CASE CLOSED

It's a Matter of Life and Death

Review the information in the Life Insurance Case Study (page 257).
Answer each of the following questions in complete sentences.
Be sure to communicate clearly enough for any of your classmates to understand
what you are saying.

1. DETERMINING PREMIUMS

(a) Would a power model provide an appropriate description of the relationship between age and monthly premium? Transform the data and sketch a graph that will help answer this question.

(b) Would an exponential model provide an appropriate description of the relationship between age and monthly premium? Transform the data and sketch a graph that will help answer this question.

(c) Based on your answers to (a) and (b), use least-squares regression to fit the most appropriate type of model for these data. Write monthly premium as a function of age.

(d) Use your model to predict the monthly premium for a 58-year old who wants a $1 million, 10-year term life insurance policy. Also, predict for a 68-year old.

(e) How comfortable to do you feel about the predictions you made in (d)? Justify your answer using a residual plot an r^2.

2. DEATH STATISTICS

Here is a two-way table of number of deaths in the United States in three age groups from selected causes in 2003. The entries are counts of deaths:

Cause	15 to 24 Years	25 to 44 Years	45 to 64 Years
Accidents	14,966	27,844	23,669
AIDS	171	6,879	5,917
Cancer	1,628	19,041	144,936
Heart Disease	1,083	16,283	101,713
Homicide	5,148	7,367	2,756
Suicide	3,921	11,251	10,057
Total Deaths	**33,022**	**128,942**	**437,058**

(a) Why don' the entries in the columns add to the "total deaths" count?

(b) Should you use counts or percents to compare the age groups? Explain.

(c) Construct the conditional distribution of cause of death for each age group. Make a bar graph to display the results.

(d) Use your results in (c) to explain briefly how the leading causes of death change as people get older.

3. STAY FITTER, LIVE LONGER

A sign in a fitness center says, "Mortality is halved for men over 65 who walk at least 2 miles a day."

(a) Mortality is eventually 100% for everyone. What do you think "mortality is halved" means?

(b) Assuming that the claim is true, explain why this fact does not show that exercise *causes* lower mortality.