***Descriptive Statistics***:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Term | **Meaning** | **Population Formula** | **Sample Formula** | **Example {1,16,1,3,9}** |
| **Sort** | Sort values in increasing order |  |  | {1,1,3,9,16} |
| **Mean** | Average |  |  | 6 |
| **Median** | The middle value – half are below and half are above |  |  | 3 |
| **Mode** | The value with the most appearances |  |  | 1 |
| Variance | The average of the squared deviations between the values and the mean |  |  | (1-6)2 + (1-6) 2 + (3-6)2 + (9-6)2 + (16-6)2 divided by 5 values = 168/5 = 33.6 |
| **Standard Deviation** | The square root of Variance, thought of as the “average” deviation from the mean. |  |  | Square root of 33.6 = 5.7966 |
| **Coefficient of Variation** | The variation relative to the value of the mean |  |  | 5.7966 divided by 6 = 0.9661 |
| **Minimum** | The minimum value |  |  | 1 |
| **Maximum** | The maximum value |  |  | 16 |
| **Range** | Maximum minus Minimum |  |  | 16 – 1 = 15 |

***Probability Terms***:

|  |  |  |  |
| --- | --- | --- | --- |
| Term | **Meaning** | **Notation** | **Example\* (see footnote)** |
| **Probability** | For any event A, probability is represented within 0 ≤ P ≤1. | P() | 0.5 |
| **Random Experiment** | A process leading to at least 2 possible outcomes with uncertainty as to which will occur. |  | Rolling a dice |
| **Event** | A subset of all possible outcomes of an experiment. |  | Events A and B |
| **Intersection of Events** | Let A and B be two events. Then the intersection of the two events is the event that both A and B occur (logical AND). | A∩B | The event that a 2 appears |
| **Union of Events** | The union of the two events is the event that A or B (or both) occurs (logical OR). | A∪B | The event that a 1, 2, 4, 5 or 6 appears |
| **Complement** | Let A be an event. The complement of A is the event that A does not occur (logical NOT). |  | The event that an odd number appears |
| **Mutually Exclusive Events** | A and B are said to be mutually exclusive if at most one of the events A and B can occur. |  | A and B are not mutually exclusive because if a 2 appears, both A and B occur |
| **Collectively Exhaustive Events** | A and B are said to be collectively exhaustive if at least one of the events A or B must occur. |  | A and B are not collectively exhaustive because if a 3 appears, neither A nor B occur |
| **Basic Outcomes** | The simple indecomposable possible results of an experiment. One and exactly one of these outcomes must occur. The set of basic outcomes is mutually exclusive and collectively exhaustive. |  | Basic outcomes 1, 2, 3, 4, 5, and 6 |
| **Sample Space** | The totality of basic outcomes of an experiment. |  | {1,2,3,4,5,6} |

\* Roll a fair die once. Let A be the event an even number appears, let B be the event a 1, 2 or 5 appears

***Probability Rules***:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***If events A and B are mutually* exclusive** | | |  | ***If events A and B are NOT mutually* exclusive** | | | |
| Term | Equals | **Area:** |  | Term | Equals | **Venn:** |  |
| P(A)= | P(A) |  |  | P(A)= | P(A) |  |  |
| P()= | 1 - P(A) |  |  | P()= | 1 - P(A) |  |  |
| P(A∩B)= | 0 |  |  | P(A∩B)= | P(A) \* P(B)  *only if A and B are independent* |  |  |
| P(A∪B)= | P(A) + P(B) |  |  | P(A∪B)= | P(A) + P(B) – P(A∩B) |  |  |
|  |  |  |  | P(A|B)=  *[****Bayes' Law****: P(A holds given that B holds)]* |  | **÷** | **÷** |
| ***General probability rules***:    ***1)*** If **P(A|B) = P(A)**, then A and B are **independent events**! (for example, rolling dice one after the other).  ***2)*** If there are *n* possible outcomes which are equally likely to occur:  P(outcome i occurs) =  for each *i* ∈ [1, 2, ..., *n*]  *\*Example: Shuffle a deck of cards, and pick one at random. P(chosen card is a 10♦) = 1/52.*  ***3)*** If event A is composed of ***n* equally likely basic outcomes**:  P(A) =  *\*Example: Suppose we toss two dice. Let A denote the event that the sum of the two dice is 9. P(A) = 4/36 = 1/9, because there are 4 out of 36 basic outcomes that will sum 9.* | | |
|
|
|  | P(A∩B) = P(A|B) \* P(B) | |  | |
|  | P(A∩B) = P(B|A) \* P(A) | |
|  | P(A)= | P(A∩B) + P(A∩)  =  **P(A|B)P(B) + P(A|)P( )** | **+** | **+** |
|  | \*Example: Take a deck of 52 cards. Take out 2 cards sequentially, but don’t look at the first. The probability that the second card you chose was a ♣ is the probability of choosing a ♣ (event A) after choosing a ♣ (event B), plus the probability of choosing a ♣ (event A) after not choosing a ♣ (event B), which equals (12/51)(13/52) + (13/51)(39/52) = 1/4 = 0.25. | | | |

