MCQ NORMAL DISTRIBUTION

MCQ 10.1
The range of normal distribution is:
(a) 0 to n (b) 0 to ∞ (c) -1 to +1 (d) -∞ to +∞

MCQ 10.2
In normal distribution:
(a) Mean = Median = Mode (b) Mean < Median < Mode
(c) Mean > Median > Mode (d) Mean ≠ Median ≠ Mode

MCQ 10.3
Which of the following is true for the normal curve:
(a) Symmetrical (b) Unimodel (c) Bell-shaped (d) All of the above

MCQ 10.4
In a normal curve, the ordinate is highest at:
(a) Mean (b) Variance (c) Standard deviation (d) Q

MCQ 10.5
The parameters of the normal distribution are:
(a) μ and σ^2 (b) μ and σ (c) np and nq (d) n and p

MCQ 10.6
The shape of the normal curve depends upon the value of:
(a) Standard deviation (b) Q (c) Mean deviation (d) Quartile deviation

MCQ 10.7
The normal distribution is a proper probability distribution of a continuous random variable, the total area under the curve f(x) is:
(a) Equal to one (b) Less than one (c) More than one (d) Between -1 and +1

MCQ 10.8
In a normal probability distribution of a continuous random variable, the value of standard deviation is:
(a) Zero (b) Less than zero (c) Greater than zero (d) None of the above

MCQ 10.9
In a normal curve, the highest point on the curve occurs at the mean, μ, which is also the:
(a) Median and mode (b) Geometric mean and harmonic mean
(c) Lower and upper quartiles (d) Variance and standard deviation

MCQ 10.10
The normal curve is symmetrical and for symmetrical distribution, the values of all odd order moments about mean will always be:
(a) 1 (b) 0.5 (c) 0.25 (d) 0

MCQ 10.11
If X ~ N(μ, σ^2), the points of inflection of normal distribution are:
(a) ±σ (b) ±μ (c) σ ± μ (d) μ ± σ

MCQ 10.12
In normal probability distribution for a continuous random variable, the value of a mean deviation is approximately equal to:
(a) 2/3 (b) 2/3 σ (c) 4/5 (d) 4/5 σ
MCQ 10.13
In a normal distribution whose mean is land standard deviation 0, the value 4 quartile deviation is approximately:
(a) 4/5  (b) 4/5 \( \sigma \)  (c) 2/3 \( \sigma \)  (d) 2/3

MCQ 10.14
In a normal distribution, the lower and upper quartiles are equidistant from the mean and are at a distance of:
(a) 0.7979  (b) 0.7979 \( \sigma \)  (c) 0.6745  (d) 0.6745 \( \sigma \)

MCQ 10.15
The value of e is approximately equal to:
(a) 2.7183  (b) 2.1783  (c) 2.8173  (d) 2.1416

MCQ 10.16
The value of \( \pi \) is approximately equal to:
(a) 3.4116  (b) 3.1416  (c) 3.1614  (d) 3.6416

MCQ 10.17
If \( X \sim N(\mu, \sigma^2) \), the standard normal variate is distributed as:
(a) \( N(1, 0) \)  (b) \( N(0, 1) \)  (c) \( N(\mu, 0) \)  (d) \( N(0, \sigma^2) \)

MCQ 10.18
The coefficient of skewness of a normal distribution is:
(a) Positive  (b) Negative  (c) Zero  (d) Three

MCQ 10.19
The total area of the normal probability density function is equal to:
(a) 0  (b) 0.5  (c) 1  (d) 0.25

MCQ 10.20
In a standard normal distribution, the value of mode is:
(a) Equal to zero  (b) Less than zero  (c) Greater than zero  (d) Exactly one

MCQ 10.21
The normal probability density function curve is symmetrical about the mean, \( \mu \), i.e. the area to the right of the mean is the same as the area to the left of the mean. This means that \( P(X < \mu) = P(X > \mu) \) is equal to:
(a) 0  (b) 1  (c) 0.5  (d) 0.25

MCQ 10.22
The skewness and kurtosis of the normal distribution are respectively:
(a) Zero and zero  (b) Zero and one  (c) One and zero  (d) One and one

MCQ 10.23
In a normal curve \( \mu \pm 0.6745\sigma \) covers:
(a) 50% area  (b) 68.27% area  (c) 95.45% area  (d) 99.73% area

