Answers - Parametric integration (page ??)

1. Evaluate $\int_0^1 y\,dx$ for the parametric curve given by $\begin{cases} x = 4 - t \\ y = t^2 - 3t \end{cases}$

   Write dx in terms of t and dt

   $dx = -dt$

   Calculate the bounds in terms of t:

   $1 = 4 - t$

   $t = 3$

   $0 = 4 - t$

   $t = 4$

   Rewrite integral in terms of t:

   $\int_4^3 (t^2 - 3t)\ -dt = \int_4^3 (3t - t^2)\,dt$

   Integrate and calculate definite integral:

   $\left[\frac{3t^2}{2} - \frac{t^3}{2}\right]_4^3 = \frac{11}{6}$