***Random Variables and Distributions***:

To calculate the **Expected Value** , use the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| ∇ \* ∇ = ∇ | | | |
| **Event** | **Payoff** | **Probability** | **Weighted Payoff** |
| [name of first event] | [payoff of first event in $] | [probability of first event 0≤P≤1] | [product of Payoff \* Probability] |
| [name of second event] | [payoff of second event in $] | [probability of second event 0≤P≤1] | [product of Payoff \* Probability] |
| [name of third event] | [payoff of third event in $] | [probability of third event 0≤P≤1] | [product of Payoff \* Probability] |
| \* See example in BOOK 1 page 54 | | **Total (Expected Payoff):** | [total of all Weighted Payoffs above] |

To calculate the **Variance** Var(X) = and **Standard Deviation** , use:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ∇ - ∇ = ∇ ^2= ∇ \* ∇ = ∇ | | | | | | |
| **Event** | **Payoff** | **Expected Payoff** | **Error** | **(Error)2** | **Probability** | **Weighted (Error)2** |
| [1st event] | [1st payoff] | [Total from above] | [1st payoff minus Expected Payoff] | 1st Error squared | 1st event’s probability | 1st (Error)2 \* 1st event’s probability |
| [2nd event] | [2nd payoff] | [Total from above] | [2nd payoff minus Expected Payoff] | 2nd Error squared | 2nd event’s probability | 2nd (Error)2 \* 2nd event’s probability |
| [3rd event] | [3rd payoff] | [Total from above] | [3rd payoff minus Expected Payoff] | 3rd Error squared | 3rd event’s probability | 3rd (Error)2 \* 3rd event’s probability |
|  |  |  |  |  | **Variance:** | [total of above] |
|  |  |  |  |  | **Std. Deviation:** | [square root of Variance] |

***Counting Rules***:

|  |  |  |  |
| --- | --- | --- | --- |
| Term | Meaning | Formula | **Example** |
| **Basic Counting Rule** | The *number* of ways to pick *x* things out of a set of *n* (with no regard to order). The *probability* is calculated as 1/*x* of the result. |  | The *number* of ways to pick 4 specific cards out of a deck of 52 is: 52!/((4!)(48!)) = 270,725, and the *probability* is 1/270,725 = 0.000003694 |
| **Bernoulli Process** | For a sequence of *n* trials, each with an outcome of either success or failure, each with a probability of *p* to succeed – the probability to get *x* successes is equal to the Basic Counting Rule formula (above) times px(1-p)n-x. |  | If an airline takes 20 reservations, and there is a 0.9 probability that each passenger will show up, then the probability that **exactly** 16 passengers will show is:  (0.9)16(0.1)4  = 0.08978 |
| **Bernoulli Expected Value** | The expected value of a Bernoulli Process, given *n* trials and *p* probability. | E(X) = np | In the example above, the number of people expected to show is: (20)(0.9) = 18 |
| **Bernoulli Variance** | The variance of a Bernoulli Process, given *n* trials and *p* probability. | Var(X) = np(1 - p) | In the example above, the Bernoulli Variance is (20)(0.9)(0.1) = 1.8 |
| **Bernoulli Standard Deviation** | The standard deviation of a Bernoulli Process: | σ(X) = | In the example above, the Bernoulli Standard Deviation is = 1.34 |
| **Linear Transformation Rule** | If X is random and Y=aX+b, then the following formulas apply: | E(Y) = a\*E(X) + b  Var (Y) = a2\*Var(X)  σ (Y) = |a|\*σ(X) |  |

