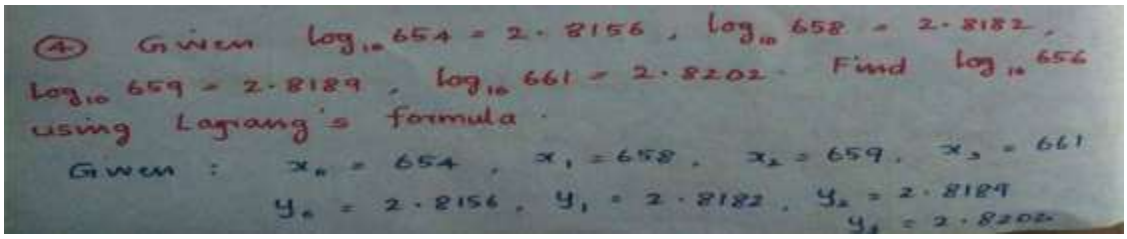
Topic: 4.3 –Problems on Lagrange's Interpolation

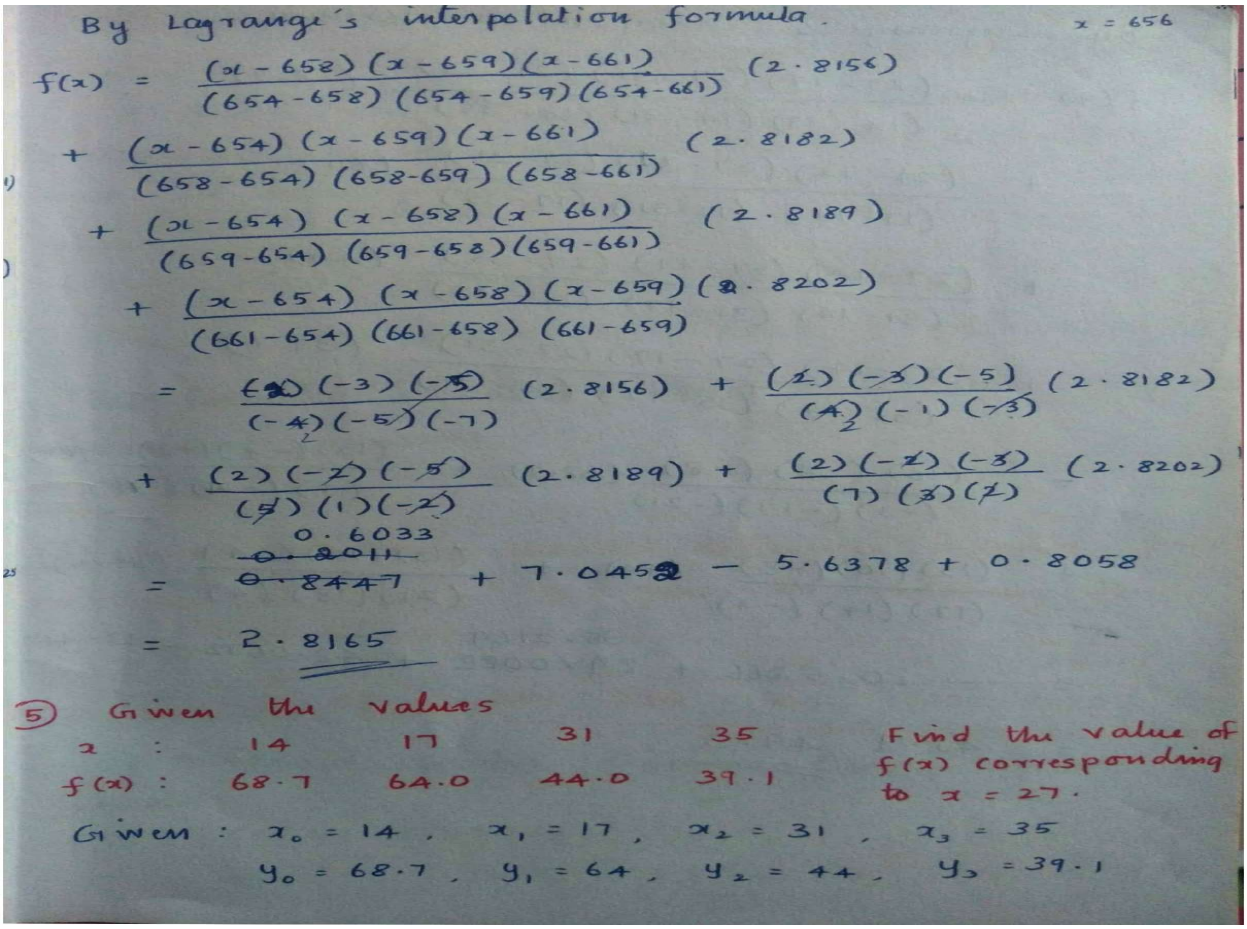


④ Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$. Find $\log_{10} 656$ using Lagrang's formula.

Given : $x_0 = 654$, $x_1 = 658$, $x_2 = 659$, $x_3 = 661$

$y_0 = 2.8156$, $y_1 = 2.8182$, $y_2 = 2.8189$

$y_3 = 2.8202$



By Lagrange's interpolation formula. $x = 656$

$$f(x) = \frac{(x-658)(x-659)(x-661)}{(654-658)(654-659)(654-661)}(2.8156) + \frac{(x-654)(x-659)(x-661)}{(658-654)(658-659)(658-661)}(2.8182) + \frac{(x-654)(x-658)(x-661)}{(659-654)(659-658)(659-661)}(2.8189) + \frac{(x-654)(x-658)(x-659)}{(661-654)(661-658)(661-659)}(2.8202)$$

$$= \frac{(-2)(-3)(-5)}{(-4)(-5)(-7)}(2.8156) + \frac{(2)(-3)(-5)}{(4)(-1)(-3)}(2.8182) + \frac{(2)(-2)(-5)}{(5)(1)(-2)}(2.8189) + \frac{(2)(-2)(-3)}{(7)(3)(2)}(2.8202)$$

$$= 0.8447 + 7.0458 - 5.6378 + 0.8058$$

$$= 2.8165$$

⑤ Given the values

x :	14	17	31	35
$f(x)$:	68.7	64.0	44.0	39.1

Find the value of $f(x)$ corresponding to $x = 27$.

Given : $x_0 = 14$, $x_1 = 17$, $x_2 = 31$, $x_3 = 35$

$y_0 = 68.7$, $y_1 = 64$, $y_2 = 44$, $y_3 = 39.1$