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Arithmetic Mean

$\bar{x} = \frac{\Sigma x}{n}$ ungrouped data

$\bar{x} = \frac{\Sigma fx}{\Sigma f} = \frac{\Sigma fx}{N}$ → grouped discrete & cont.

* If the A.M is 26.75, find the missing value.

Marks (CI)	No. of students (f)	x	fx
0-10	3	5	15
10-20	(a)	15	15a
20-30	15	25	375
30-40	10	35	350
40-50	5	45	225
	33 + a		965 + 15a

$\bar{x} = \frac{\Sigma fx}{\Sigma f}$

$\Rightarrow \frac{965 + 15a}{33 + a} = 26.75$

$$\Rightarrow 965 + 15a = 26.75(33 + a)$$

$$\Rightarrow 965 + 15a = 882.75 + 26.75a$$

$$\Rightarrow 15a - 26.75a = 882.75 - 965$$

$$\Rightarrow +11.75a = +82.25$$

$$\Rightarrow a = \frac{82.25}{11.75} = 7$$

* AM $= \bar{x} = 56$

CI	f	x	fx
30-40	10	35	350 ✓
40-50	20	45	900 ✓
50-60	40	55	2200 ✓
60-70	— (a)	65	65a
70-80	8	75	600 ✓
80-90	6	85	510 ✓
	84 + a		4560 + 65a

$$\bar{x} = \frac{\Sigma fx}{\Sigma f} \Rightarrow 56 = \frac{4560 + 65a}{84 + a}$$

$$\Rightarrow 4560 + 65a = 56(84 + a)$$

$$\Rightarrow 4560 + 65a = 4704 + 56a$$

$$\Rightarrow 65a - 56a = 4704 - 4560$$

$$\Rightarrow 9a = 144 \Rightarrow a = 16$$

* AM = 21·9 Total freq. = 75

CI	f	x	fx
0 – 5	2	2·5	5
5 – 10	5	7·5	37·5
10 – 15	7	12·5	87·5
15 – 20	– (a)	17·5	17·5a
20 – 25	– (b)	22·5	22·5b
25 – 30	16	27·5	440
30 – 35	8	32·5	260
35 – 40	3	37·5	112·5
	41+a+b		942·5 + 17·5a + 22·5b

Tot. fr. = 75

$\Rightarrow 41 + a + b = 75$

$\Rightarrow a + b = 34$ ——— (1)

$\bar{x} = 21·9$

$\frac{\Sigma fx}{\Sigma f} = 21·9$

$\Rightarrow \frac{942·5 + 17·5a + 22·5b}{75} = 21·9$

$\Rightarrow 942·5 + 17·5a + 22·5b = 1642·5$

∴ $17.5a + 22.5b = 700$ — ②

$a + b = 34$ — ①