

**M20580 L.A. and D.E. Tutorial**  
Quiz 5

1. Given that  $\mathcal{B} = \{1, t - 1, t^2 - t\}$  is a basis for  $\mathbb{P}_2$  and  $[\mathbf{p}]_{\mathcal{B}} = \begin{bmatrix} \alpha \\ \beta \\ \gamma \end{bmatrix}$  is the coordinate vector of the polynomial  $\mathbf{p}(t) = t^2 + t + 6$  relative to  $\mathcal{B}$ , what is the value of  $\alpha$ ?

2. The vector  $\vec{v}$  has coordinates  $[\vec{v}]_{\mathcal{B}} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$  in the basis  $\mathcal{B} = \{(1, 0, -1), (2, 2, 2), (3, 1, 1)\}$ . Find  $\vec{v}$ .