***Uniform Distribution***:

|  |  |  |
| --- | --- | --- |
|  | **Term/Meaning** | **Formula** |
| **Expected Value** |  |
| **Variance** |  |
| **Standard Deviation** |  |
| **Probability that X *falls* between *c* and *d*** |  |

***Normal Distribution***:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | z | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2517 | .2549 |
| 0.7 | .2580 | .2611 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| Probability Density Function:    *where π ≅ 3.1416 and e ≅ 2.7183* | | 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| Standard Deviations away from the mean:    *(Z and σ are swappable!)* | | 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| *P(a ≤ X ≤ b) = area under fX(x) between a and b:* | | 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| Standard Normal Table - seven usage scenarios: | | 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| =  + | =  + | 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| =  - | =  - | 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| =  - | =  - | 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| =  + |  | 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |

***Correlation***:

* If X and Y are two different sets of data, their correlation is represented by Corr(XY), rXY, or **ρXY** (rho).
* If Y increases as X increases, 0 < ρ XY < 1. If Y decreases as X increases, -1 < ρ XY < 0.
* The extremes ρ XY = 1 and ρ XY = -1 indicated perfect correlation – info about one results in an exact prediction about the other.
* If X and Y are completely uncorrelated, ρXY = 0.
* The **Covariance** of X and Y, Cov(XY) , has the same sign as ρ XY, has unusual units and is usually a means to find ρ XY.

|  |  |  |
| --- | --- | --- |
| **Term** | **Formula** | **Notes** |
| **Correlation** |  | Used with Covariance formulas below |
| **Covariance** (2 formulas) | *(difficult to calculate)* | Sum of the products of all sample pairs’ distance from their respective means multiplied by their respective probabilities |
|  | Sum of the products of all sample pairs multiplied by their respective probabilities, minus the product of both means |
| **Finding Covariance given Correlation** |  |  |

***Portfolio Analysis***:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Term** | **Formula** | **Example\*** |
|  | Mean of any Portfolio “S” |  | = ¾(8.0%)+ ¼(11.0%) = 8.75% |
| *Uncorrelated* | Portfolio Variance | σ2 | σ2 = (¾)2(0.5)2 + (¼)2(6.0)2 = 2.3906 |
| Portfolio Standard Deviation | σ | σ = 1.5462 |
| *Correlated* | Portfolio Variance |  |  |
| Portfolio Standard Deviation |  |

\* Portfolio “S” composed of ¾ Stock A (mean return: 8.0%, standard deviation: 0.5%) and ¼ Stock B (11.0%, 6.0% respectively)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| The Central Limit Theorem Normal distribution can be used to approximate binominals of more than 30 trials (n≥30): | |  | ***Continuity Correction***  Unlike continuous (normal) distributions (i.e. $, time), discrete binomial distribution of integers (i.e. # people) must be corrected: | | |
| Term | **Formula** |  | **Old cutoff** | **New cutoff** |  |
| **Mean** | E(X) = np |  | P(X>20) | P(X>20.5) |
| **Variance** | Var(X) = np(1 - p) |  | P(X<20) | P(X<19.5) |
| **Standard Deviation** | σ(X) = |  | P(X≥20) | P(X≥19.5) |
|  | |  | P(X≤20) | P(X≤20.5) |
|  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Sampling Distribution of the Mean***  If the *X*i's are normally distributed (*or n* ≥ 30), then  is normally distributed with: | |  | ***Sampling Distribution of a Proportion***  If, for a proportion, *n* ≥ 30 then  is normally distributed with: | |
| **Term** | **Formula** |  | **Term** | **Formula** |
| **Mean** | ***μ*** |  | **Mean** | ***p*** |
| **Standard Error of the Mean** |  |  | **Standard Deviation** |  |

