

Solution Assignment #3 MTH603

$$f_0(x) = \frac{(x-2)(x-3)(x-4)(x-5)}{(1-2)(1-3)(1-4)(1-5)}$$

$$= \frac{x^4 - 14x^3 + 71x^2 - 154x + 120}{24}$$

$$= \frac{1}{24}x^4 - \frac{7}{12}x^3 + \frac{71}{24}x^2 - \frac{77}{12}x + 5$$

$$f_1(x) = \frac{(x-1)(x-3)(x-4)(x-5)}{(2-1)(2-3)(2-4)(2-5)}$$

$$= \frac{x^4 - 13x^3 + 59x^2 - 107x + 60}{-6}$$

$$= -\frac{1}{6}x^4 + \frac{13}{6}x^3 - \frac{59}{6}x^2 + \frac{107}{6}x - 10$$

$$f_2(x) = \frac{(x-1)(x-2)(x-4)(x-5)}{(3-1)(3-2)(3-4)(3-5)}$$

$$= \frac{x^4 - 12x^3 + 49x^2 - 78x + 40}{4}$$

$$= \frac{1}{4}x^4 - 3x^3 + \frac{49}{4}x^2 - \frac{39}{2}x + 10$$

$$f_3(x) = \frac{(x-1)(x-2)(x-3)(x-5)}{(4-1)(4-2)(4-3)(4-5)}$$

$$= \frac{x^4 - 11x^3 + 41x^2 - 61x + 30}{-6}$$

$$= -\frac{1}{6}x^4 + \frac{11}{6}x^3 - \frac{41}{6}x^2 + \frac{61}{6}x - 5$$

$$f_4(x) = \frac{(x-1)(x-2)(x-3)(x-4)}{(5-1)(5-2)(5-3)(5-4)}$$

$$= \frac{x^4 - 10x^3 + 35x^2 - 50x + 24}{24}$$

$$= \frac{1}{24}x^4 - \frac{5}{12}x^3 + \frac{35}{24}x^2 - \frac{25}{12}x + 1$$

$$\left\{ \begin{aligned}
 &y(x)=2\left(\frac{1}{24}x^4-\frac{71}{2}x^3+\frac{71}{24}x^2-\frac{77}{12}x+5\right)+ \\
 &5\left(-\frac{1}{6}x^4+\frac{13}{6}x^3-\frac{59}{6}x^2+\frac{107}{6}x-10\right)+ \\
 &7\left(\frac{1}{4}x^4-3x^3+\frac{49}{4}x^2-\frac{39}{2}x+10\right)+ \\
 &14\left(-\frac{1}{6}x^4+\frac{11}{6}x^3-\frac{41}{6}x^2+\frac{61}{6}x-5\right)+ \\
 &32\left(\frac{1}{24}x^4-\frac{5}{12}x^3+\frac{35}{24}x^2-\frac{25}{12}x+1\right)''
 \end{aligned} \right.$$

$$= x^3 - \frac{13}{2}x^2 + \frac{31}{2}x - 8$$