Øving 10 Matte 4 Vegard G. Jervell

x_i	-2	1	6
f_i	1	2	3

Oppg 1)

$$P_n(x) = f_0 + \sum_{i=1}^{n} f[x_i, x_{i-1}, \dots, x_0] \prod_{k=0}^{i-1} (x - x_k)$$

Finner dividerte differanser

$$\begin{array}{cccc} -2 & 1 & & \\ & & 1/3 & \\ 1 & 2 & & -\frac{1}{60} \\ & & 0,2 & \\ 6 & 3 & & \end{array}$$

$$\underline{P_2(x) = \frac{1}{3}(x+2) - \frac{1}{60}(x+2)(x-1) + 1}$$

Oppg 2)

$$\begin{array}{ccccc} -2 & 1 & & & \\ & & 0,4 & & \\ -0,75 & 1,5 & & -0,038 & \\ & & 2/7 & & 3,1\cdot10^{-3} \\ 1 & 2 & & -0,013 & \\ & & 0,2 & & \\ 6 & 3 & & & \end{array}$$

$$\underline{P_3(x) = 1 + 0,4(x+2) - 0,038(x+2)(x+0,75) + 0,0031(x+2)(x+0,75)(x-1)}$$

Oppg 3)

$$f(x) \approx \sum_{i=0}^{n} f(x_i) l_i(x)$$

hvor $l_i(x)$ er lagrangefunksjonene tilhørende x_i

$$\int_a^b f(x)\,dx \approx \int_a^b \sum_{i=0}^{n} f(x_i) l_i(x)\,dx$$

$$= \sum_{i=0}^{n} f(x_i) \int_a^b l_i(x)\,dx$$

$$\int_a^b f(x)\,dx \approx \sum_{i=0}^{n} f(x_i) A_i \,, \quad A_i = \int_a^b l_i(x)\,dx \qquad \square$$

Oppg 4)

$x_0 = -1$, $x_1 = 0$, $x_2 = 1$

$$l_0(x) = \frac{(x-0)(x-1)}{(-1-0)(-1-1)}$$

$$l_1 = \frac{(x+1)(x-1)}{(0+1)(0-1)}$$

$$l_2 = \frac{(x+1)(x-0)}{(1+1)(1-0)}$$