, to support a claim.

Level 3:
Your answer is correct but one or two of your explanations are incomplete or you have made minor calculation mistakes. Your answer includes:
- Correct and complete scatter plots with lines of best fit;
- A correct analysis of the strength of the correlations among the graphed variables but the explanation may be incomplete;
- A correct argument that uses data, including calculated statistics, to support a claim, although the supporting argument may be incomplete.

Level 2:
You have answered one part correctly but your explanations are missing or weak. Your answer includes:
- Correct and complete scatter plots with lines of best fit, although you may need help to figure out how to create the scatter plots and lines of best fit;
- A partially correct analysis of the strength of the correlations among the graphed variables;
- A partially correct argument that uses data, including calculated statistics, to support a claim.

Level 1:
Your answers are incorrect. Your answer includes:
- Incomplete or incorrect scatter plots and lines of best fit;
- A vague, missing, or incorrect analysis of the strength of the correlations among the graphed variables;
- A vague, missing, or incorrect argument to support a claim.

Level 0:
Your answer is not related to the question, the teacher cannot understand your answer, or you do not write anything.

Name:_____

Algebra I: Interpret Data

Complete all the tasks in the test booklet.

1 **The table below shows some data about houses for sale in a beach town in California.**

Number	Area of House (in square feet)	Area of Lot (in square feet)	Year Built	Number of Bedrooms	Number of Bathrooms	Price (in dollars)
1	779	3,049	1918	2	2.0	479,000
2	1,247	5,042	2005	2	2.5	590,000
3	1,392	98,445	1921	2	2.0	1,995,000
4	1,718	6,098	1978	2	2.0	640,000
5	1,213	4,791	1961	3	2.0	699,000
6	1,095	11,325	1975	2	1.0	593,000
7	1,017	4,790	1949	2	1.0	530,000
8	1,960	55,321	1977	4	2.5	675,000
9	1,453	3,049	1998	3	3.0	849,000
10	2,934	42,688	2008	4	3.0	1,275,000
11	1,596	3,048	1988	3	2.5	549,000
12	1,131	10,454	1950	2	1.0	589,900
13	2,550	14,810	1977	3	2.0	999,999
14	1,688	3,919	1940	2	2.0	625,000
15	1,863	10,018	1975	3	2.0	535,000
16	1,738	3,049	1980	3	2.0	1,225,000
17	4,476	11,324	1860	5	3.5	1,250,000
18	1,841	4,356	2002	3	2.0	559,000
19	1,471	5,662	1994	3	2.0	525,000
20	1,730	6,403	1969	4	2.0	679,900
21	2,006	5,226	2002	3	2.5	539,000
22	956	5,227	1910	2	3.0	545,000
23	2,860	6,968	1976	6	3.5	1,249,000
24	1,850	4,791	1997	3	3.0	1,595,000
25	2,680	7,405	2000	4	3.0	2,195,000
26	1,692	9,582	1944	3	3.0	679,000
27	2,100	4,185	2006	4	2.5	899,000
28	2,524	3,132	2012	3	2.5	749,793
29	2,819	4,791	1996	4	3.5	1,689,000
30	1,842	10,018	1987	3	2.5	899,000

A. Create five scatter plots. Each plot represents how price relates to one of the other variables (i.e., house size, lot size, year built, number of bedrooms, and number of bathrooms). Include a line of best fit on each graph. Use a spreadsheet or other graphing technology to create the scatter plots and lines of best fit.

Go On

B. Which variable has the strongest correlation to the price of a house? Which variable has the weakest correlation to the price of a house? Use data from the scatter plots and relevant summary statistics to support your answers. You may use the spreadsheet, a calculator, or other technology to find relevant summary statistics.

Go On

C. Do any of the houses appear to be significantly overpriced or underpriced? Use data from the scatter plots and relevant summary statistics to support your answer.

