Paired Sample Sign Test

Tests which do not require the knowledge or assumption that the data involved is normally distributed are known as **distribution-free** or **non-parametric** tests.

The **paired sign test** involves allocating a + or - sign to the difference between each pair of readings and uses a binomial model with $p=\frac{1}{2}$ to determine the critical region

N.B. If a pair of reading are equal (and therefor the difference is 0) we discount this from the test

How to identify a paired sign test:

✓ the question states that it is 'distribution free' or 'non-parametric'

✓ there is two sets of data which are paired (bivariate)

✓ the data may be qualitative

Important notation:

- μ = population mean
- η = population average
- σ = population standard deviation
- n = total number in the population
- p = probability of success

Variables	

H_0:	$\eta_{\text{difference}} = 0$
H_1:	$\eta_{\text{difference}} \neq$ or $<$ or $>$ population average stated in the question

1 if > or < 2 if ≠	Tailed test
5% unless otherwise stated	Significance level
n =	The number of pairs that are NOT EQUAL
Test Statistic:	Count the number of + and - signs

IF Ho is true then $P(\eta_d < 0) = P(\eta_d > 0) = 0.5$

Hence:	B (n , 0.5)
Compare:	Use the binomial distribution stated above to look for the value of X which satisfies the significance level REMEMBER to half the significance level if conducting 2 tailed test
Critical Region:	$P(X \leq x) = p <$ significance level

Conclude:	
Hence we REJECT Ho when the test statistic lies in the critical region	
Therefore there is	