MCQ 10.24
The lower and upper quartiles for a standardized normal variate are respectively:
(a) -0.6745\( \sigma \) and 0.6745\( \sigma \)  (b) -0.6745 \( \sigma \) and 0.6745 \( \sigma \)  (c) 0.7979\( \sigma \) and 0.7979\( \sigma \)  (d) -0.7979 and 0.7979

MCQ 10.25
The maximum ordinate of a normal curve is at:
(a) \( X = \mu \)  (b) \( X = \mu + \sigma \)  (c) \( X = \mu - 2\sigma \)  (d) \( X = \sigma^2 \)
MCQ 10.26
The value of the standard deviation $\sigma$ of a normal distribution is always:
(a) Equal to zero  (b) **Greater than zero**  (c) Less than zero  (d) Equal to 0.5

MCQ 10.27
If $X \sim N(100, 64)$, then standard deviation $\sigma$ is:
(a) 100  (b) 64  (c) **8**  (d) $100 - 64 = 36$

MCQ 10.28
If $Z \sim N(0, 1)$, the coefficient of variation is equal to:
(a) Zero  (b) One  (c) **Infinity**  (d) Hundred percent

MCQ 10.29
The points of inflection of the standard normal distribution lie at:
(a) -1 and 0  (b) 0 and 1  (c) **-1 and +1**  (d) $\mu$ and $\sigma$

MCQ 10.30
If $Z \sim N(0, 1)$, then $\mu_4$ is equal to:
(a) 0  (b) 1  (c) **3**  (d) $\sigma^4$

MCQ 10.31
The value of second moment about the mean in a normal distribution is 5. The fourth moment about the mean in the distribution is:
(a) 5  (b) 15  (c) 25  (d) **75**

MCQ 10.32
If $X$ is a normal random variable having mean $\mu$, then $E[X - \mu]$ is equal to:
(a) Variance  (b) Standard deviation  (c) Quartile deviation  (d) **Mean deviation**

MCQ 10.33
If $X$ is a normal random variable having mean $\mu$, then $E(X - \mu)^2$ is equal to:
(a) $\sigma^2$  (b) $\sigma$  (c) $3\sigma^4$  (d) $\beta_1$

MCQ 10.34
Which of the following is possible in normal distribution?
(a) $\sigma < 0$  (b) $\sigma = 0$  (c) **$\sigma > 0$**  (d) $\sigma > n$

MCQ 10.35
The range of standard normal distribution is:
(a) 0 to $\infty$  (b) $0$ to $\infty$  (c) 0 to $k$  (d) **$-\infty$ to $+\infty$**

MCQ 10.36
In the normal distribution, the value of the maximum ordinate is equal to:
(a) $\frac{1}{\sqrt{2\pi}}$  (b) $\frac{1}{\sqrt{2\pi e}}$  (c) $\frac{1}{\sqrt{2\pi\sigma}}$  (d) **$\frac{1}{\sigma\sqrt{2\pi}}$**

MCQ 10.37
The value of the ordinate at points of inflection of the normal curve is equal to:
(a) $\frac{1}{\sqrt{2\pi}}$  (b) $\frac{1}{\sqrt{2\pi e}}$  (c) $\frac{1}{\sqrt{2\pi\sigma}}$  (d) **$\frac{1}{\sigma\sqrt{2\pi}}$**

MCQ 10.38
If $Z \sim N(0, 1)$, then $\beta_2$ is equal to:
(a) 0  (b) **3**  (c) $3\sigma^4$  (d) $\sigma^2$
Pearson’s constants for a normal distribution with mean $\mu$ and variance $\sigma^2$ are:

(a) $\beta_1=0, \beta_2=0, \gamma_1=0, \gamma_2=0$
(b) $\beta_1=0, \beta_2=1, \gamma_1=1, \gamma_2=3$
(c) $\beta_1=0, \beta_2=3, \gamma_1=0, \gamma_2=0$
(d) $\beta_1=3, \beta_2=0, \gamma_1=0, \gamma_2=0$

The value of maximum ordinate in standard normal distribution is equal to:

(a) $\frac{1}{\sqrt{2\pi}}$
(b) $\frac{1}{\sqrt{2\pi e}}$
(c) $\frac{1}{\sqrt{2\pi}}$
(d) $\frac{1}{\sigma \sqrt{2\pi}}$