CCR Performance Tasks

Algebra I: Interpret Data

Teacher Guide

illuminate education

About the Teacher Guide

This document contains support materials for “Algebra I: Interpret Data.”
This includes:

(a) The task
(b) The standards and depth of knowledge level of the task
(c) The scoring rubric
(d) Discussion questions
(e) Extension activities

These specifications have been included to help you connect the task to the Common Core content standards and the standards for mathematical practice. The rubric is designed to help you look for the development of mathematical practices in student work. It is also here to help you look for consistencies in student content errors that can help guide intervention and reteach strategies.

Test Definition File

Item #	Correct Answer	Practice Standard	Content Standards
1	See Scoring Rubric	Mathematical Practice 3	S-ID.6, S-ID.7, S-ID.8

SBAC Claims	PARCC Sub-Claims
1 and 3	A and C

Special Instructions

Consider preparing a spreadsheet for students to use with the data from the table already included in sheet 1. This helps avoid transcription errors. If you are using Microsoft® Excel, make sure the data analysis tool pack is installed.

Performance Task

The table below shows some data about houses for sale in a beach town in California.

Number	Area of House (in square feet)	Area of Lot (in square feet)	Year Built	Number of Bedrooms	Number of Bathrooms	Price (in dollars)
1	779	3,049	1918	2	2.0	479,000
2	1,247	5,042	2005	2	2.5	590,000
3	1,392	98,445	1921	2	2.0	1,995,000
4	1,718	6,098	1978	2	2.0	640,000
5	1,213	4,791	1961	3	2.0	699,000
6	1,095	11,325	1975	2	1.0	593,000
7	1,017	4,790	1949	2	1.0	530,000
8	1,960	55,321	1977	4	2.5	675,000
9	1,453	3,049	1998	3	3.0	849,000
10	2,934	42,688	2008	4	3.0	1,275,000
11	1,596	3,048	1988	3	2.5	549,000
12	1,131	10,454	1950	2	1.0	589,900
13	2,550	14,810	1977	3	2.0	999,999
14	1,688	3,919	1940	2	2.0	625,000
15	1,863	10,018	1975	3	2.0	535,000
16	1,738	3,049	1980	3	2.0	1,225,000
17	4,476	11,324	1860	5	3.5	1,250,000
18	1,841	4,356	2002	3	2.0	559,000
19	1,471	5,662	1994	3	2.0	525,000
20	1,730	6,403	1969	4	2.0	679,900
21	2,006	5,226	2002	3	2.5	539,000
22	956	5,227	1910	2	3.0	545,000
23	2,860	6,968	1976	6	3.5	1,249,000
24	1,850	4,791	1997	3	3.0	1,595,000
25	2,680	7,405	2000	4	3.0	2,195,000
26	1,692	9,582	1944	3	3.0	679,000
27	2,100	4,185	2006	4	2.5	899,000
28	2,524	3,132	2012	3	2.5	749,793
29	2,819	4,791	1996	4	3.5	1,689,000
30	1,842	10,018	1987	3	2.5	899,000

A. Create five scatter plots. Each plot represents how price relates to one of the other variables (i.e., house size, lot size, year built, number of bedrooms, and number of bathrooms). Include a line of best fit on each graph. Use a spreadsheet or other graphing technology to create the scatter plots and lines of best fit.

B. Which variable has the strongest correlation to the price of a house? Which variable has the weakest correlation to the price of a house? Use data from the scatter plots and relevant summary statistics to support your answers. You may use the spreadsheet, a calculator, or other technology to find relevant summary statistics.

C. Do any of the houses appear to be significantly overpriced or underpriced? Use data from the scatter plots and relevant summary statistics to support your answer.

Standards Alignment

Practice Standards

MP3 > DOK 3

Construct viable arguments and critique the reasoning of others. -- Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and--if there is a flaw in an argument--explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Content Standards

S-ID.6

Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.*

b. Informally assess the fit of a function by plotting and analyzing residuals.

c. Fit a linear function for a scatter plot that suggests a linear association.

S-ID.7

Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S-ID.8

Compute (using technology) and interpret the correlation coefficient of a linear fit.

SBAC Claims

Mathematics Claim #1:
Concepts and Procedures. Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.

Mathematics Claim #3:
Communicating Reasoning. Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.

