Assignment 3

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I. NCERT-Class-9-Statistics

Example 9: In a city, the weekly observations made in a study on the cost of living index are given in the following table:

Cost of living index	Number of weeks
140-150	5
150-160	10
160-170	20
170-180	9
180-190	6
190-200	2
Total	52

Draw the frequency polygon for the data above (without constructing a histogram).

Solution:

- **Constructing a Histogram** We can come up with a histogram for a better understanding on the arranged data.
  Representing the data, as per the given data.

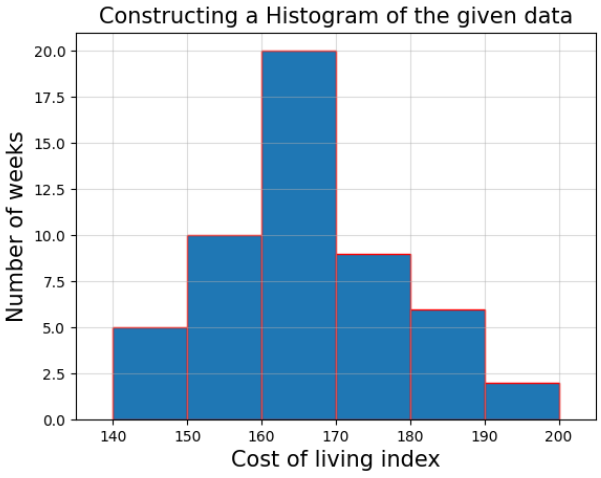

Figure 0. Histogram from the given data above.

- **Constructing a Frequency Polygon** Finding the class-marks of the above classes.
  - For 140-150, the upper-limit is 150 and the lower limit is 140.
    So the class-mark $= \frac{150+140}{2} = \frac{290}{2} = 145.$
  - For 150-160, the upper-limit is 160 and the lower limit is 150.
    So the class-mark $= \frac{160+150}{2} = \frac{310}{2} = 155.$
  - For 160-170, the upper-limit is 170 and the lower limit is 160.
    So the class-mark $= \frac{170+160}{2} = \frac{330}{2} = 165.$
  - For 170-180, the upper-limit is 180 and the lower limit is 170.
    So the class-mark $= \frac{180+170}{2} = \frac{350}{2} = 175.$
  - For 180-190, the upper-limit is 190 and the lower limit is 180.
    So the class-mark $= \frac{190+180}{2} = \frac{370}{2} = 185.$
  - For 190-200, the upper-limit is 200 and the lower limit is 190.
    So the class-mark $= \frac{200+190}{2} = \frac{390}{2} = 195.$

    Tabulating the above class-marks corresponding to their classes.

Classes	Class-marks	Frequency
140-150	145	5
150-160	155	10
160-170	165	20
170-180	175	9
180-190	185	6
190-200	195	2
Total		52

We can now draw a frequency polygon by plotting the class-marks along the horizontal axis, the frequency along the vertical axis, and then plotting and joining the points B(145,5), C(155,10), D(165,20), E(175,9),

F(185,6) and G(195,2) by line segments.

Note: We should plot the point corresponding to the class-mark of the class 130-140 (just before the lowest class 140-150) with zero frequency, i.e., A(135,0), and the point H(205,0) occurs immediately after G(195,2).

Therefore, plotting the resulting frequency polygon as ABCDEFGH. The shaded portion represents the polygon required.

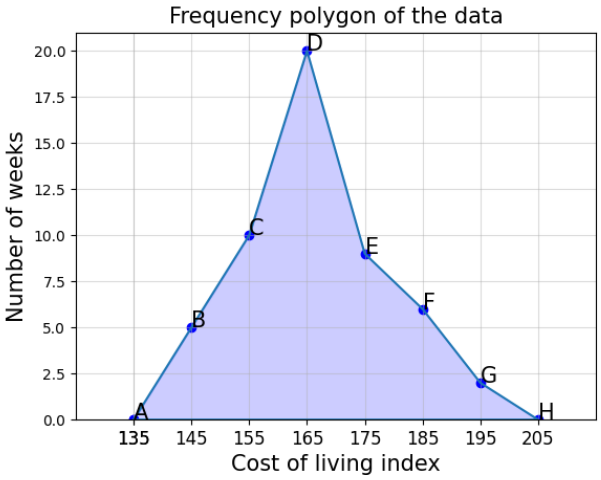

Figure 0. Frequency polygon from the given data above.