Summary Table for Statistical Techniques

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|   | Inference | Parameter | Statistic | Type ofData | Examples | Analysis | MinitabCommand | Conditions |
| 1 | Estimating amean | Onepopulationmean µ  | sample mean  | numerical | What is the averageweight of adults?What is the averagecholesterol level ofadult females?  | 1-sample t-interval  | Stat>Basicstatistics>1-sample t  | data approximately normalorhave a large samplesize (n ≥ 30)  |
| 2 | Test about amean | Onepopulationmean µ  | sample mean  | numerical | Is the average GPAof juniors at PennState higher than3.0?Is the averageWinter temperaturein State Collegeless than 42ْ F? | Ho: µ = µoHa: µ ¹ µoor Ha: µ > µoor Ha: µ < µoThe one sample t test: | Stat>Basicstatistics>1-sample t | data approximately normalorhave a large samplesize (n ≥ 30)  |
| 3 | Estimating aproportion | Onepopulationproportionp  | sampleproportion | categorical(binary) | What is theproportion of malesin the world?What is theproportion ofstudents that smoke?  | 1-proportion Z-interval  | Stat>Basicstatistics>1-sampleproportion | n≥ 10 and n (1-) ≥ 10 |
| 4 | Test about aproportion | Onepopulationproportionp  | sampleproportion | categorical(binary) | Is the proportionof females differentfrom 0.5?Is the proportion ofstudents who failStat200 less than0.1? | Ho: p = poHa: p ¹ poor Ha: p > poor Ha: p < poThe one proportion Z-test:   | Stat>Basicstatistics>1-sampleproportion | n po³ 10andn (1-po) ³ 10 |
|   | Inference | Parameter | Statistic | Type ofData | Examples | Analysis | MinitabCommand | Conditions |
| 5 | Estimating thedifference oftwo means | difference intwopopulationmeansµ1-µ2  | difference intwo samplemeans  | numerical | How different arethe mean GPAs ofmales and females?How many fewercolds do vitamin Ctakers get, onaverage, than nonvitamin C takers?  | two-sample t-interval  See text, page 445, forthe s.e. of the difference | Stat>Basicstatistics>2-sample t  | independent samples fromthe two populationsdata in each sample areabout normal or largesamples (ni ≥ 30)  |
| 6 | Test tocompare twomeans | difference intwopopulationmeansµ1-µ2  | difference intwo samplemeans  | numerical | Do the mean pulserates of exercisersand non-exercisersdiffer?Is the mean EDSscore for dropoutsgreater than themean EDS score forgraduates? | Ho: µ1 = µ2Ha: µ1 ¹ µ2or Ha: µ1 > µ2or Ha: µ1 < µ2The two sample t test:See text, page 445, forthe s.e. of the difference | Stat>Basicstatistics>2-sample t | independent samples fromthe two populationsdata in each sample areabout normal or largesamples (ni ≥ 30)  |
| 7 | Estimating amean withpaired data | mean ofpaireddifferenceµD  | sample meanofdifference | numerical | What is thedifferencein pulse rates, on theaverage, before andafter exercise?   | paired t-interval  | Stat>Basicstatistics>Paired t | differences approximatelynormalorhave a large numberof pairs (n ≥ 30)  |
| 8 | Test about amean withpaired data | mean ofpaireddifferenceµD  | sample meanofdifference | numerical | Is the difference inIQ of pairs of twinszero?Are the pulse ratesof people higherafter exercise? | Ho: µD = 0Ha: µD ¹ 0or Ha: µD > 0or Ha: µD < 0 | Stat>Basicstatistics>Paired t | differences approximatelynormalorhave a large numberof pairs (n ≥ 30)  |

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| 9 | Estimating thedifference oftwoproportions | difference intwopopulationproportionsp1-p2  | difference intwo sampleproportions  | categorical(binary) | How different arethe percentages ofmale and femalesmokers?How different arethe percentages ofupper- and lower-class bingedrinkers?  | two-proportions Z-interval  See notes for s.e. formula | Stat>Basicstatistics>2 proportions | independent samplesfrom the two populationsn≥ 10 and (1-n)≥ 10for each sample |
| 10 | Test tocompare twoproportions | difference intwopopulationproportionsp1-p2  | difference intwo sampleproportions  | categorical(binary) | Is the percentage ofmales with lungcancer higherthan the percentageof females with lungcancer?Are the percentagesof upper- and lower-class binge drinkersdifferent? | Ho: p1 = p2Ha: p1 ¹ p2or Ha: p1 > p2or Ha: p1 < p2The two proportion z test: See notes for s.e. formula | Stat>Basicstatistics>2 proportions | independent samplesfrom the two populationsn≥ 10 and (1-n)≥ 10for each sample |
| 11 |    Relationshipin a 2-waytable   | relationshipbetween twocategoricalvariablesordifference intwo or morepopulationproportions  | the observedcounts in atwo-way table | categorical | Is there arelationshipbetween smokingand lung cancer?Do the proportionsof students in eachclass who smokediffer?  | Ho: The two variables arenot relatedHa: The two variables arerelatedThe chi-square statistic: | Stat>Tables>CrossTabu-lation >Chi-Square analysis forFor summarizedData: Stat>Tables> Chi-Square. |   all expected counts shouldbe greater than 1at least 80% of the cellsshould have an expectedcount greater than 5   |

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| 12 | Test about aslope | slope of thepopulationregressionline b1  | sampleestimate ofthe slopeb1 | numerical | Is there a linearrelationship betweenheight and weight ofa person? | Ho: b1= 0Ha: b1 ¹ 0or Ha: b1 > 0or Ha: b1 < 0The t test with n-2 degrees offreedom: | Stat>Regression>Regression | the form of the equationthat links the two variablesmust be correctthe error terms are normallydistributedthe errors terms haveequal variancesthe error terms areindependent of each other |
| 13 | Test tocompareseveralmeans  | Populationmeans of thek populationsµ1,µ2,….., ,µk  | Sample meansof the kpopulationsx1,x2,….., ,xk | numerical | Is there a differencebetween the meanGPA of Freshman,Sophomore, Juniorand Senior classes? |  Ho: µ1=µ2=˙˙˙ =µkHa: not all the means areequalThe F test for one-wayANOVA:  | Stat>ANOVA>Oneway | each population is normallydistributedindependent samples fromthe k populationsequal population standarddeviations  |