In October 2001, National Geographic announced the discovery in the Sahara of fossil remains of a huge crocodilian, dubbed *SuperCroc*. This croc is believed to have reached 40 feet (12 meters) in length, comparable to the length of a city bus. The expedition found about 50 percent of the skeleton, including the fossilized 6-foot-long (1.8 meter) jaws in central Niger. The enlarged bulbous end of its snout sheltered a huge cavity that may have given the giant croc an enhanced sense of smell and unusual call. Its eye sockets are tilted upward, like those of the living gharial in India, which helped it to conceal its huge body underwater while scanning the river's edge.

As interesting as SuperCroc is, it is difficult to do meaningful statistics with a single observation. Its relative, the Indian *gharial*, however, is another large crocodilian that lives in rivers in India, Bangladesh, and to a lesser extent, Bhutan, Myanmar, Nepal, and Pakistan. You can see a gharial in the National Zoo in Washington, DC. This long-nosed, fish-eating crocodile is recognized by its elongated, narrow snout, and the bulbous nasal appendage present on mature males. Its formal name is *Gavialis Gangeticus*. *Gavialis* is a corrupted derivation from the Hindi word *ghariyal*, which is a name for "crocodile". *Gangeticus* means "of the Ganges (River)", where *-icus* is from the Latin and means "belonging to." It is estimated that there are 2,500 to 3,500 in the wild today, and they are officially classified as endangered.

The gharial is one of the largest of all living crocodilian -- males reach at least 5 meters in length, and often approach 6 meters. The gharial is poorly equipped for locomotion on land - the leg musculature is not suited to raise the body off the ground (to produce the 'high-walk' gait -- being able only to push its body forward across the ground ('belly-sliding'), although it can do this with some speed when required. It is, however, very agile in the water - the tail is well-developed and laterally flattened, and the rear feet possess extensive webbing.

The table below gives data on the head length and the body length, both in centimeters, for 17 individual gharial crocodilian.

Length (cm)	length (cm)
35.0	177.0
49.0	264.0
56.0	311.0
64.0	382.0
61.0	385.0
71.0	475.0
83.0	548.0
51.0	343.0
62.0	386.0
52.0	338.0
52.0	319.0
39.5	224.0
38.3	202.0
37.5	218.0
32.3	183.0
35.8	203.0
38.2	209.0

Question: Is it possible to predict body length of the gharial if you know the head length? Investigate this question using the tools developed in Chapters 1 to 3. Produce a model that will enable you to make such a

prediction, and comment on the quality of this model. Also comment on how confident you would be in making a prediction from your model.

Task. Your assignment is to do whatever you need to investigate this data set and then write a brief article for the newspaper describing your findings and conclusions. Be sure to include in your article: a statement of the problem, the data, and any plots or graphs you construct. Be sure to discuss patterns and trends but also be sure to explain any deviations to the patterns. As part of the assignment, the Science editor wants you to predict the body length if the head length is 50 cm and 87 cm.

Mode.   You may work on this assignment individually, <u>or</u> you may work with one partner (not more than one) in the class.

Report. Try to keep graphs and your commentaries about these graphs together on the same page, if possible, so the reader won't have to flip back and forth when reading your report. If you worked with a partner on this Special Problem, then both must contribute equally, and both names must appear on the article. When you write your article, assume that your readers will be reasonably intelligent, but they may not be as statistically literate as you. If you use any technical terms, you may want to briefly explain these terms as part of your story.

Grading. The score awarded for this Special Problem will depend on the quality of your analyses, the clarity of your explanations, the appropriateness of your conclusions, and whether you adhered to the general guidelines for Special Problems.

Deadline. Special Problem 3C is due on _____ .