P134 3.1

1(a) $P_2(x) = 1 \cdot \dfrac{(x-2)(x-3)}{(0-2)(0-3)} + 3 \cdot \dfrac{(x-0)(x-3)}{(2-0)(2-3)} + 0 \cdots = -\dfrac{4}{3}x^2 + \dfrac{11}{3}x + 1$

2(a)

$\begin{array}{c|c}
0 & 1 \\
 & \quad 1 \\
2 & 3 \qquad -\dfrac{4}{3} \\
 & \quad -3 \\
3 & 0
\end{array}$

$\therefore P(x) = 1 + 1(x-0) - \dfrac{4}{3}(x-0)(x-2)$

$= -\dfrac{4}{3}x^2 + \dfrac{11}{3}x + 1$

P140 2

(a)

$\begin{array}{c|c}
1 & 0 \\
 & \quad \ln 2 \\
2 & \ln 2 \qquad \qquad 0 - \dfrac{\ln 2}{6} \\
 & \quad \dfrac{\ln 2}{2} \\
4 & \ln 4
\end{array}$

$\therefore P(x) = 0 + \ln 2 \cdot (x-1) - \dfrac{\ln 2}{6}(x-1)(x-2)$

$= \dfrac{-\ln 2}{6}x^2 + \dfrac{3\ln 2}{2}x - \dfrac{4\ln 2}{3}$

(b) $P(X) = -\dfrac{\ln 2}{6} X^2 + \dfrac{3\ln 2}{2} X - \dfrac{4\ln 2}{3}$

$P(3) = -\dfrac{9}{6}\ln 2 + \dfrac{9}{2}\ln 2 - \dfrac{4}{3}\ln 2 = \dfrac{5}{3}\ln 2$

(c) $|\ln X - P(X)| \le \dfrac{|(X-1)(X-2)(X-4)|}{3!} f_{max}^{(3)}(X) = \dfrac{|(X-1)(X-2)(X-4)|}{3}$

当 $X=3$ 时，$|\ln 3 - P(3)| \le \dfrac{2}{3} = 0.6667$

(d) 实际误差 $\ln 3 - P(3) = 0.056633$