

# MAT 102 Assignment

## Answers

1.)  $r = xi + yj + zk$

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

i.) Velocity =  $\frac{dr}{dt}$

$$\Rightarrow 24t^2i + (12t^2 - 7)j + k$$

ii.) Acceleration =  $\frac{d^2r}{dt^2}$

$$\Rightarrow 48ti + 24tj + k$$

2.)  $r = xi + yj + zk$

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

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

At  $t = 1$

$$\frac{dr}{dt} = 3i + 3j + 2k$$

$$\left| \frac{dr}{dt} \right| = \sqrt{(3)^2 + (3)^2 + (2)^2} = \sqrt{22}$$

$$T = \frac{dr/dt}{\left| \frac{dr}{dt} \right|} \Rightarrow \frac{3i + 3j + 2k}{\sqrt{22}}$$