What is Normal Distribution?

Worksheet

A normal distribution is a symmetric, bell-shaped curve defined by its mean () and standard deviation (), where about 68% of data fall within 1, 95% within 2, and 99.7% within 3 of the mean.

$$f(x) = @frac{1}{@sigma@sqrt{2@pi}} e^{-@frac{(x-@mu)^2}{2@sigma^}$$

Questions

1. In a normal distribution with mean 50 and SD 5, what % of data falls between 45 and 55?

A) 50%
B) 68%
C) 95%
D) 99.7%

2. What is the z-score of a value equal to the mean?

A) -1
B) 0
C) 1
D) Undefined

3. Which best describes the shape of a normal distribution?

A) Skewed right
B) Skewed left
C) Symmetric bell curve
D) Uniform/flat

4. With mean 80 and SD 10, what is the z-score of 100?

A) 1
B) 2
C) 20
D) 0.2

5. On an IQ test with mean 100 and standard deviation 15, find the z-score for a score of 130.

6. On a test with mean 70 and standard deviation 8, find the z-score for a score of 62.

7. Heights have mean 170 cm and standard deviation 10 cm. What % of people are between 160 and 180 cm?

8. Define: What is a normal distribution?

9. Define: What is the empirical rule?

10. Define: What is a z-score?

Answer Key

1. B) 68% - 45-55 is 1, which holds about 68% of the data (empirical rule).
2. B) 0 - z = ( )/ = 0.
3. C) Symmetric bell curve - The normal distribution is a symmetric bell curve.
4. B) 2 - z = (100 80)/10 = 2.
5. z = (x)/ = (130 100)/15 z = 30/15 = 2.0 130 is 2 standard deviations above the mean
6. z = (62 70)/8 = 8/8 = 1.0 62 is 1 standard deviation below the mean
7. 160 = 1 (17010), 180 = + 1 (170+10) The range is 1 about 68% of the data (empirical rule)
8. A symmetric, bell-shaped probability distribution centered on the mean.
9. About 68% of data lies within 1, 95% within 2, and 99.7% within 3 of the mean.
10. How many standard deviations a value is from the mean: z = (x)/.