**Personal Tutors
Chapter 13**

Personal Tutor Activity 13.1 — Use Direct Variation to Solve Problems

1. **Apply** A new engineer is working for an engineering firm that specializes in green technologies. The engineer has been tasked to evaluate the effectiveness of a specific faucet used in a building. A test has been conducted, which determines that the faucet drips constantly. The engineer sets up an experiment and finds that 3 cups of water are wasted every 30 minutes. This experiment was conducted three consecutive times with the same results. Find the constant of variation and write an equation to model the direct variation illustrated in this experiment. Determine the amount of water wasted in a 24-hour period.

2. **Starting Hint** Identify the variables needed for the equation. Write out the equation first, and then write the numbers you know underneath each part.

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Personal Tutor Activity 13.2 — Make Conjectures from Data

1. **Apply** A new engineer has decided to start working as a consultant for a Systems Engineering firm. Since she will be a consultant, she needs to determine how many contracts she will need to procure to break even with her costs. After she has conducted research, she has found that she will need $25,000 for overhead costs. These costs will include rent, utilities, and other expenses. These are fixed costs. The engineer will then charge $1000 per week for each contract she procures. Additional variable costs will include approximately $250 per contract. These variable costs will include additional labor, copying, and mailing. This new engineer is attempting to break even with her new consulting business. Determine how many contracts will need to be procured for the engineer to break even.

2. **Starting Hint** Write out the equation for each constraint, and then write the numbers you know underneath each part.