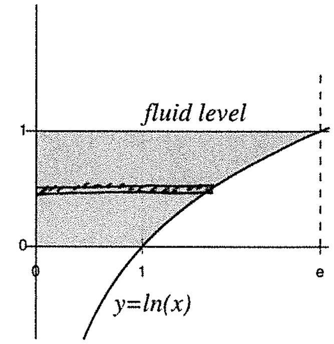
Math 172	Quiz 10	Name: ________________
6 June 2016	Show Appropriate Work	Point Values in $\boxed{\text{boxes}}$.

1. $\boxed{5}$ Calculate the fluid force of a plate in the shape of the region shown in the figure below. The surface of the mystery fluid of density ρ is at $y = 1$.



$\text{force}_i = \rho g (1-y)e^y \Delta y$

$\text{force} = \rho g \int_0^1 (1-y)e^y\, dy$

$u = 1-y \quad dv = e^y dy$

$du = -dy \quad v = e^y$

$= \rho g \left[(1-y)e^y \Big|_0^1 + \int_0^1 e^y dy \right]$

$= \rho g \left[-1 + e^y \Big|_0^1 \right] = \rho g (e-2)$

2. $\boxed{2}$ Find parametric equations, $x(t)$ and $y(t)$, for the line segment from $(3, 2)$ to $(5, -2)$. Include the domain of t.

$x = 3 + 2t$

$y = 2 - 4t \qquad 0 \leq t \leq 1$

3. $\boxed{2}$ Find parametric equations, $x(t)$ and $y(t)$, for the circle with center $(1, -2)$ and radius 3. Include the domain of t.

$x = 1 + 3\cos t$

$y = -2 + 3\sin t \qquad 0 \leq t \leq 2\pi$

4. $\boxed{1}$ We can change the 'speed' of a parametric curve by scaling the parameter. For example, replacing t with $2t$ will increase the speed by a factor of two, i.e. the curve will be traced out twice as fast. We can change the direction a curve travels by similarly altering the parameter.

A cyloid generated by a circle of radius 1 has a parameterization given by

$$x(t) = t - \sin(t), \quad y(t) = 1 - \cos t.$$

Find a parameterization of a cycloid generated by a circle of radius 1 that goes 'backwards.'

$x = -t - \sin(-t) \ , \ y = 1 - \cos(-t)$