***Confidence Intervals***:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Parameter** | **Confidence Interval** | **Usage** | **Sample** | **σ** |
| **1** |  |  | Normal |  | Known σ |
|  |  |  | Large | Unknown σ |
| **2** |  |  | Normal | Small | Unknown σ |
| **3** |  |  | Binomial | Large |  |
| **4** |  |  | Normal |  | Matched pairs |
| **5** |  |  | Normal |  | Known σ,  Independent Samples |
|  |  |  | Large |  |
| **6** |  |  | Binomial | Large |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Formulae Guide | | | |  | **t-table** | | | | | |
|  | | | |  | d. f. | 0.100 | 0.050 | 0.025 | 0.010 | 0.005 |
|  | 1 | 3.078 | 6.314 | 12.706 | 31.821 | 63.656 |
|  | 2 | 1.886 | 2.920 | 4.303 | 6.965 | 9.925 |
|  | 3 | 1.638 | 2.353 | 3.182 | 4.541 | 5.841 |
|  | 4 | 1.533 | 2.132 | 2.776 | 3.747 | 4.604 |
|  | 5 | 1.476 | 2.015 | 2.571 | 3.365 | 4.032 |
|  | 6 | 1.440 | 1.943 | 2.447 | 3.143 | 3.707 |
|  | 7 | 1.415 | 1.895 | 2.365 | 2.998 | 3.499 |
|  | 8 | 1.397 | 1.860 | 2.306 | 2.896 | 3.355 |
|  | 9 | 1.383 | 1.833 | 2.262 | 2.821 | 3.250 |
|  | 10 | 1.372 | 1.812 | 2.228 | 2.764 | 3.169 |
|  | 11 | 1.363 | 1.796 | 2.201 | 2.718 | 3.106 |
|  | 12 | 1.356 | 1.782 | 2.179 | 2.681 | 3.055 |
|  | 13 | 1.350 | 1.771 | 2.160 | 2.650 | 3.012 |
|  | 14 | 1.345 | 1.761 | 2.145 | 2.624 | 2.977 |
|  | 15 | 1.341 | 1.753 | 2.131 | 2.602 | 2.947 |
|  | |  |  |  | 16 | 1.337 | 1.746 | 2.120 | 2.583 | 2.921 |
| Confidence Level to Z-Value Guide | | | |  | 17 | 1.333 | 1.740 | 2.110 | 2.567 | 2.898 |
| **Confidence Level** | | **Zα/2 (2-Tail)** | **Zα (1-Tail)** |  | 18 | 1.330 | 1.734 | 2.101 | 2.552 | 2.878 |
| **80%** | **α = 20%** | 1.28 | 0.84 |  | 19 | 1.328 | 1.729 | 2.093 | 2.539 | 2.861 |
| **90%** | **α = 10%** | 1.645 | 1.28 |  | 20 | 1.325 | 1.725 | 2.086 | 2.528 | 2.845 |
| **95%** | **α = 5%** | 1.96 | 1.645 |  | 21 | 1.323 | 1.721 | 2.080 | 2.518 | 2.831 |
| **99%** | **α = 1%** | 2.575 | 2.325 |  | 22 | 1.321 | 1.717 | 2.074 | 2.508 | 2.819 |
| **c** | **α = 1.0-c** | Z(c/2) | z(c-0.5) |  | 23 | 1.319 | 1.714 | 2.069 | 2.500 | 2.807 |
|  | |  |  |  | 24 | 1.318 | 1.711 | 2.064 | 2.492 | 2.797 |
| Determining the Appropriate Sample Size | | | |  | 25 | 1.316 | 1.708 | 2.060 | 2.485 | 2.787 |
| **Term** | | **Normal Distribution Formula** | **Proportion Formula** |  | 26 | 1.315 | 1.706 | 2.056 | 2.479 | 2.779 |
| Sample Size (for +/- e) | |  |  |  | 27 | 1.314 | 1.703 | 2.052 | 2.473 | 2.771 |
|  | 28 | 1.313 | 1.701 | 2.048 | 2.467 | 2.763 |

