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MAT102 Assignment

$$1.) \quad r = x_i + y_j + 2k \\ r = t_i + t^2_j + t^3k$$

$$\frac{dr}{dt} = i + 2tj + 3t^2k$$

$$\text{At } t=1 \quad \frac{dr}{dt} = i + 2j + 3k$$

$$\left| \frac{dr}{dt} \right| = \sqrt{(1)^2 + (2)^2 + (3)^2} = \sqrt{14}$$

$$T = \frac{dr/dt}{\left| \frac{dr}{dt} \right|} = \frac{i + 2j + 3k}{\sqrt{14}}$$

$$2) \quad A = 4t^3j + 5k, \quad B = 2t^2i + 4tj \\ C_7 = A \times B = (4t^3j + 5k) \times (2t^2i + 4tj)$$

$$C_7 = 16t^4 \\ \Rightarrow \int_0^1 16t^4 dt$$

$$= \left| \frac{16t^5}{5} + C \right|_0^1 = \frac{16}{5}$$