Date

4) Normal or Gaussian Distribution.

μ = median = mode

$N(\mu, \sigma^2)$

$\mu \in R$ = mean
$\sigma^2 \in R > 0$ = Variance
$x \in R$

pdf. -- $\dfrac{1}{\sigma\sqrt{2\pi}} e^{-1/2\left(\frac{x-\mu}{\sigma}\right)^2}$

Mean = μ
Variance = σ^2 , S.D. = $\sqrt{\sigma^2} = \sigma$

Empirical Rule of Normal Distribution

$P(\mu - \sigma \leq x \leq \mu + \sigma) \approx 68\%$

$P(\mu + 2\sigma \leq x \leq \mu + 2\sigma) \approx 95\%$

$P(\mu - 3\sigma \leq x \leq \mu + 3\sigma) \approx 99.7\%$

e.g. ① Weight of the student in class
② IRIS dataset

5] Uniform Distribution

① Continuous uniform Distribution - (pdf.)

$U(a,b)$ $\quad -\infty < a < b < \infty$

$$pdf = \begin{cases} \frac{1}{b-a} & \text{for } x \in [a,b] \\ 0 & \text{o.w} \end{cases}$$

$$cdf. = \begin{cases} 0 & \text{for } x < a \\ \frac{x-a}{b-a} & \text{for } x \in [a,b] \\ 1 & \text{for } x > b \end{cases}$$

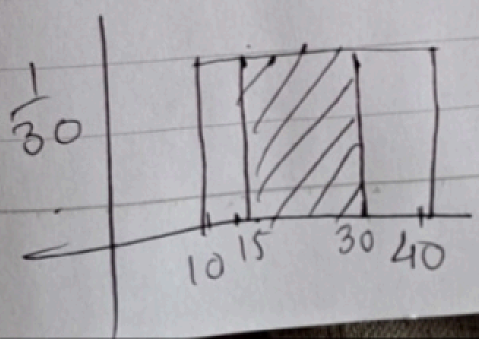
$$mean = \frac{1}{2}(a+b)$$

$$median = \frac{1}{2}(a+b)$$

$$variance = \frac{1}{12}(b-a)^2$$

e.g. The no. of candies sold at a shop is uniformly distributed with a maximum of 40 & min of 10.

i) What is the prob. of daily sales to fall betn 15 & 30.



Date

$$P(15 \le x \le 30) = (x_2 - x_1) \times \frac{1}{b-a}$$

$$= \frac{15}{30} = 0.5$$

$$P(x \geq 20) = (40-20) \cdot \frac{1}{30}$$

$$= \frac{20}{30} = \frac{2}{3} =$$

2) Discrete Uniform Distribution -

eg) Rolling a dice

$\{1, 2, 3, 4, 5, 6\}$

$U(a, b)$. a, b with $b \geq a$

pmf $= \frac{1}{n}$ $n = b - a + 1$

mean $= \frac{a+b}{2}$ = median