Formula Card

Key of Variables and Notation

Σ means to sum what follows	$\hat{y}$ = estimate (prediction) of y	t_α= t-score with probability of α to the right
x = data value	μ = population mean	ME = margin of error
n = sample size	σ = population standard deviation	p_0= hypothesized proportion
Q_1, Q_2, Q_3 = 1^{st}, 2^{nd}, and 3^{rd} quartiles	p = probability, population proportion, or p-value	μ_0 = hypothesized mean
$z_{\alpha/2}$ = z-score where $\alpha/2$ is the area to the right of z	p′= sample proportion = x/n, where x is the number of successes	q = 1-p
s_x = sample standard deviation of all x-values	df = degrees of freedom = n-1	α= significance level

Term	Formula/Notation	Calculator
	Chapter 1	
Random Integers		MATH > PRB > 5:randInt(min, max, number of integers)
	Chapter 2	
Histogram, Scatterplot, or Boxplot	-	2nd > StatPlot > 1 > Histogram, Scatterplot or Boxplot > Zoom > 9
Sample Mean	$\bar{x} = \frac{\sum x}{n}$	Stat > Calc > 1-VarStats
Sample Standard Deviation	$s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$	Stat > Calc > 1-VarStats
Range	*Range = max - min*	-
Interquartile Range (IQR)	*Interquartile range = Q3-Q1*	-
Potential Outliers	*Outliers = Above Q3+1.5*IQR or below Q1-1.5*IQR*	Modified Boxplot (see above)
Five-Number Summary	*(Min, Q1, Med, Q3, Max)*	Stat > Calc > 1-VarStats
z-Score	$z\text{-}score = \frac{observed\ value - mean}{standard\ deviation\ (\sigma, s, \text{or } \sigma_{\bar{x}})}$	-
Empirical Rule	*68% within 1σ, 95% w/in 2σ, and 99.7% w/in 3σ*	-
kth Percentile	*i = k/100(n+1)*	-
	Chapter 3	
Probability of Event A	$P(A) = \frac{\#\ outcomes\ in\ A}{\#\ outcomes\ total\ in\ Sample\ Space}$	-
Complement of Event A	$P(A') = 1 - P(A)$	-
Addition Rule	$P(A\ or\ B) = P(A) + P(B) - P(A\ \&\ B)$	-
Conditional Probability	$P(A \mid B) = \frac{P(A\ \&\ B)}{P(B)}$	-
Independence Tests	$P(A \mid B) = P(A)$ $P(A\ \&\ B) = P(A) \cdot P(B)$	-
Multiplication Rules	$P(A\ \&\ B) = P(A) \cdot P(B)$ *** *if* *** *A and B are independent.* $P(A\ \&\ B) = P(A \mid B) \cdot P(B)$, *always.*	-
	Chapter 4	
Mean of Discrete Probability Distribution	$\mu = \sum x \cdot P(x)$	Stat > Calc > 1-VarStats L1, L2 where L1 is x and L2 is P(X)
Standard Deviation of Discrete Probability Distribution	$\sigma = \sqrt{\sum (x-\mu)^2 \cdot P(x)}$	Stat > Calc > 1-VarStats L1, L2 where L1 is x and L2 is P(X)

Binomial Probability	$\text{P}(\text{x} = \text{a}) = {}_nC_a \cdot p^a \cdot q^{n-a}$ (I would always use binompdf & binomcdf instead.)	2nd > DISTR > binom**p**df(n, p, exact number) or binom**c**df(n, p, this number or fewer)
Mean & Standard Deviation of Binomial Probability	$\mu = n \cdot p$ $\sigma = \sqrt{n \cdot p \cdot (1-p)}$	
	Chapter 6	
Probability, Given z	Table A	2nd > DISTR > normalcdf(min, max, mu, sigma or s.e.)
z, Given Probability to left	Table A	2nd > DISTR > invNorm(area to left)
x, Given Probability to left	$x = \mu + z \cdot \sigma$	2nd > DISTR > invNorm(area to left, mu, sigma or s.e.)
	Chapter 7	
Mean of Sampling Distribution: Means	$\mu_{\bar{x}} = \mu$	-
Standard Deviation (Error) for Sample Means	$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ or $\frac{s}{\sqrt{n}}$	-
	Chapter 8	
Standard Deviation (Error) for Sample Proportions	$\sigma_{p'} = \sqrt{\frac{p'(1-p')}{n}}$	-
Margin of Error: Proportions	$ME = z\sqrt{\frac{p'(1-p')}{n}}$	-
Margin of Error: Means	$ME = t_{\alpha/2} \cdot \frac{s}{\sqrt{n}} = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$	-
Confidence Interval: Proportions	$Interval = p' \pm z\sqrt{\frac{p'(1-p')}{n}}$	Stat > Tests > 1-PropZInt
Confidence Interval: Means	$Interval = \bar{x} \pm t_{\alpha/2} \cdot \frac{s}{\sqrt{n}}$	Stat > Tests > TInterval (or zInterval if σ is known)
Sample Size: Proportions	$n = \frac{p'(1-p')z^2}{m^2}$	-
Sample Size: Means	$n = \frac{\sigma^2 z^2}{m^2}$ or $\frac{s^2 z^2}{m^2}$	-
	Chapter 9	
z-Score: Proportion	$z = \frac{p' - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$	Stat > Tests > 1-PropZTest
t-Score: Mean	$t = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$	Stat > Tests > T-Test
	Chapter 12	
Correlation	r	Stat > Calc > 8: LinReg
Residual	$residual = y - \hat{y}$	-
Regression Line	$\hat{y} = a + bx$	Stat > Calc > 8: LinReg