***Hypothesis Testing***:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Two-tailed | | Lower-tail | | Upper-tail | |
| Test Type | Test Statistic | *H*a | Critical Value | *H*a | Critical Value | *H*a | Critical Value |
| Single *μ* (*n* ≥ 30) |  |  |  |  |  |  |  |
| Single *μ* (*n* < 30) |  |  |  |  |  |  |  |
| Single *p* (*n* ≥ 30) |  |  |  |  |  |  |  |
| Diff. between two *μ*s |  |  |  |  |  |  |  |
| Diff. between two *p*s |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Classic Hypothesis Testing Procedure** | | | |
| **Step** | | **Description** | **Example** |
| **1** | **Formulate Two Hypotheses** | The hypotheses ought to be mutually exclusive and collectively exhaustive. The hypothesis to be tested (the null hypothesis) always contains an equals sign, referring to some proposed value of a population parameter. The alternative hypothesis never contains an equals sign, but can be either a one-sided or two-sided inequality. | *H*0: *μ* = 0  *H*A: *μ* < 0 |
| **2** | **Select a Test Statistic** | The test statistic is a standardized estimate of the difference between our sample and some hypothesized population parameter. It answers the question: “*If the null hypothesis were true, how many standard deviations is our sample away from where we expected it to be*?” |  |
| **3** | **Derive a Decision Rule** | The decision rule consists of regions of rejection and non-rejection, defined by critical values of the test statistic. It is used to establish the probable truth or falsity of the null hypothesis. | We reject *H*0 if . |
| **4** | **Calculate the Value of the Test Statistic; Invoke the Decision Rule in light of the Test Statistic** | Either reject the null hypothesis (if the test statistic falls into the rejection region) or do not reject the null hypothesis (if the test statistic does not fall into the rejection region. |  |

***Regression***:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Statistic** | Symbol |  | Regression Statistics |  |  |  |  |  |
| **Independent Variables** | **X1,…Xk** |  | Multiple R | **0.9568** |  |  |  |  |
|  | R Square | **0.9155** |  |  |  |  |
| **Dependent Variable (a random variable)** | **Y** |  | Adjusted R Square | **0.9015** |  |  |  |  |
|  | Standard Error | **6.6220** |  |  |  |  |
| **Dependent Variable (an individual observation among sample)** | **Yi** |  | Observations | 15 |  |  |  |  |
|  | ANOVA |  |  |  |  |  |
| **Intercept (or constant); an unknown population parameter** |  |  |  | *df* | *SS* | *MS* | *F* | *Significance F* |
|  | Regression | 2 | **5704.0273** | **2852.0137** | **65.0391** | 0.0000 |
| **Estimated intercept; an estimate of** |  |  | Residual | 12 | **526.2087** | **43.8507** |  |  |
|  | Total | 14 | **6230.2360** |  |  |  |
| **Slope (or coefficient) for Independent Variable 1 (unknown)** |  |  |  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* |  |
|  | Intercept | -20.3722 | 9.8139 | **-2.0758** | **0.0601** |  |
| **Estimated slope for Independent Variable 1; an estimate of** |  |  | Size (100 sq ft) | 4.3117 | 0.4104 | 10.5059 | 0.0000 |  |
|  | Lot Size (1000 sq ft) | 4.7177 | 0.7646 | 6.1705 | 0.0000 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Statistic (Mapped to Output Above)** | **Symbol** | **Formula** |  | **Statistic (Mapped to Output Above)** | **Symbol** | **Formula** |
| **Dependent Variable (sample mean of *n* observations)** |  |  |  | **0.9155**  ***R*-square**  **(Coefficient of Determination)** |  |  |
| **Dependent Variable (estimated value for a given vector of independent variables)** |  |  |  | **0.9568**  **Multiple *R***  **(Coefficient of Multiple Correlation)** |  |  |
| **Error for observation *i*. The unexplained difference between the actual value of *Y*i and the prediction for *Y*i based on our regression model.** |  |  |  | **0.9015**  **Adjusted *R*-square** |  |  |
| **6230.2360**  **Total Sum of Squares** | **(or SST)** |  |  | **6.6220**  **Standard Error (a.k.a. Standard Error of the Estimate)** |  |  |
| **526.2087**  **Sum of Squares due to Error** |  |  |  | **-2.0758**  ***t*-statistic for testing vs.** |  |  |
| **43.8507**  **Mean Squares due to Error** |  |  |  | **0.0601**  ***p*-value for testing**  **vs.** | ***p*-value** |  |
| **5704.0273**  **Sum of Squares due to Regression** |  |  |  | **65.0391**  ***F*** |  |  |
| **2852.0137**  **Mean Squares due to Regression** |  |  |  |  |  |  |