1. If a ball is thrown into the air with a velocity of 40 ft/s, its height in feet t seconds later is given by

$$y = 40t - 16t^2.$$

    (a) Find the average velocity for each time period:

- $[2, 2.5]$

- $[2, 2.1]$

- $[2, 2.05]$

- $[2, 2.01]$

    (b) Estimate the instantaneous velocity when $t = 2$.

2. In a certain state, the maximum speed permitted on freeways is 65 mi/h and the minimum speed is 40 mi/h. The fine for violating these limits is $15 for every mile per hour above the maximum speed or below the minimum speed. Express the amount of the fine F as a function of the driving speed x and graph $F(x)$ for $0 \le x \le 100$.

3. A cell phone plan has a basic charge of $35 a month. The plan includes 400 free minutes and charges 10 cents for each additional minute of usage. Write the monthly cost C as a function of the number x of minutes used and graph C as a function of x for $0 < x < 600$.

4. An electricity company charges its customers a base rate of $10 a month, plus 6 cents per kilowatt-hour (kWh) for the first 1200 kWh and 7 cents per kWh for all usage over 1200 kWh. Express the monthly cost E as a function of the amount x of electricity used. Then graph the function E for $0 < x < 2000$.