

Math 113 - SPSS Project : Gasoline Prices

People are always complaining about how much gasoline costs. This is particularly true of people in Decatur where it seems the gas is always higher than in the surrounding areas. This semester we will collect data on gasoline prices, analyze it, and make inferences based on our data.

There is an Internet site at www.gaspricewatch.com dedicated to monitoring gasoline prices. This site allows users to enter gasoline prices and search for the lowest gasoline prices in their area by zip code.

Here are some of the questions we'd like to answer.

1. Are gasoline prices in Decatur higher than in surrounding areas?
2. Is gasoline cheaper in the morning than the afternoon or evening?
3. Is gasoline more expensive on the weekend?
4. Are certain brands of gas more expensive than others?
5. How does the octane rating affect pricing?
6. Are stations listed with gaspricewatch.com cheaper than other stations?
7. Are the stations electronically reporting to gaspricewatch.com accurate?

Phase 0 - Group Selection

The instructor will divide the class into groups of about five students each based on criteria such as availability and computer expertise. Most of the computer work can be done in class, but there may be some times that the groups will have to meet outside of class.

One member of each group will be selected by the members of that group to be a delegate to a steering committee. The steering committee will work with the instructor during Phase I, collect data with their groups for Phase II, and then work together with the combined classroom data for Phase III and Phase IV. For most of the project, the steering committee will work together, leaving the other groups with four people each.

Phase I - Planning the Experiment (10 points)

Use the worksheet provided with this handout to decide what information needs to be collected to answer the questions above. Each person except for the steering committee delegate should complete their sheet and then as a group discuss the responses and collaboratively complete the sheet of the steering committee delegate. The steering committee member will then bring the groups responses to the meeting with the other committee members and the instructor to combine the results into a consistent format for the class to use.

After the steering committee has met with the instructor, data collection sheets will be prepared for Phase II of the project.

Phase II - Collecting the Data (20 points)

Students are then encouraged to collect as much data as they can and this process will continue until we're ready to start analyzing the data in the second half of the course. More specific instructions will be provided when Phase II is ready to begin.

Each group will enter their data into a separate file and the instructor will combine the information into a single file for the steering committee to use in the next phases of the project.

Phase III - Describing the Data (20 points)

Use the data that your group has collected to answer the following questions. The steering committee will use the combined class data.

1. Find the mean and standard deviation for the gasoline prices. Break down the results by 1) location (Decatur or not), 2) octane rating, and 3) brand of gasoline. Use the “Compare Means / Means” function.
2. Generate a multiple line chart that illustrates the mean gasoline price for each of the octane ratings over time. Use the “Line Chart” graph.
3. Generate a normal q-q plot of the gasoline prices for each octane rating (split file by octane rating). Remove the detrended plots from the output. Based on the normal q-q plots, do the data appear normally distributed? Use the “Q-Q” graph. Be sure to unsplit the file after generating the graphs.

Phase IV - Inferential Statistics (30 points)

Answer the following questions. For all questions except 5, select the cases where the octane rating is regular gasoline. For each question, type the original question as the heading, include the output from SPSS used to determine the answer, and give a conclusion that references the appropriate values from the output. Clean up the output by removing unnecessary information (case processing summaries and confidence intervals) and setting wide tables to print to fit.

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Be sure to answer the questions above, but feel free to address any other questions.

Phase V - Evaluation

Project Evaluation (10 points)

As a group, comment on the entire project. Address questions like

1. Was there any data that was collected that wasn't needed?
2. Was there data that wasn't collected, but it would have been nice to know?
3. What changes would you make the next time this project is done?
4. Was the project relevant / interesting?
5. Are there topics that you would like to see investigated?

This should be typed and only one document per group submitted. The steering committee should work together.

Individual Evaluations (10 points)

As an individual, evaluate each member of your group including yourself. Comment on how much they contributed to the group. Did they show up for all the meetings, did they participate when they showed up, did they pull their weight or did they not do anything.

In addition to a paragraph describing each person, assign them a score between 0 and 10 points for their effort in the group. Remember you are evaluating yourself, also.

* The score that you receive for this part of the project will be the mean scores given to you by each person in your group.

This may be handwritten and there should be one document per person. The steering committee should evaluate the other members of the steering committee, not the members of their original group.

Due Dates:

Thu, Aug 23 - Phase 0

Groups assigned

Tue, Aug 28 - Phase I

Each person has completed their sheet and the group has met to complete the steering committee member's sheet.

Fri, Aug 31 - Phase I

The steering committee meets with the instructor.

Thu, Sep 6 - Phase I

The steering committee has finished their work on designing the experiment.

Mon, Sep 10 - Phase II

Data collection sheets and SPSS files are ready. Data collection begins. Data should be entered into SPSS on a regular basis instead of waiting until the end of the phase.

Fri, Oct 19 - Phase II

Data collection ends.

Fri, Nov 9 - Phase III

Descriptive statistics output is due.

Tue, Dec 4 - Phase IV

Inferential statistics are due.

Tue, Dec 4 - Phase V

Project and individual evaluations are due.

