1. Find $\vec{\mathbf{r}}'(t)$ if $\vec{\mathbf{r}}(t) = \left\langle \sec\left(e^{t^2}\right), t^2 \ln\left(4 + \sqrt{t^3}\right), \dfrac{4t^2}{3t^3 - 5t + 2} \right\rangle$.

2. Find $\vec{\mathbf{r}}(t)$ if $\vec{\mathbf{r}}'(t) = \left\langle \dfrac{4}{t - 3} + \sqrt{t}, \sin(\pi t), e^{2t - 8} \right\rangle$ and $\vec{\mathbf{r}}(4) = \left\langle 3, -\dfrac{1}{\pi}, -7 \right\rangle$.

3. Find the length of the curve $\vec{\mathbf{r}}(t) = \left\langle t, \dfrac{1}{2}t^2, t^2 \right\rangle$, $0 \le t \le 1$.

4. Find the length of the curve $\vec{\mathbf{r}}(t) = \langle \cos t, \sin t, \ln(\cos t) \rangle$, $0 \le t \le \dfrac{\pi}{4}$.