① Give a linear combination of $\underline{1}$, $x+\underline{1}$ that equals $3x-7$

$$-\underline{10}(1)+\underline{3}(x+1)=\boxed{3x-7}\in P_1$$

② Give a linear combination of $x+1$, $\cancel{3x+3}$ that equals $\boxed{-5x+2}\in P_1$

There is no linear combination of ...

3 Give a linear combination of $1, x, x+1$ that equals $\boxed{4x-2}$ $\in P$

$\boxed{-3(1)+3(x)+1(x+1)=4x-2}$

$\boxed{4(x)-2(1)=4x-2}$

4 For any of 1–3 that are possible, see if you can find more than one linear combination.

$$\boxed{0(1)+6(x)+(-2)(x+1)=4x-2}$$

$1(1)+1(x)-1(x+1)=0$ $p(x)=0$

So 1, x and x+1 are linearly dependent.

$\mathbb{R}^2$ $\begin{bmatrix} 5 \\ 1 \end{bmatrix}$

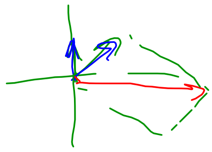
$\_\begin{bmatrix} \\ \\ \end{bmatrix} + \_\begin{bmatrix} \\ \\ \end{bmatrix} + \_ \cdots = \begin{bmatrix} \\ \\ \end{bmatrix}$

Basis?

Several Bases?

$\mathcal{B}_1 = \left\{ \begin{bmatrix} \\ \\ \end{bmatrix}, \dots, \begin{bmatrix} \\ \\ \end{bmatrix} \right\}$

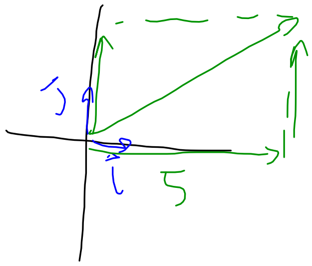
$$\mathcal{B}_1 = \left\{ \overset{\vec{i}}{\begin{bmatrix}1\\0\end{bmatrix}}, \overset{\vec{j}}{\begin{bmatrix}0\\1\end{bmatrix}} \right\}$$



$$\mathcal{B}_2 = \left\{ \begin{bmatrix}1\\1\end{bmatrix}, \begin{bmatrix}0\\1\end{bmatrix} \right\}$$

$$\underline{5} \begin{bmatrix}1\\1\end{bmatrix} + \underline{-4} \begin{bmatrix}0\\1\end{bmatrix} = \begin{bmatrix}5\\1\end{bmatrix}$$

$$\mathcal{B}_3 = \left\{ \begin{bmatrix}1\\1\end{bmatrix}, \begin{bmatrix}1\\0\end{bmatrix} \right\}$$



$$\mathcal{B}_4 = \left\{ \begin{bmatrix}1\\n\end{bmatrix}, \begin{bmatrix}-\pi\\e\end{bmatrix} \right\}$$

$$\begin{bmatrix}1\\1\\1\end{bmatrix},\begin{bmatrix}1\\2\\3\end{bmatrix},\cancel{\begin{bmatrix}2\\3\\4\end{bmatrix}}\quad\begin{bmatrix}7\\15\\-1\end{bmatrix}$$

$\mathcal{P}_2$

$\mathcal{B}_1 = \{x^2, x, 1\}$

$\{x\}$ is not a basis for $\mathcal{P}_2$
because it doesn't span $\mathcal{P}_2$

$\{1, x, x^2, x+1\}$ is not a basis
because the polynomials are linearly dependent.

$5x^2 - 7x + 2$

Turn in:
1.5:4

$\{x^2, 2x^2, x\}$