

Answer on Question #63954 – Math – Statistics and Probability

Question

The height of 40 students were measured and recorded as follows:

38.7 40.2 55.4 60.9 70.1 72.5 50.4 63.7

39.4 54.6 59.3 60.2 45.1 66.5 37.9 74.2

44.5 59.6 55.2 60.7 68.0 70.0 71.2 48.3

49.4 54.4 60.9 64.7 69.3 57.4 46.2 68.9

55.3 70.2 71.7 63.2 55.4 39.0 40.3 44.5

Using classes of 35-39, 40-44, calculate:

- i. The arithmetic mean
- ii. The standard deviation

Solution

	Class	Lower boundary	Upper boundary	Midpoint, x	Frequency, f	xf	x^2f
	35-39	34.5	39.5	37	4	148	5476
	40-44	39.5	44.5	42	4	168	7056
	45-49	44.5	49.5	47	4	188	8836
	50-54	49.5	54.5	52	2	104	5408
	55-59	54.5	59.5	57	7	399	22743
	60-64	59.5	64.5	62	7	434	26908
	65-69	64.5	69.5	67	5	335	22445
	70-74	69.5	74.5	72	7	504	36288
Total					40	2280	135160

- i. The arithmetic mean is

$$\bar{x} = \frac{\sum xf}{\sum f} = \frac{2280}{40} = 57.0 \text{ cm.}$$

- ii. The standard deviation is

$$s = \sqrt{\frac{\sum x^2f - \sum f \cdot (\bar{x})^2}{\sum f - 1}} = \sqrt{\frac{135160 - 40 \cdot (57)^2}{40 - 1}} = 11.5 \text{ cm.}$$