Exercise 9D

Question 4:

Class	Frequency f_i	Mid-value x_i	$u_i = \left(\frac{x_i - A}{h}\right)$	f_iu_i	C.F.
100-120	12	110	-2	-24	12
120-140	14	130	-1	-14	26
140-160	8	150= A	0	0	34
160-180	6	170	1	6	40
180-200	10	190	2	20	50
	N = 50			$\Sigma f_iu_i = -12$	

Let assumed mean A = 150 and h = 20

(i) Mean $= A + h\left(\frac{\Sigma f_iu_i}{N}\right) = 150 + 20 \times \left(\frac{-12}{50}\right)$

$= 150 - \frac{24}{5} = 150 - 4.8 = 145.2$

(ii) $N = 50, \frac{N}{2} = \frac{50}{2} = 25$

Cumulative frequency just after 25 is 26

$\therefore$ Corresponding frequency median class is 120 - 140

So, l = 120, f = 14, $\frac{N}{2} = 25$, h = 20, c = 12

$$\therefore \quad \text{Median} = l + h\left(\frac{\frac{N}{2} - c}{f}\right) = 120 + 20\left(\frac{25 - 12}{14}\right)$$

$$= 120 + \frac{20 \times 13}{14} = 120 + \frac{130}{7} = 120 + 18.6 = 138.6$$

(iii) Mode = 3 × Median - 2 × Mode
= 3 × 138.6 - 2 × 145.2
= 415.8 - 190.4
= 125.4
Hence, Mean = 145.2, Median = 138.6 and Mode = 125.4

********** END **********