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) \( f'(3) \approx \frac{4}{6} = 0.6 \)

(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) \( P(6) \approx 6500 + (-840) \times 1 = 5660 \) critters

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

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

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