PARCC Sub-Claims

Sub-Claim A:
Major Content with Connections to Practices. The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.

Sub-Claim C:
Highlighted Practices MP.3, 6 with Connections to Content: expressing mathematical reasoning. The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.

Scoring Rubric

4 Point Response:

The response demonstrates a high level of understanding. The response demonstrates:

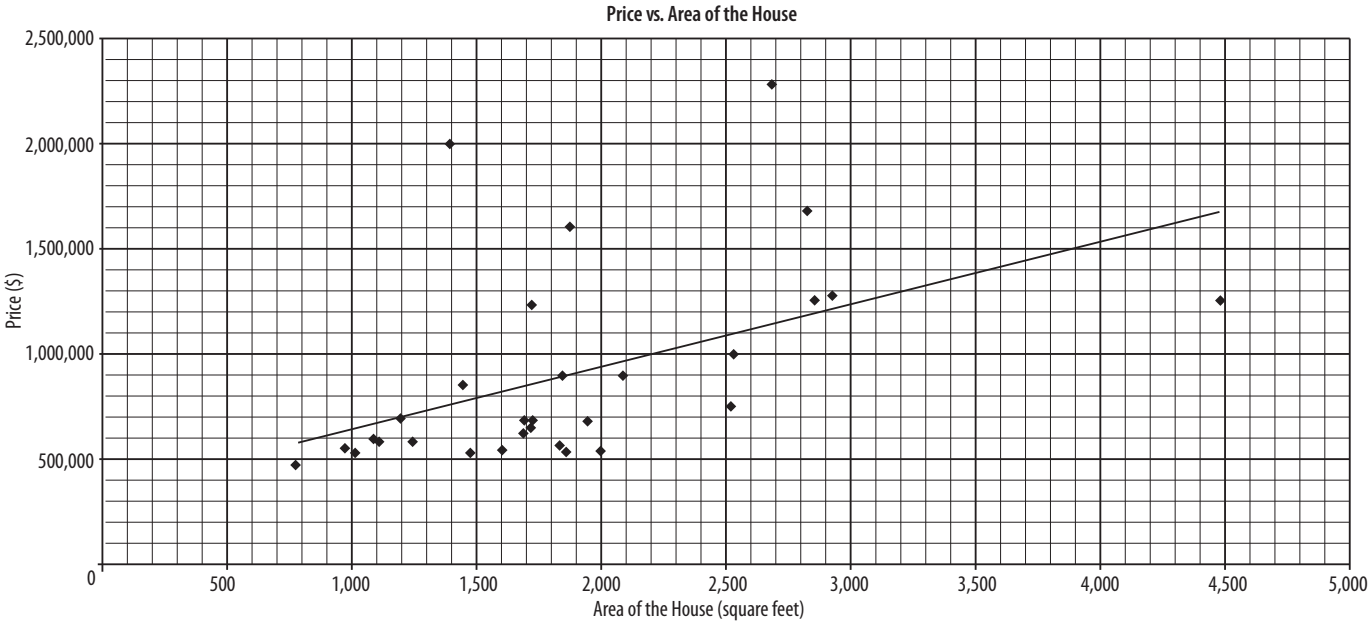
- The ability to use technology to create scatter plots with lines of best fit and to calculate summary statistics;
- A strong ability to analyze data to determine strong and weak correlations;
- A strong ability to use data to support a claim.

