Increasing and Decreasing Functions, Concavity

1. Suppose $f(x) = (x-1)(x-4)(x-9) = x^3 - 14x^2 + 49x - 36$.

  (a) Find the intervals on which $f(x)$ is increasing and the intervals on which $f(x)$ is decreasing.

  (b) Find the intervals on which $f(x)$ is concave up and the intervals on which $f(x)$ is concave down.

2. Suppose $g'(x) = (x-1)(x-4)(x-9) = x^3 - 14x^2 + 49x - 36$.

  (a) Find the intervals on which $g(x)$ is increasing and the intervals on which $g(x)$ is decreasing.

  (b) Find the intervals on which $g(x)$ is concave up and the intervals on which $g(x)$ is concave down.

3. Discuss the similarities and the differences between the last two problems.