A random variable $X$ is normally distributed with $\mu = 70$ and $\sigma^2 = 25$. The third moment about arithmetic mean is:

(a) Zero
(b) Less than zero
(c) Greater than zero
(d) None of the above

For the standard normal distribution, $P(Z > \text{mean})$ is:

(a) More than 0.5
(b) Less than 0.5
(c) Equal to 0.5
(d) Difficult to tell

Given a standardized normal distribution (with a mean of zero and a standard deviation of one), $P(Z < \text{variance})$ is equal to:

(a) 0.8413
(b) 0.3413
(c) 0.1587
(d) 0.5000

The area to the left of $(\mu+\sigma)$ for a normal distribution is approximately equal to:

(a) 0.16
(b) 0.34
(c) 0.50
(d) 0.84

The median of a normal distribution corresponds to a value of $Z$ is:

(a) 0
(b) 1
(c) 0.5
(d) -0.5

The mean and standard deviation of the standard normal distribution a respectively:

(a) 0 and 1
(b) 1 and 0
(c) $\mu$ and $\sigma^2$
(d) $\pi$ and $e$

In a standard normal distribution, the area to the left of $Z = 1$ is:

(a) 0.6413
(b) 0.7413
(c) 0.8413
(d) 0.3413

The semi-inter quartile range for a standard normal random variable $Z$ is:

(a) 0.6745
(b) 0.6745 $\sigma$
(c) 0.7979
(d) 0.7979 $\sigma$

If $X \sim N(\mu, \sigma^2)$, then $\mu_4$ is equal to:

(a) 3
(b) 3 $\sigma$
(c) 3 $\sigma^2$
(d) $3 \sigma^4$

If $X \sim N(\mu, \sigma^2)$, then $\beta_2$ is equal to:

(a) 0
(b) 3
(c) $3 \sigma^4$
(d) $\sigma^4/3$

$P(\mu-\sigma < X < \mu+\sigma)$ is equal to:

(a) 0.5000
(b) 0.6827
(c) 0.9545
(d) 0.9973
MCQ 10.52
In a normal curve $\mu \pm 2\sigma$ covers:
(a) 50% area  
(b) 68.27% area  
(c) **95.45% area**  
(d) 99.73% area

MCQ 10.53
In $X$ is $N(\mu, \sigma^2)$, the percentage of the area contained within the limits $\mu \pm 3\sigma$:
(a) 50%  
(b) 68.27%  
(c) **95.45%**  
(d) **99.73%**

MCQ 10.54
Most of the area under the normal curve with parameters $\mu$ and $\sigma$ lies between:
(a) $\mu - 0.5\sigma$ and $\mu + 0.5\sigma$  
(b) $\mu - \sigma$ and $\mu + \sigma$  
(c) $\mu - 2\sigma$ and $\mu + 2\sigma$  
(d) **$\mu - 3\sigma$ and $\mu + 3\sigma$**

MCQ 10.55
The probability density function of the standard normal distribution is:
(a) $\frac{1}{\sqrt{2\pi}} e^{-\frac{Z^2}{2}}$  
(b) $\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(Z-\mu)^2}{4\sigma^2}}$  
(c) $\frac{1}{\sqrt{2}\pi} e^{-\frac{Z^2}{2}}$  
(d) $\frac{1}{\sqrt{2\pi}} e^{-\frac{Z^2}{4}}$

MCQ 10.56
The equation of the normal frequency distribution is:
(a) $\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(X-\mu)^2}{2\sigma^2}}$  
(b) $\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(X-\mu^2)}$  
(c) $\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}(\frac{X-\mu}{\sigma})^2}$  
(d) $\frac{1}{\sqrt{2\pi}} e^{-\frac{(X-\mu)^2}{2\sigma^2}}$

MCQ 10.57
If $X$ is $N(\mu, \sigma^2)$ and if $Y = a + bX$, then mean and variance of $Y$ are respectively:
(a) $\mu$ and $\sigma^2$  
(b) $a + \mu$ and $b\sigma^2$  
(c) $a + b\mu$ and $\sigma^2$  
(d) **$a + b\mu$ and $b^2\sigma^2$**

