Formulas

Probability Rules:

Complements A and $A^C$: $P(A^C) = 1 - P(A)$
$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
$P(A \text{ and } B) = P(A) \times P(B | A) = P(B) \times P(A | B)$

A and B are disjoint events i.e. mutually exclusive if $P(A \text{ and } B) = 0$, they cannot occur at the same time.
A and B are independent events if $P(A) = P(A | B)$ or $P(B) = P(B | A)$

Discrete random variable: $x$
Probability distribution: $0 \leq P(x) \leq 1$, $\sum P(x) = 1$
Mean: $\mu = \sum xP(x)$

Binomial random variable: $x$ counts the number of successes in $n$ independent trials where the probability of success on any one trial is $p$
Probability function: $P(x) = \binom{n}{x} p^x (1 - p)^{n-x}$ $x = 0, 1, 2, \ldots, n$
Mean: $\mu = np$, Standard deviation: $\sigma = \sqrt{np(1 - p)}$

Normal random variable, $y$:
Mean: $\mu$, Standard deviation: $\sigma$
Standardize: $z = \frac{y - \mu}{\sigma}$

Distribution of the sample proportion, $\hat{p}$:
Shape: approximately normal,
Mean: $p$, Standard deviation: $\sigma(\hat{p}) = \sqrt{\frac{p(1 - p)}{n}}$
Standardize: $z = \frac{\hat{p} - p}{\sigma(\hat{p})}$

Distribution of the sample mean, $\bar{y}$:
Shape: approximately normal,
Mean: $\mu$, Standard deviation: $\sigma(\bar{y}) = \frac{\sigma}{\sqrt{n}}$
Standardize: $z = \frac{\bar{y} - \mu}{\sigma(\bar{y})}$