2. $B = (v_1, v_2, v_3)$

$$\mathbb{R}_2[x] = \{ \rho \in \mathbb{R}[x] \mid \deg(\rho) \leq 2 \}$$

$v_1 = 1 + x^2 \qquad v_2 = 5 + x \qquad v_3 = 5x + x^2$

$v = 1 + 2x + 2x^2$

Let $k_1, k_2, k_3 \in \mathbb{R}$

$k_1 \cdot v_1 + k_2 \cdot v_2 + k_3 \cdot v_3 = v$

$k_1 \cdot (1 + x^2) + k_2 \cdot (5 + x) + k_3 \cdot (5x + x^2) = (1 + 2x + 2x^2)$

$k_1 + k_1 x^2 + 5k_2 + k_2 \cdot x + 5k_3 x + k_3 x^2 = 1 + 2x + 2x^2$

$$\Rightarrow \begin{cases} k_1 + 5k_2 = 1 \Rightarrow 5k_2 = 1 - k_1 \Rightarrow k_2 = \frac{1}{5}(1 - k_1) \\ k_2 + 5k_3 = 2 \\ k_1 + k_3 = 2 \Rightarrow k_3 = 2 - k_1 \end{cases}$$

$\frac{1}{5}(1 - k_1) + 5(2 - k_1) = 2 \mid \cdot 5$

$(1 - k_1) + 25(2 - k_1) = 10$

$1 - k_1 + 50 - 25k_1 = 10$

$41 = 26k_1$

$k_1 = \frac{41}{26} = 1,57$