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Civil Engineering

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MAT 102

$$r = x_i + y_j + z_k$$

$$r = t_i + t^2 j + t^3 k$$

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

$$\left. \frac{dr}{dt} \right|_{t=1} = i + 2j + 3k$$

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

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

$$2 \quad A = 4t^3 j + 5k \quad B = 2t^2 i + 4tj$$

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

$$G = 16t^4$$

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

$$= \left[\frac{16t^5}{5} \right]_0^1$$

$$= \frac{16(1)^5}{5} - \frac{16(0)^5}{5}$$

$$= \frac{16}{5}$$