Homework Number 5 for Real Analysis and Trigonometry

Here is Homework #5 . It is due on Tuesday, August 7. This homework is worth 10 point, i.e., 10% of your grade. Do three of these problems correctly for full credit, do more for an additional 1% each.

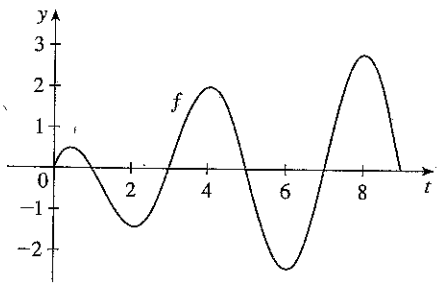
1. The honeybee population starts with 100 bees and increases at a rate of $n'(t)$ bees per week. What does
$$100 + \int_0^5 n'(t)\,dt$$
represent?

2. If the units for x are feet and the units for $a(x)$ are pounds per foot, what are the units for da/dx? What are the units for $\int_0^{100} a(x)\,dx$?

3. A batter hits a baseball 3 ft above the ground toward the center field fence, which is 10 ft high and 400 ft from home plate. The ball leaves the bat with speed of 115 ft/sec at an angle 50° above the horizontal. Is it a home run? Hint: Treat the vertical and horizontal components of the ball's position independently, and remember that gravity effects the vertical component.

4. **19–20** Let $g(x) = \int_0^x f(t)\,dt$, where f is the function whose graph is shown.
(a) At what values of x do the local maximum and minimum values of g occur?
(b) Where does g attain its absolute maximum value?
(c) On what intervals is g concave downward?
(d) Sketch the graph of g.

19.



5. **26** Let
$$f(x) = \begin{cases} 0 & \text{if } x < 0 \\ x & \text{if } 0 \leq x \leq 1 \\ 2 - x & \text{if } 1 < x \leq 2 \\ 0 & \text{if } x > 2 \end{cases}$$
and $g(x) = \int_0^x f(t)\,dt$

(a) Find an expression for $g(x)$ similar to the one for $f(x)$.
(b) Sketch the graphs of f and g.
(c) Where is f differentiable? Where is g differentiable?