5. 两点： $p(x)=\frac{x-0.9}{1.1-0.9}0.8912+\frac{x-1.1}{0.9-1.1}0.7833$

$p(1)=\frac{0.1}{0.2}\times0.8912+\frac{0.1}{0.2}\times0.7833=0.83725.$

三点： $p(x)=\frac{(x-0.9)(x-1.1)}{(1.3-0.9)(1.3-1.1)}0.9636+\frac{(x-0.9)(x-1.3)}{(1.1-0.9)(1.1-1.3)}0.8912+\frac{(x-1.1)(x-1.3)}{(0.9-1.1)(0.9-1.3)}0.7833$

$p(1)=\frac{-0.01}{0.08}\times0.9636+\frac{0.03}{0.04}0.8912+\frac{0.03}{0.08}\times0.7833=0.8416875$

差商表

x	f(x)	一阶	二阶	三阶	四阶.	五阶.
0.7	0.6442					
0.9	0.7833	0.6955				
1.1	0.8912	0.5395	-0.78			
1.3	0.9636	0.362	-0.8875	-0.5375		
1.5	0.9975	0.1695	-0.9625	-0.375	0.8125	
1.7	0.9917	-0.029	-0.9925	-0.15	1.125	1.5625

$p(x)=0.6442+0.6955(x-0.7)-0.78(x-0.7)(x-0.9)-0.5375(x-0.7)(x-0.9)(x-1.1)$
$\quad+0.8125(x-0.7)(x-0.9)(x-1.1)(x-1.3)+1.5625(x-0.7)(x-0.9)(x-1.1)(x-1.3)(x-1.5)$

$p(1)=0.88745312 5.$

8.

x	0	1	2	3
f	0	0	0	0

(1): $S'(0)=1 \quad S'(3)=0.$

不妨设 $S_{01}(x)=(a_1x+b_1)x(x-1) \qquad S_{12}(x)=(a_2x+b_2)(x-1)(x-2).$

$S_{23}(x)=(a_3x+b_3)(x-2)(x-3)$

则有：
$$\begin{cases} S'_{01}(0)=-b_1=1 \\ S'_{01}(1)=S'_{12}(1) \\ S'_{12}(2)=S'_{23}(2) \\ S'_{23}(3)=3a_3+b_3=0 \\ S''_{01}(1)=S''_{12}(1) \\ S''_{12}(2)=S''_{23}(2) \end{cases}$$
即
$$\begin{cases} b_1=-1 \\ a_1+b_1=-a_2-b_2 \\ 2a_2+b_2=-2a_3-b_3 \\ 3a_3+b_3=0 \\ 6a_1+2(b_1-a_1)=6a_2+2(b_2-3a_2) \\ 12a_2+2(b_2-3a_2)=12a_3+2(b_3-5a_3) \end{cases} \Rightarrow \begin{cases} a_1=0.8 \\ b_1=-1 \\ a_2=-0.4 \\ b_2=0.6 \\ a_3=-0.2 \\ b_3=0.6 \end{cases}$$

$$\text{故}\ S(x)=\begin{cases}(0.8x-1)x(x-1) & x\in[0.1) \\ (-0.4x+0.6)(x-1)(x-2) & x\in[1.2) \\ (-0.2x+0.6)(x-2)(x-3) & x\in[2,3]\end{cases}$$

(2) $\because S''(0)=1.\ S''(3)=0.$ 由(1)中设法，有:

$$\begin{cases}a_1+b_1=-a_2-b_2 \\ 2a_2+b_2=-2a_3-b_3 \\ 2a_1+b_1=b_2 \\ 3a_2+b_2=a_3+b_3 \\ 2(b_1-a_1)=1 \\ 4a_3+b_3=0\end{cases} \Rightarrow \begin{cases}a_1=-\frac{19}{90} \\ b_1=\frac{13}{45} \\ a_2=\frac{5}{90} \\ b_2=\frac{-6}{45} \\ a_3=-\frac{1}{90} \\ b_3=\frac{2}{45}\end{cases}$$

$$\text{故}\ S(x)=\begin{cases}\frac{1}{90}(-19x+26)x(x-1) & x\in[0.1) \\ \frac{1}{90}(5x-12)(x-1)(x-2) & x\in[1.2) \\ \frac{1}{90}(-x+4)(x-2)(x-3) & x\in[2,3]\end{cases}$$

10. $y=ax+b.$ $\quad a=\dfrac{\Sigma x f(x)-n\bar{x}\bar{f}(x)}{\Sigma x^2-n\bar{x}^2}$

$\bar{x}=\frac{1}{6}\Sigma x_i=66.1$ $\quad \bar{y}=\frac{1}{6}\Sigma y_i=243.$

$\Sigma x_i y_i=101176.3$ $\quad \Sigma x_i^2=28365.28$

$\Rightarrow a=2.03$ $\quad b=108.817$

故 $y=2.03x+108.817.$