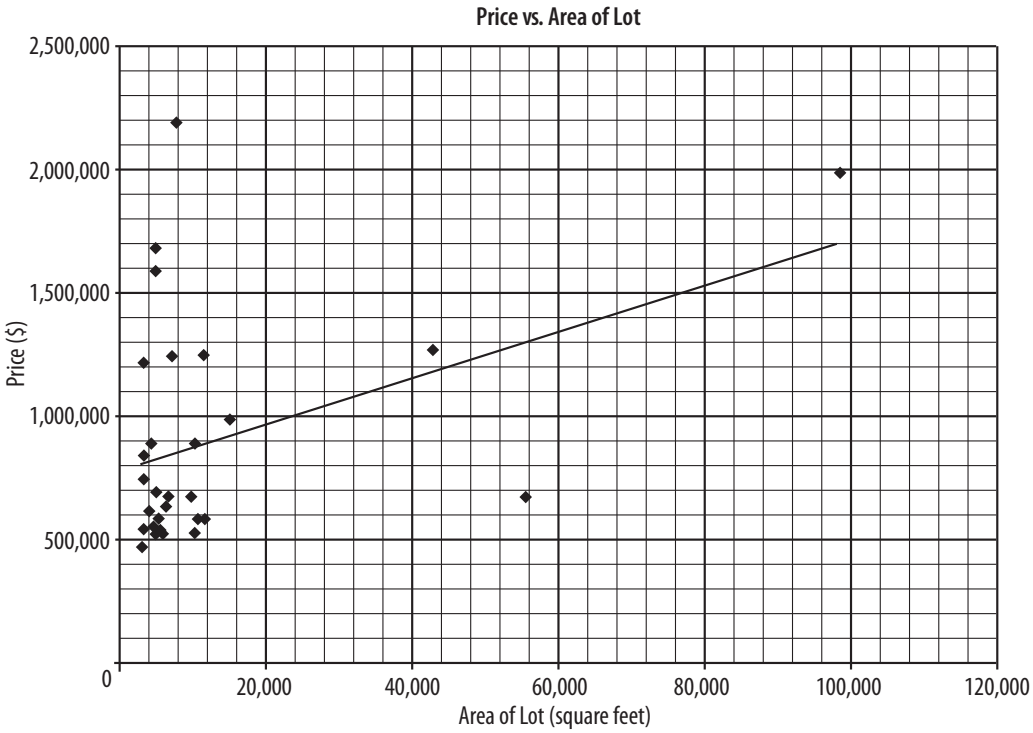
A level 4 response should include:

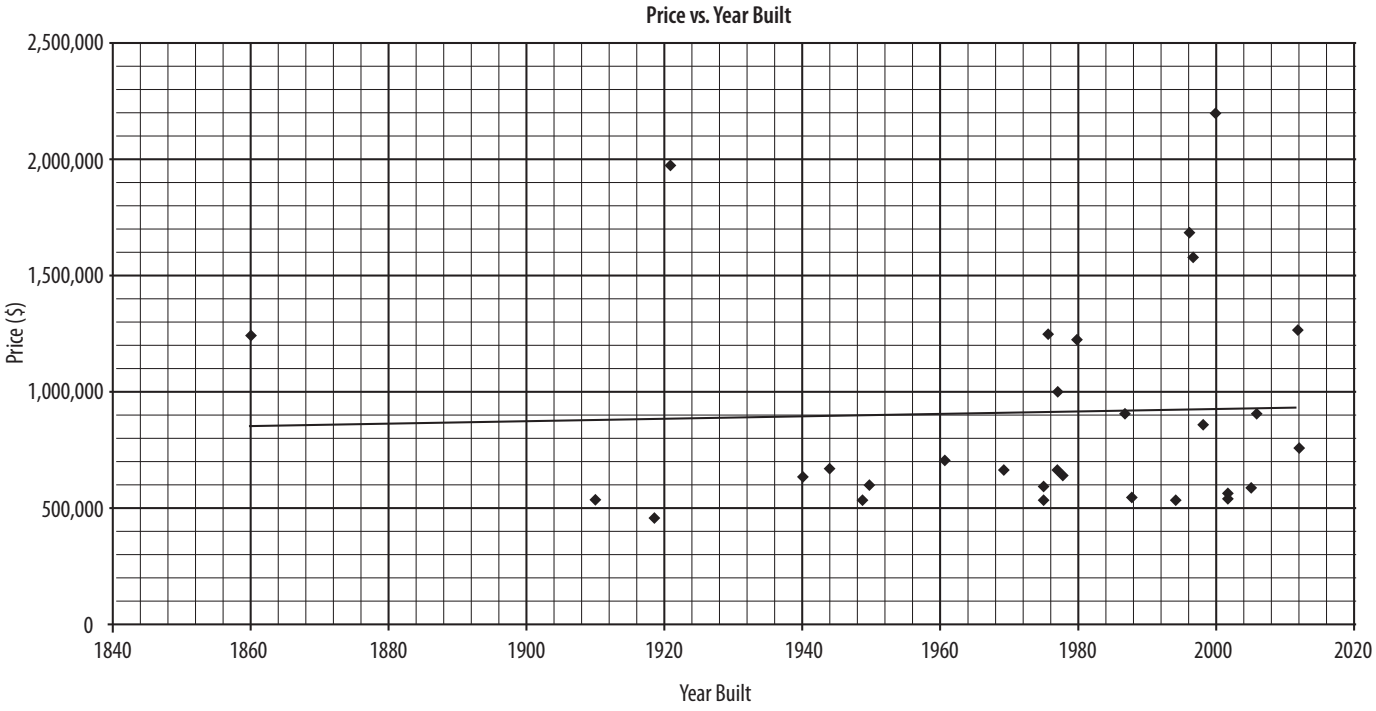
- Correct and complete scatter plots with lines of best fit;
- Answers with correct and complete explanations including specific references to the data to support claims in parts B and C.

