

$$1a) D_4 = \{(0, 0), (\pi/6, 1/2), (\pi/3, \sqrt{3}/2), (\pi/2, 1)\}$$

0	0	$\begin{matrix} \searrow \\ \searrow \\ \searrow \\ \searrow \end{matrix}$	$\frac{1/2 - 0}{\pi/6 - 0} = \frac{6}{2\pi}$	$\begin{matrix} \searrow \\ \searrow \\ \searrow \\ \searrow \end{matrix}$	$\frac{6\sqrt{3} - 6/2\pi - 6/2\pi}{\pi/3 - 0} = \frac{18\sqrt{3} - 36}{2\pi^2}$
$\pi/6$	$1/2$		$\frac{\sqrt{3}/2 - 1/2}{\pi/3 - \pi/6} = \frac{6\sqrt{3} - 6}{2\pi}$		$\frac{-6\sqrt{3} - 12/2\pi - 6\sqrt{3} - 6/2\pi}{\pi/2 - \pi/6} = \frac{-36\sqrt{3} - 18}{2\pi^2}$
$\pi/3$	$\sqrt{3}/2$		$\frac{1 - \sqrt{3}/2}{\pi/2 - \pi/3} = \frac{-6\sqrt{3} + 12}{2\pi}$		
$\pi/2$	1				

↓

$\frac{18\sqrt{3} - 36}{2\pi^2}$	$\begin{matrix} \searrow \\ \searrow \end{matrix}$	$\frac{-36\sqrt{3} - 18/2\pi^2 - 18\sqrt{3} - 36/2\pi^2}{\pi/2 - 0}$
$\frac{-36\sqrt{3} - 18}{2\pi^2}$		$\frac{-108\sqrt{3} + 36}{2\pi^3}$

$$P_4(x) = \frac{6}{2\pi}(x) + \frac{18\sqrt{3} - 36}{2\pi^2}(x)(x - \pi/6) + \frac{-108\sqrt{3} + 36}{2\pi^3}(x)(x - \pi/6)(x - \pi/3)$$

or

0	0	$\begin{matrix} \searrow \\ \searrow \\ \searrow \\ \searrow \end{matrix}$	$\frac{3}{\pi}$	$\begin{matrix} \searrow \\ \searrow \\ \searrow \\ \searrow \end{matrix}$	$\frac{9(\sqrt{3} - 2)}{\pi^2}$	$\begin{matrix} \searrow \\ \searrow \\ \searrow \\ \searrow \end{matrix}$	$\frac{18(5 - 3\sqrt{3})}{\pi^3}$
$\pi/6$	$1/2$		$\frac{3(\sqrt{3} - 1)}{\pi}$		$\frac{9(3 - 2\sqrt{3})}{\pi^2}$		
$\pi/3$	$\sqrt{3}/2$						
$\pi/2$	1		$\frac{3(2 - \sqrt{3})}{\pi}$				

$$P_4(x) = \frac{3}{\pi}(x) + \frac{9(\sqrt{3} - 2)}{\pi^2}(x)(x - \pi/6) + \frac{18(5 - 3\sqrt{3})}{\pi^3}(x)(x - \pi/6)(x - \pi/3)$$