Math 112 - Solutions to Quiz 3

Let $f(x) = x^3 - 9x^2 + 15x$.

1. $f'(x) = 3x^2 - 18x + 15 = 3(x^2 - 6x + 5) = 3(x-5)(x-1)$
   f' is positive when $x < 1$ and $x > 5$ and negative in $1 < x < 5$ so
   f is increasing when $x < 1$ and $x > 5$ and decreasing in $1 < x < 5$.
   Therefore, f has a relative maximum value of 7 at $x = 1$ and a relative minimum value of -25 at $x = 5$.

2. $f''(x) = 3(2x - 6) = 6(x - 3)$
   f'' is negative when $x < 3$ and positive when $x > 3$so
   f is concave down when $x < 3$ and concave up when $x > 3$.
   So, $(3, f(3)) = (3, -9)$ is the only point of inflection.

   Below is a graph (not required as part of your answer)