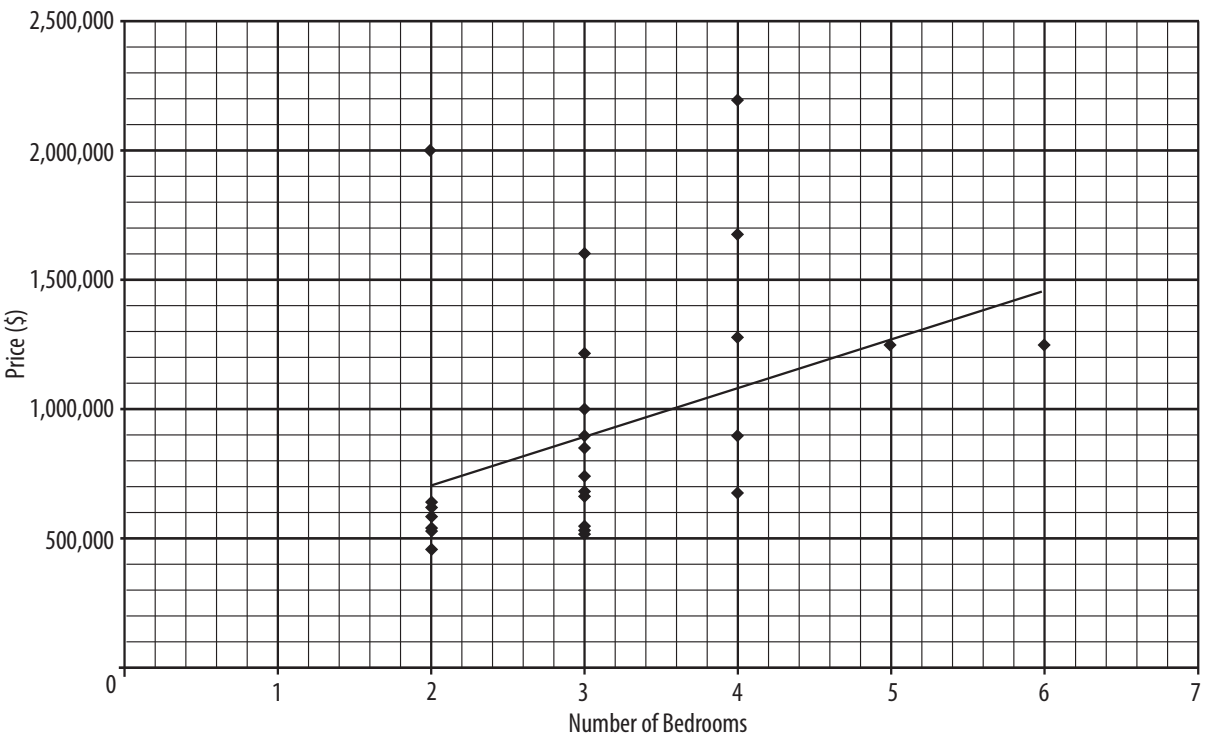
A sample level 4 response is included below.

