1. Find the value of $n$ such that the arc length from $t = 0$ to $t = n$ for the vector function $\langle 3\sin(t), 3\cos(t), 2 \rangle$ is 6.

Solution: Arc length for a vector function, $r(t)$ from $a$ to $b$ is defined to be $\int_a^b |r'(t)| dt$. We know that arc length in this case is 6, and we know our starting point is 0. We must now solve for $n$. Using the equation for arc length, obtain $r'(t) = \langle 3\cos(t), -3\sin(t), 0 \rangle$, and $|r'(t)| = \sqrt{9} = 3$ Now integrate $\int_0^n 3 dt$ and set this integral equal to 6 in order to obtain the equation $3n = 6$ and we see that $n = 2$. 
