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COURSE: MAT 102

1) $x = 8t^3, y = 4t^3 - 7t, z = t + 3$

i, Velocity = $\frac{dx}{dt}$

$$r = xi + yj + zk$$

$$r = 8t^3i + (4t^3 - 7t)j + (t + 3)k$$

$$\frac{dr}{dt} = 24t^2i + (12t^2 - 7)j + k$$

ii, Acceleration = $\frac{d^2r}{dt^2} = 48ti + 24tj$

2) $T = \frac{dr/dt}{|dr/dt|}$

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

$$\frac{dr}{dt} = 3i + 3t^2j + 2tk$$

$$|dr/dt| = \sqrt{(3)^2 + (3)^2 + (2)^2} = \sqrt{9 + 9 + 4}$$

$$|dr/dt| = \sqrt{22}$$

$$\therefore T = \frac{3i + 3j + 2k}{\sqrt{22}}$$