

Formulas to Know for Gateway Statistics Exam

1) Mean: $\mu = \frac{\sum x}{N}$, $\bar{x} = \frac{\sum x}{n}$, $E(x) = \sum xP(x)$

2) Standard Deviation: $\sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}}$, $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}} = \sqrt{\text{sample variance}}$

3) Standard error of the mean: $\sigma_{\bar{x}} = \sigma / \sqrt{n}$

4) Frequency Distribution: class width = $\frac{\text{Max} - \text{Min}}{\# \text{ classes}}$

5) z statistic for testing hypotheses about the mean: $z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$

6) t statistic for testing hypotheses about the mean: $t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$

7) Confidence Interval for the mean

(z) $\mu = \bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}} = \bar{x} \pm (\text{interval width})/2$

(t) $\mu = \bar{x} \pm t_{\alpha/2} \frac{s}{\sqrt{n}}$, with n-1 d.f.

8) Confidence Interval for a proportion: $\mu = p \pm z_{\alpha/2} \sqrt{\frac{p(1-p)}{n}}$, where

$\mu = \frac{\# \text{ successes in the population}}{\text{population size}}$, $p = \frac{\# \text{ successes in the sample}}{\text{sample size}}$, $P(z > z_{\alpha/2}) = \frac{\alpha}{2}$

9) Regression Equation: $\hat{Y} = b_0 + b_1x$

10) Standard error of estimate: the estimated standard deviation of Y about the regression line.

11) Coefficient of determination: R^2 = the percentage of the variation in Y that can be explained by the variation in X.