1. (a) $f'(1) \approx \frac{f(2) - f(1)}{2-1} = .8$, $f'(1) \approx \frac{f'(2) - f'(1)}{2-1} = -2$

   $f'(2) \approx \frac{f(3) - f(2)}{2-1} = .6$, $f''(2) \approx \frac{f'(3) - f'(2)}{3-2} = -2$

   $f'(3) \approx \frac{f(4) - f(3)}{4-3} = .4$

   (b) $f(x)$ appears to be concave down since $f''(x) < 0$ at each point on the interval where it can be estimated.

2. \[ f(x) \]

   \[ f'(x) \]

   \[ f''(x) \]

   (not required for problem)

3. $N'(3) > 0$ since new cases are still coming in (so that $N(t)$ is increasing).

   $N''(3) < 0$ since the rate of increase of new cases is decreasing (so that $N'(t)$ is decreasing).