

Problem 3)

$$r^n - 3r^{n-1} + 2r^{n-2} = 0$$

$$r^{n-2} (r^2 - 3r + 2) = 0$$

$$1 - 3/r + 2/r^2 = 0$$

$$r^2 - 3r + 2 = 0$$

$$(r-2)(r-1) = 0, \quad r=2, r=1$$

$$\text{Gen sol} = a(n) = (C_1 \cdot 2^n + C_2 \cdot 1^n)$$

$$a(0) = C_1 + C_2 = 2$$

$$a(1) = 2C_1 + C_2 = 3$$

$$C_1 = 1$$

$$C_2 = 1$$

$$a(n) = 2^n + 1^n$$

$$= \boxed{2^n + 1}$$

Problem 5)

$$a(n) - a(n-4)$$

$$r^n - r^{n-4} = 0$$

$$r^n (1 - r^{-4}) = 0$$

$$1 - 1/r^4 = 0$$

$$r^2 - 1/r^2 = 0$$

$$r - 1/r = 0$$

$$r = 1, r = -1$$

$$a(n) = C_1 1^n + C_2 (-1)^n$$

$$a(0) = C_1 + C_2 = 0$$

$$a(1) = C_1 - C_2 = 0$$

$$C_1 = C_2$$

$$C_1 + C_1 = 0$$

$$C_1 = 0$$

$$C_2 = 0$$

$$a(n) = 0$$