

Worksheet #20

- (1) Find the length of the curve

$$\mathbf{r}(t) = \left\langle 2t, t^2, \frac{1}{3}t^3 \right\rangle$$

for $0 \leq t \leq 1$.

- (2) Find the length of the curve intersection of the cylinder $4x^2 + y^2 = 4$ and the plane $x + y + z = 2$.

- (3) Find the unit tangent vector $\mathbf{T}(t)$ and the curvature for the curve

$$\mathbf{r}(t) = \langle t^2, \sin t - t \cos t, \cos t + t \sin t \rangle, \quad t > 0.$$