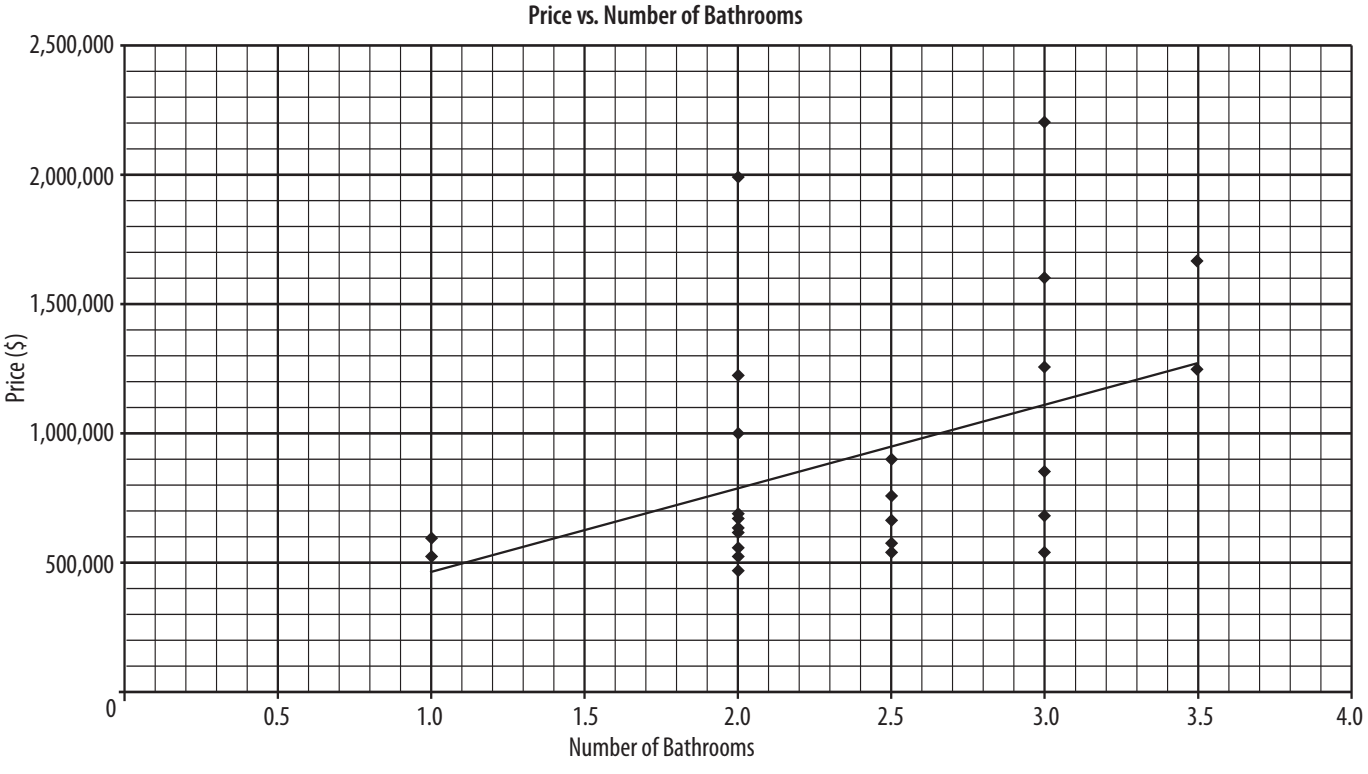
Part A:











Part B:

Note: Answers will vary. Area of the house, number of bedrooms, and number of bathrooms all have fairly strong positive correlations with the price.

The price of the house seems to correlate somewhat strongly with the number of bathrooms. The Pearson correlation coefficient is about 0.47. The line of best fit has a positive slope. However, there are houses with 3 bathrooms that are relatively inexpensive so there are definitely other variables that significantly impact price. The price has a weak correlation with the year built. The line of best fit for the year built is almost flat. The houses built between 1940 and 1970 tend to cost less, but most of the houses were built after 1970 and the prices of those houses vary from about $500,000 to over $2 million, which is pretty much the entire price range. There are also some older houses that are quite expensive. The Pearson correlation coefficient is about 0.03.

