

# STAT 305 Exam I

## Reference Sheet

### Numeric Summaries

mean  $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$

population variance  $\sigma^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$

population standard deviation  $\sigma = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}$

sample variance  $s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$

sample standard deviation  $s = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2}$

### Functions

**Quantile Function**  $Q(p)$  For a univariate sample consisting of  $n$  values that are ordered so that  $x_1 \leq x_2 \leq \dots \leq x_n$  and value  $p$  where  $0 \leq p \leq 1$ , let  $i = \lfloor n \cdot p + 0.5 \rfloor$ . Then the quantile function at  $p$  is:

$$Q(p) = x_i + (n \cdot p + 0.5 - i)(x_{i+1} - x_i)$$