

Show all work. 5 points each.

1. Find the equation of the tangent line for the curve $\mathbf{r}(t) = \langle 1+2\sqrt{t}, t^3-t, t^3+2 \rangle$ at $t = 1$.

2. Find the length of the curve $\mathbf{r}(t) = \langle 3 \sin(t), 4t, 3 \cos(t) \rangle$ for $0 \leq t \leq 2$.