Part C:

Considering area of the house, I'd say house number 3 is overpriced. It is only 1,392 square feet but costs almost $2 million. That seems high given the costs of other houses in the area. The median house price is $679,450 and the median house size is 1,734 square feet. So this house has an area below the median and a price well above the median. You can see from the scatter plot that this house is an outlier. It is far from the line of best fit. When you look at the lot size for this house, you can see that it is huge. This is the house with the greatest lot size, which may be part of why the price seems so high. But the price is greater than that predicted by the line of best fit for lot size. This house is actually above the predicted prices on all of the charts.

3 Point Response:

The response demonstrates a strong understanding, but the work contains minor errors. A level 3 response is characterized by:

- The ability to use technology to create scatter plots with lines of best fit and to calculate summary statistics;
- A strong ability to analyze data to determine strong and weak correlations, although the explanation may be incomplete;
- A strong ability to use data to support a claim, although the explanation may be incomplete.

2 Point Response:

The response demonstrates a basic but incomplete understanding. A level 2 response is characterized by:

- The ability to use technology to create scatter plots with lines of best fit and to calculate summary statistics, although the student may require support to complete the scatter plots and calculate the statistics;
- A basic ability to analyze data to determine strong and weak correlations, although the explanation may be incomplete or only partially correct. The student may identify only a strong correlation or only a weak correlation;
- A basic ability to use data to support a claim, although the explanation may be incomplete or only partially correct;
- No answer for part B or part C.

1 Point Response:

The response demonstrates minimal understanding. A level 1 response is characterized by:

- A weak ability to use technology to create scatter plots with lines of best fit and to calculate summary statistics;
- A weak ability to analyze data to determine strong and weak correlations. The explanations may be vague, missing, or contain errors;
- A weak ability to use data to support a claim. The explanation may be vague, missing, or contain errors.

0 Point Response:

There is no response, or the response is off topic.

Discussion Questions

Use the following questions to help students struggling to access the problem:

1. Which statistics are useful when analyzing the housing data?

Possible response: *The median house price is useful for determining which houses are relatively expensive or inexpensive. You can also use the mean and median for the other variables to see which houses are relatively large, and so forth. The correlation coefficient can help you analyze the strength of the correlation.*

2. Which data points on the "Price vs. Year Built" graph appear to be outliers?

Possible response: *The house built in 1860 is an outlier because of how old it is. The house built in 1921 is much more expensive than the other houses built in the same time period.*

3. Do any of the graphs show clusters of data points?

Possible response: *The lot size graph shows a cluster; most of the houses have lots between 3,000 and 12,000 square feet and are priced between $500,000 and $900,000.*

4. Why might you be interested in identifying houses that are underpriced or overpriced?

Possible response: *If you want to buy a house, you want to find a house that is underpriced because it could be a good deal. Or, if you are interested in a specific house, you want to see if it is overpriced so you can decide what to offer.*

5. How can you identify houses that are overpriced or underpriced?

Possible response: *Looking for outliers on each graph is a good way to start. Then you can see if any of the houses are outliers on more than one graph. A house that is significantly above the line of best fit on several graphs is overpriced, and a house that is significantly below the line of best fit is underpriced.*

Extension Activities

1. Collect and analyze data on houses in other parts of the country.

   A. There are large amounts of data about houses freely available online. Collect data about houses in your town or city. Look at how variables such as lot size and the number of bedrooms correlate to price.

2. Compare the same variable for different geographic locations.

   A. Collect data on lot size for two different locations. Create histograms to represent the data. Use summary statistics to compare the data sets.

   B. Collect data on the number of bedrooms for different locations. Create dot plots to represent the data. Use summary statistics to compare data sets.

3. Collect and analyze data on other commodities, and analyze variables that may contribute to price.

   A. Collect data on the prices of used automobiles. Consider variables such as year built and number of miles on the car.