$\boxed{19.02.2016}$

1. $\{a, b, c, d, e, f, g, h\}$ $\quad$ abc, dužina 5

$\_\ \_\ \_\ \_\ \_ \Rightarrow$ ukupan broj : $\binom{8}{5} \cdot 5!$

$abc\ \_\ \_ \Rightarrow$ sa abc : $5 \cdot 4 \cdot 3!$

2. $7 \leq x_1 + x_2 + x_3 + x_4 \leq 12$

$$x_1 + x_2 + x_3 + x_4 = 7$$

$$x_1 + x_2 + x_3 + x_4 = 8$$

$$x_1 + x_2 + x_3 + x_4 = 9$$

$$x_1 + x_2 + x_3 + x_4 = 10$$

$$x_1 + x_2 + x_3 + x_4 = 11$$

$$x_1 + x_2 + x_3 + x_4 = 12$$

$$\binom{10}{3} + \binom{11}{3} + \binom{12}{3} + \binom{13}{3} + \binom{14}{3} + \binom{15}{3}$$

3. $(1-4x)^6 (1+3x^2)^9 =$

$$= \sum_{k=0}^{n=6} \binom{6}{k} 1^{6-k} (-4x)^k \sum_{j=0}^{n=9} \binom{9}{j} 1^{9-j} (3x^2)^j = \sum_{k=0}^{n=6} \sum_{j=0}^{n=9} (-4)^k \cdot 3^j \cdot x^{k+2j} \binom{6}{k} \binom{9}{j}$$

$k + 2j = 9$

$k = 0 \Rightarrow j = 4{,}5\ \times$

$k = 1 \Rightarrow j = 4 \quad \binom{6}{1}(-4) \cdot 3^4 \cdot \binom{9}{4}$

$k = 3 \Rightarrow j = 3 \quad \binom{6}{3}(-4)^3 \cdot 3^3 \cdot \binom{9}{3}$

$k = 5 \Rightarrow j = 2 \quad \binom{6}{5}(-4)^5 \cdot 3^2 \cdot \binom{9}{2}$

$\cancel{k = 7 \Rightarrow j = 1}$

$\cancel{k = 9 \Rightarrow j = 0}$

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4. $f_n = 3f_{n-1} - 4f_{n-3}$ $\quad f_0 = 0 \quad f_1 = 3 \quad f_2 = 21$

$t^n = 3t^{n-1} - 4t^{n-3} \quad / : t^{n-3}$

$t^3 = 3t^2 - 4 \Rightarrow t^3 - 3t^2 + 4 = 0$

+

$t^2(t+1) - 4(t-1)(t+1) = 0$

$f_n = A(-1)^n + (Bn + C)\cdot 2^n \quad (t+1)(t^2 - 4t + 4) = 0$

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$t_1 = -1 \quad t_2 = t_3 = 2$

$f_1 = 3 = -A + 2B + 2C$

$f_2 = 21 = A + 8B + 4C$

$3 = 2B + 3C$

$24 = 10B + 6C \; / : 2 \Rightarrow 12 = 5B + 3C$ $\Big\} \overset{\ominus}{\Rightarrow} 9 = 3B$

$B = 3$

$1 = 2 + C \Rightarrow C = -1 \quad A = 1$

$f_n = (-1)^n + (3n-1)\cdot 2^n$

= 0

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