

$$3. \vec{r}(t) = t^2 \vec{i} + 4t \vec{j}$$

$$a) \vec{r}(1) = 1^2 \vec{i} + 4(1) \vec{j} = \vec{i} + 4 \vec{j}$$

$$b) \vec{r}(s+3) = ((s+3)^2 \vec{i} + 4(s+3) \vec{j})$$

$$c) \vec{r}(1+\Delta t) - \vec{r}(1)$$

$$\begin{aligned} \vec{r}(1+\Delta t) &= (1+\Delta t)^2 \vec{i} + 4(1+\Delta t) \vec{j} \\ &= (1 + 2\Delta t + (\Delta t)^2) \vec{i} + (4 + 4\Delta t) \vec{j} \end{aligned}$$

$$\vec{r}(1) = 1^2 \vec{i} + 4(1) \vec{j} = \vec{i} + 4 \vec{j}$$

$$\begin{aligned} \vec{r}(1+\Delta t) - \vec{r}(1) &= (1 + 2\Delta t + (\Delta t)^2) \vec{i} + (4 + 4\Delta t) \vec{j} \\ &\quad - (\vec{i} + 4 \vec{j}) \\ &= (2\Delta t + (\Delta t)^2) \vec{i} + 4\Delta t \vec{j} \end{aligned}$$

$$4. \vec{r}(t) = 3t^2 \vec{i} + \ln(t) \vec{j} - 4 \vec{k}$$

$$\begin{aligned} a) \vec{r}(4) &= 3(4)^2 \vec{i} + \ln(4) \vec{j} - 4 \vec{k} \\ &= 48 \vec{i} + \ln(4) \vec{j} - 4 \vec{k} \end{aligned}$$

$$b) \vec{r}(-2) = 3(-2)^2 \vec{i} + \ln(-2) \vec{j} - 4 \vec{k}$$

(NOT DEFINED)