

STA2023: Test 3 formulas

Probability distribution:

$$\text{Mean, } \mu = \sum x \cdot p(x)$$

$$\text{Variance, } \sigma^2 = \sum x^2 \cdot p(x) - \mu^2$$

$$\text{Standard deviation: } \sigma = \sqrt{\sum x^2 \cdot p(x) - \mu^2}$$

Binomial Distribution:

$$\text{mean, } \mu = n \cdot p$$

$$\text{Variance: } \sigma^2 = n \cdot p \cdot q$$

$$\text{Standard deviation: } \sigma = \sqrt{n \cdot p \cdot q}$$

Probability of exactly  $x$  successes on  $n$  trials with probability of success on an individual trial =  $p$ :

$$P(x) = {}_n C_x \cdot p^x \cdot q^{n-x} \qquad p + q = 1$$

Normal Distribution:

z-score:

$$z = \frac{x - \mu}{\sigma}$$

If a sample of size  $n > 1$  is taken, by the Central Limit Theorem,

$$Z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$