

Dated:

## Task 9:-

Example Mean, Median & Mode:-

data set:  $[4, 8, 6, 5, 3, 8, 9, 2, 8, 3]$

$$\text{mean} = \frac{4+8+6+5+3+8+9+2+8+3}{10} = \frac{56}{10} = 5.6$$

Median:  $2, 3, 3, 4, (5, 6), 8, 8, 8, 9$

$$\frac{5+6}{2} = 5.5$$

mode: Most Repeated value =

mode = 8

Problem 28. Normal Distribution.

The heights of a certain population are normally distributed with a mean of 170 cm and a standard deviation of 10 cm.

1- What is the probability that a randomly selected person has a height between 160 cm and 180 cm?

$$\text{For 160 cm} = \frac{160-170}{10} = -1$$

$$P(-1 \leq Z \leq 1) \approx 0.6826$$

$$\text{For 180 cm} = \frac{180-170}{10} = 1$$



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2. ~~Q. 2~~ What height represents the 95th percentile?

$$X = \mu + Z \cdot \sigma = 170 + 1.645 \times 10 = 186.45 \text{ cm}$$

### Problem 3: Binomial Distribution

A factory produces light bulbs, and it is known that 5% of the light bulbs are defective. A quality control inspector randomly selects 20 light bulbs.

1. What is the probability that exactly 2 light bulbs are defective?

$$\frac{8}{100} \quad n=20, k=2 \text{ and } p=0.05$$

$$\binom{20}{2} (0.05)^2 (0.95)^{18} \approx 0.1887$$

~~2. What is the probability that at most 2 light bulbs are defective?~~

### Problem 4: Uniform Distribution

The time it takes to travel to work is uniformly distributed between 30 minutes and 60 minutes.

1. What is the probability that the travel time is less than 45 minutes?

$$\frac{45-30}{60-30} = \frac{15}{30} = \frac{1}{2} = 0.5$$

Dated:

2. What is the expected travel time?

$$\frac{30+60}{2} = 45 \text{ minutes}$$

Problem 5: Basic Probability.

A box contains 5 red balls, 3 blue balls, and 2 green balls. A ball is drawn at random.

1. What is the probability of drawing a red ball?

$$P(\text{Red}) = \frac{5}{10} = \frac{1}{2}.$$

2. What is the probability of drawing a blue or green ball?

$$P(\text{Blue Or Green}) = P(\text{Blue}) + P(\text{Green}) = \frac{3}{10} + \frac{2}{10} = \frac{5}{10} = \frac{1}{2} = 0.5$$