MCQ 10.58
For a normal distribution with mean $\mu$ and standard deviation $\sigma$:
(a) **Approximately 5% of values are outside the range ($\mu - 2\sigma$) to ($\mu + 2\sigma$)**  
(b) Approximately 5% of values are greater than ($\mu + 2\sigma$)  
(c) Approximately 5% of values are outside the range ($\mu - \sigma$) to ($\mu + \sigma$)  
(d) Approximately 5% of values are less than ($\mu - 3\sigma$)

MCQ 10.59
The normal probability distribution with mean $np$ and variance $npq$ may used to approximate the binomial distribution if $n \geq 50$ and both $np$ and $nq$ are:
(a) **Greater than 5**  
(b) Less than 5  
(c) Equal to 5  
(d) Difficult to tell

MCQ 10.60
In a normal distribution $Q_1 = 20$ and $Q_3 = 40$, then mean is equal to:
(a) 20  
(b) **30**  
(c) 40  
(d) 60

MCQ 10.61
If $Z$ is a standard normal variate, then $P(-1.645 \leq Z \leq +1.645)$ is equal to:
(a) **0.90**  
(b) 0.95  
(c) 0.98  
(d) 0.99

MCQ 10.62
If $Z$ is a standard normal variate, then $P(-2.33 \leq Z \leq +2.33)$ is equal to:
(a) 0.4901  
(b) 0.6827  
(c) 0.9545  
(d) **0.9802**

MCQ 10.63
If $Z$ is a standard normal variate, then $P(- 2.575 \leq Z \leq +2.575)$ is equal to:
(a) 0.9951  
(b) **0.99**  
(c) 0.4951  
(d) 0.4949
MCQ 10.64
If \( Z \) is a standard normal variate, then \( P[|Z| < 1.96] \) is equal to:
(a) 0.0250  (b) 0.4750  (c) 0.95  (d) 0.9750

MCQ 10.65
For a normal distribution with \( \mu = 10, \sigma = 2 \), the probability of a value greater than 10 is:
(a) 0.1915  (b) 0.3085  (c) 0.6915  (d) 0.9500

MCQ 10.66
Given a random variable \( X \) which is normally distributed with a mean and variance both equal to 100. The value of mean deviation is approximately equal to:
(a) 7  (b) 8  (c) 8.5  (d) 9

MCQ 10.67
If \( X \) is a normal variate with mean 50 and standard deviation 3. The value of quartile deviation is approximately equal to:
(a) 1  (b) 1.5  (c) 2  (d) 2.5

MCQ 10.68
In a normal distribution mean is 100 and standard deviation is 10. The values of points of inflection are:
(a) 100 and 110  (b) 80 and 120  (c) 90 and 110  (d) None of the above

MCQ 10.69
If \( X \) is a normal variate with mean 20 and variance 16. The respective values of \( \beta_1 \) and \( \beta_2 \) are:
(a) 0 and 3  (b) 3 and 1  (c) 0.5 and 1  (d) 3 and 3

MCQ 10.70
If \( X \) is N(100; 5), the fourth central moment is:
(a) 65  (b) 75  (c) 85  (d) 100

MCQ 10.71
A normal distribution has the mean \( \mu = 200 \). If 70 percent of the area under the curve lies to the left of 220, the area to the right of 220 is:
(a) 0.3  (b) 0.5  (c) 0.2  (d) 0.7

MCQ 10.72
Given a normal distribution with \( \mu = 100 \) and \( \sigma^2 = 100 \), the area to the left of 100 is:
(a) One  (b) Equal to 0.5  (c) Less than 0.5  (d) Greater than 0.5

MCQ 10.73
If a normal distribution with \( \mu = 200 \) have \( P(X > 225) = 0.1587 \), then \( P(X < 175) \) equal to:
(a) 0.3413  (b) 0.8413  (c) 0.1587  (d) 0.5000

MCQ 10.74
A random variable has a normal distribution with the mean \( \mu = 400 \). If 8 percent of the area under the curve lies to the left of 500, the area between 400 and 500 is:
(a) 0.5  (b) 0.2  (c) 0.3  (d) Zero

MCQ 10.75
If \( Y = 5X + 10 \) and \( X \) is N(10, 25), then mean of \( Y \) is:
(a) 50  (b) 60  (c) 70  (d) 135

MCQ 10.76
If \( X \) is a normal random variable with mean \( \mu = 50 \) arid standard deviation \( \sigma = 7 \), if \( Y = X - 7 \) then standard deviation of \( Y \) is:
(a) 7  (b) 14  (c) 0  (d) 49