This formulas with labels is EXCLUSIVELY FOR STUDY PURPOSE ONLY. FOR EXAMS YOU WILL BE PROVIDED A FORMULA SHEET (without labels) Kerthi

(WITH LABEL) **Formulas**

Revenue: $R(q) = q \cdot D(q)$

Profit: $P(q) = R(q) - C(q)$

Marginal profit: $MP(q) = MR(q) - MC(q)$

consumer surplus at q_0: $\left[\int_0^{q_0} D(q)\,dq\right] - q_0 \cdot D(q_0)$

$f'(x) \cong \frac{f(x+h) - f(x-h)}{2 \cdot h}$ Difference quotient formula

Stepsize (length of subinterval or rectangle): $\Delta x = \frac{b-a}{n}$

x value: $x_i = a + i \cdot \Delta x$

midpoint: $m_i = \frac{x_{i-1} + x_i}{2}$

$S_n(f,[a,b]) = \sum_{i=1}^{n} f(m_i) \cdot \Delta x$ Midpoint sums

P.d.f for uniform r.V: $f_X(x) = \begin{cases} 0 & \text{if } x < a \\ \frac{1}{b-a} & \text{if } a \le x \le b \\ 0 & \text{if } x > b \end{cases}$

$F_X(x) = \begin{cases} 0 & \text{if } x < a \\ \frac{x-a}{b-a} & \text{if } a \le x \le b \\ 1 & \text{if } x > b \end{cases}$ C.d.f for uniform r.V

P.d.f for exponential r.V: $f_X(x) = \begin{cases} 0 & \text{if } x < 0 \\ \frac{1}{\alpha} \cdot e^{-x/\alpha} & \text{if } x \ge 0 \end{cases}$

$F_X(x) = \begin{cases} 0 & \text{if } x < 0 \\ 1 - e^{-x/\alpha} & \text{if } x \ge 0 \end{cases}$ C.d.f for exponential r.V

P.d.f for standard Normal r.V: $f_Z(z) = \frac{1}{\sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot z^2}$

$f_X(x) = \frac{1}{\sigma_X \cdot \sqrt{2 \cdot \pi}} \cdot e^{-0.5 \cdot \left(\frac{x - \mu_X}{\sigma_X}\right)^2}$ P.d.f for Normal r.V

Expected value for finite r.V: $E(X) = \sum_{\text{all } x} x \cdot f_X(x)$

expected value for Binomial r.V: $E(X) = n \cdot p$

expected value for continuous r.V: $E(X) = \int_{-\infty}^{\infty} x \cdot f_X(x)\,dx$

expected value for uniform r.V: $E(X) = \frac{a+b}{2}$

expected value for exponential r.V: $E(X) = \alpha$

Sample mean: $\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i$

Variance for finite r.V: $V(X) = \sum_{\text{all } x} (x - \mu_X)^2 \cdot f_X(x)$

Variance for Binomial r.V: $V(X) = n \cdot p \cdot (1-p)$

Variance for continuous r.V: $V(X) = \int_{-\infty}^{\infty} (x - \mu_X)^2 \cdot f_X(x)\,dx$

Variance for uniform r.V: $V(X) = \frac{(b-a)^2}{12}$

Variance for exponential: $V(X) = \alpha^2$

relationship between standard deviation & Variance: $\sigma^2 = V(X)$

Variance for $\bar{x}$ r.V: $V(\bar{x}) = \frac{V(X)}{n}$

sample standard deviation: $s^2 = \frac{1}{n-1} \cdot \sum_{i=1}^{n} (x_i - \bar{x})^2$

standardization formula: $S = \frac{X - \mu_X}{\sigma_X}$