NAME_____

Show work and write clearly.

Make sure graphs show approximating rectangle, $R(x)$, $r(x)$, $p(x)$ and $h(x)$.

1. (30 pts.) Use the disk method to find the volume of the solid obtained by rotating the region bounded by $x = y - y^2$ and $x = y^2 - 3$ about $x = -4$.

2. (30 pts.) Find the following integrals:

   a. $\int \left(\tan^{-1} x \right) dx$

   b. $\int \left(x^4 \ln x \right) dx$

   c. $\int_0^1 \left(x^3 e^{x^2} \right) dx$

3. (30 pts.) Use the shell method to find the volume of the solid obtained by rotating the region bounded by $y = x^2$, $y = 1$ and $x = 2$ about $y = -3$.

4. (10 pts.) Solve: $y' = \dfrac{xy}{3 \ln y}$.