1. (a) computing forward, backwards or the average all give the answer of

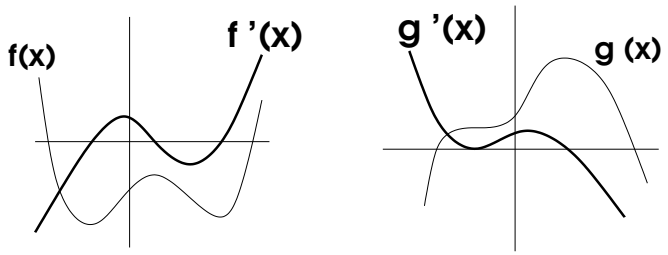
   $f'(2) \approx 2$

   (b) The best estimate would be the backwards quotient since 5 is closer to 3.
   $f'(5) \approx \frac{20-14}{5-3} = 3$

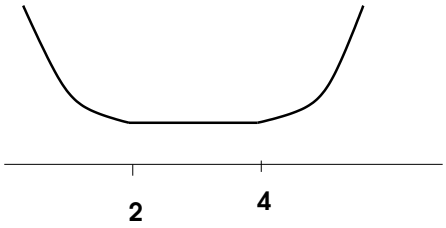
2. draw tangent lines to get estimates

   (a) $f'(1) \approx \frac{1}{0.5} = 2$
   (b) $f'(3) \approx \frac{0.6}{1} = 0.6$
   (c) $x = 5$ and $x = 9$

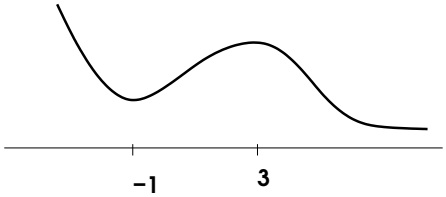
3. The derivative sketches are the thicker curves.



4. (a) graph of $f(x)$. The graph can be shifted up or down and still be correct.



   (b) graph of $f(x)$. The graph can be shifted up or down and still be correct.



5. (a) $P(5) = 6500$: After 5 hours there are 6500 critters.
   $P'(5) = -840$: At the five hour mark, if we would go for one more hour, the number of critters would decrease by approximately 840.

   (b) $P(6) \approx 6500 + (-840) * 1 = 5660$ critters

6. (a) $f(165) = 153$: A person that weighs 165 pounds would take a dose of 153 milligrams.

   $f'(165) = 5$: At the 165pounds, if you go up by one pound, the dose will go up by approximately 5 milligrams

   (b) $f(173) \approx 153 + 5 * 8 = 193$ milligrams