Name: Key **Section:** _____

Clear your desk of everything except pens, pencils and erasers. **Show all your work.**
If you have a question raise your hand and I will come to you.

1. (5 points) Find the parametrization of the line segment joining $(2,1)$ to $(3,-6)$ for variable $t \in [0,1]$.

$(x(t), y(t))$, $t \in [0,1]$

$x(0) = 2$, $x(1) = 3$ $\Rightarrow$ $\frac{x-2}{t-0} = \frac{3-2}{1-0} \Rightarrow x-2 = t$

$\therefore$ $x = 2+t$

$y(0) = 1$, $y(1) = -6$. $\Rightarrow$ $\frac{y-1}{t-0} = \frac{-6-1}{1-0}$

$\Rightarrow$ $y-1 = -7t$. $\Rightarrow$ $y = 1-7t$

$x = 2+t$, $y = 1-7t$; $t \in [0,1]$

[- deduct 2 pts if one of x & y is incorrect]

2. (5 points) Find the arc length of the circle $x = 4\cos t, y = 4\sin t$, for $0 \le t \le \frac{\pi}{2}$.

$x = 4\cos t \Rightarrow \frac{dx}{dt} = -4\sin t$.

$y = 4\sin t \Rightarrow \frac{dy}{dt} = 4\cos t$.

$\therefore S = \int_0^{\pi/2} \sqrt{4^2(\sin^2 t + \cos^2 t)}\, dt$.

$= \int_0^{\pi/2} 4\, dt = 4.[t]_0^{\pi/2}$

$= 4.\frac{\pi}{2}$.

[- deduct 2 if $\int_0^{2\pi} r\, dt$ is written]