mean	quantitative variables, typical score
median	skewed distribution, want central score, ordinal variables
mode	categorical variables, most common score

interquartile range: divide at median, then find medians of those groups
IQR = Q3-Q1

$$s = \frac{\sqrt{\Sigma(x_i - \overline{x})^2}}{N-1}$$ standard deviation.

If adding a constant, mean will add constant, SD will not change
If multiplying by a constant, mean will multiply, SD will multiply

$$z_i = \frac{(x_i - \overline{x})}{s}$$ z-transformation.

For a normal distribution:
68% within 1 SD
95% within 2 SD
99.7% within 3 SD

P(E or F) = P(E) + P(F) – P(E and F) [except if mutually exclusive]

$$P(\mathrm{A}|\mathrm{C}) = \frac{P(\mathrm{A\ and\ C})}{P(\mathrm{C})}$$

P(E and F) = P(F) · P(E|F)

Bayes' Theorem: $P(F|E) = \dfrac{P(E|F)}{P(E)}$

$\sum p_i \cdot \text{value}(i)$ expected value. *don't forget to sum over all possible outcomes

Central limit theorem: Sum of many independent random variables tends to be randomly distributed.

For percentiles:
1. z(x) is the point at which 2(100 – x) = 100 – area(x); that is, area(x) = 2x – 100
2. Transform back to raw score by multiplying z by SD and adding mean.

Normal quantile plot
Concave up means positive skew
Concave down means negative skew

$${}_nC_r = \frac{N!}{k!(N-k)!}$$

In a binomial experiment,
$\mu = np$
$\sigma^2 = npq$
$q = 1 - p$

For any combination of random variables,
$z = x + y$
$\sigma^2 z = \sigma^2_x + \sigma^2_y$
$\mu_z = \mu_x + \mu_y$
$E(z) = E(x) + E(y)$

Standard error of the mean $\sigma_m = \dfrac{\sigma}{\sqrt{N}}$

T-testing.
$t = \dfrac{m - \mu}{s/\sqrt{N}}$. If this $t < t_{crit}$, then not statistically significant.

Confidence intervals
(for binomial experiments)
95% CI = $p' \pm 1.96 * \sigma_p$
(for continuous random variables)
95% CI = $m \pm 1.96 * SEM$