ARC LENGTH

Find the length of the following curves.

1. $\vec{r}(t) = \cos(t)\hat{i} + \sin(t)\hat{j} + t\hat{k}$, $0 \le t \le 2\pi$

2. $\vec{r}(t) = t\hat{i} + \frac{\sqrt{6}}{2}t^2\hat{j} + t^3\hat{k}$, $-1 \le t \le 1$

3. $\vec{r}(t) = \cos^3(t)\hat{i} + \sin^3(t)\hat{j}$, $0 \le t \le \pi/2$

4. $\vec{r}(t) = 2(t^2 - 1)^{3/2}\hat{i} + 3t^2\hat{j} + 3t^2\hat{k}$, $1 \le t \le \sqrt{8}$

5. $\vec{r}(t) = r \cdot \cos(t)\hat{i} + r \cdot \sin(t)\hat{j}$, $0 \le t \le 2\pi$ & $r > 0$

6. $\vec{r}(t) = 3\cos(2t)\hat{i} + 3\sin(2t)\hat{j} + 3t\hat{k}$, $0 \le t \le \pi/2$

7. $\vec{r}(t) = (t^2 + 1)\cos t\,\hat{i} + (t^2 + 1)\sin t\,\hat{j} + 2t\sqrt{2}\,\hat{k}$, $0 \le t \le 1$