

1. (7) Write down the Lagrange form of the interpolating polynomial for the data  $(x, f(x)) = (1,-5), (2,6), (3,-2)$ .

**Answer:**

$$p(x) = -5 \frac{(x-2)(x-3)}{(1-2)(1-3)} + 6 \frac{(x-1)(x-3)}{(2-1)(2-3)} - 2 \frac{(x-1)(x-2)}{(3-1)(3-2)}$$

2. (8) Given that  $(x, f(x)) = (1,-5), (2,6), (3,-2)$ , compute  $f[1, 2, 3]$ .

**Answer:** Divided difference table:

$f[x]$	$f[x,y]$	$f[x,y,z]$
-5		
6	11	
-2	-8	-19/2

So  $f[1, 2, 3] = -19/2$ .

3. (5) Use the Newton basis to write the polynomial that interpolates the data  $(x, f(x)) = (1,-5), (2,6)$ .

**Answer:**

$$p(x) = f[1] + f[1, 2](x - 1) = -5 + 11(x - 1)$$