Task 3

True ①

$$-2x^2+3 = a(x^2+3x) + b(2x^2+4x-1)$$

$$(-2,0,3) = a(1,3,0) + b(2,4,-1)$$

$$(-2,0,3) = (a+2b, 3a+4b, -b)$$

$$\begin{cases} a+2b = -2 \\ a3+4b = 0 \\ -b = 3 \end{cases} \qquad \begin{cases} a+2b = -2 \\ -2b = 6 \\ -b = 3 \end{cases} \qquad \begin{cases} a = -4 -8 \\ b = 3 \end{cases}$$

$$\Rightarrow \text{II} \quad b=3, \ a=4$$

$$-2x^3+3 = 8(x^3+3x) + 3(2x^2+4x-1) \qquad -2x^3+3 = 4(x^2+3x)+(-3)(2x^2+4x-1)$$

True ②

$$x^2+2x-3 = a(-3x^2+2x+1) + b(2x^2-x-1)$$

$$(1,2,-3) = a(-3,2,1) + b(2,-1,-1)$$

$$= (-3a+2b, \ 2a-b, \ a-b)$$

$$\begin{cases} -3a+2b = 1 \\ 2a-b = 2 \\ a-b = -3 \end{cases} \qquad \begin{cases} a-b = -3 \\ 2a-b = 2 \\ -b = -8 \end{cases} \qquad \begin{cases} a-b = -3 \\ b = 8 \end{cases}$$

$$a=5, \ b=8$$

$$x^2+2x-3 = 5(3x^2+2x+1) + 8(2x^2-x-1)$$

False ③

$$3x^2+4x+1 = a(x^2-2x+1) + b(-2x^2-x+1)$$

$$(3,4,1) = a(1,-2,1) + b(-2,-1,+1)$$

$$= (a-2b, -2a-b, a+b)$$

$$\begin{cases} a-2b = 3 \\ -2a-b = 4 \\ a+b = 1 \end{cases} \qquad \begin{cases} a+b = 1 \\ b = 6 \\ -3b = 2 \end{cases} \qquad \begin{cases} a+b = 1 \\ b = 6 \end{cases}$$

Can't be expressed as a linear combination of these polynomials