

# **Grade 12 Math of Data Management**

MDM4U

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## Chapter 2

# Normal Distribution

## 2.1 Approximate Binomial

At certain situation, we can use a normal distribution to approximate a Binomial distribution

### Theorem 2.1.1

*If  $X$  is a binomial random distribution of  $n$  independent trials, each with probability of success  $p$ , and if*

$$\begin{aligned} np &> 5 \\ n(1 - p) &> 5 \end{aligned}$$

*then the binomial random variable can be approximated by a normal distribution with*

$$\begin{aligned} \mu &= np \\ \sigma &= \sqrt{np(1 - p)} \end{aligned}$$

## 2.2 Approximate Hypergeometric

If the population size  $N$  is fairly large, and the sample size is relatively small, we can use a Normal Distribution to simulate Hypergeometric

### **Theorem 2.2.1**

*If  $X$  is a hypergeometric random distribution of  $n$  independent trials, each with probability of success  $p$ , and if*

$$\frac{n}{N} < \frac{1}{10}$$
$$n(1-p) > 5$$

*then the binomial random variable can be approximated by a normal distribution with*

$$\mu = np$$
$$\sigma = \sqrt{np(1-p)}$$