THE NORMAL DISTRIBUTION

KEY WORDS & DEFINITIONS

The Normal Distribution

A continuous probability distribution that can be used to model variables that are more likely to be grouped around a central value than at extremities.

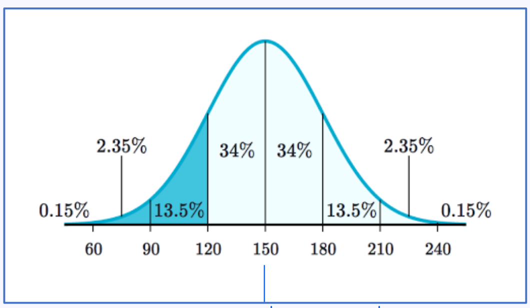
THE NORMAL DISTRIBUTION CURVE

Symmetrically bell-shaped, with asymptotes at each end.

68% percent of data is within one s.d. of μ

95% percent of data is within two s.d. of μ

99.7% percent of data is within three s.d. of μ



mean = median = mode

THE NORMAL DISTRIBUTION TABLE

To find z-values that correspond to given probabilities, i.e. $P(Z > z) = p$ use this table:

p	z	p	z
0.5000	0.0000	0.0500	1.6449
0.4000	0.2533	0.0250	1.9600
0.3000	0.5244	0.0100	2.3263
0.2000	0.8416	0.0050	2.5758
0.1500	1.0364	0.0010	3.0902
0.1000	1.2816	0.0005	3.2905

CALCULATORS FOR NORMAL DISTRIBUTION

Casio fx-991EX:

Menu 7 – Normal PD, Normal CD or Inverse Normal

Casio CG50:

Menu 2 - F5 Dist – F1 Normal – Npd, Ncd or InvN

Choose extremely large or small values for upper or lower limits as appropriate

WHAT DO I NEED TO KNOW

1. The area under a continuous probability distribution curve = 1

2. If X is a normally distributed random variable, with population mean, μ, and population variance, σ^2 we say $X \sim N(\mu, \sigma^2)$

3. To find an unknown value that is a limit for a given probability value, use the inverse normal distribution function on the calculator.

4. The notation of the standard normal variable Z is $Z \sim N(0, 1^2)$

5. The formula to standardise X is $z = \dfrac{x-\mu}{\sigma}$

6. The notation for the probability $P(Z < a)$ is $\phi(a)$

7. To find an unknown mean or standard deviation use coding and the standard normal variable, Z.

8. Conditions for a Binomial distribution to be approximated by a Normal distribution:
n must be large
p must be close to 0.5

9. The mean calculated from an approximated Binomial distribution is $\mu = np$

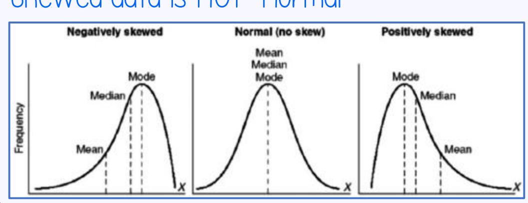
10. The variance calculated from an approximated Binomial distribution is $\sigma^2 = np(1-p)$

11. Apply a continuity correction when calculating probabilities from an approximated Binomial distribution using limits so that the integers are completely included or excluded, as required.

12. The mean of a sample from normally distributed population, is distributed as:

$$\bar{X} \sim N\left(\mu, \frac{\sigma^2}{n}\right) \quad \text{then} \quad z = \frac{\bar{X}-\mu}{\frac{\sigma}{\sqrt{n}}}$$

13. Skewed data is NOT 'Normal'



@Lucyjc1612