**PGDM (RM) (18-20)**
**Statistics for Business Analysis**
**RM-103**

**Trimester – I, End-Term Examination: September 2018**

Time allowed: 2 hrs 30 min    Max Marks: 50

Roll No: ____________

**Instruction:** Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means.** In case of rough work please use answer sheet.

| Sections | No. of Questions to attempt | Marks | Marks |
|---|---|---|---|
| A | 3 out of 5 (Short Questions) | 5 Marks each | 3*5 = 15 |
| B | 2 out of 3 (Long Questions) | 10 Marks each | 2*10 = 20 |
| C | Compulsory Case Study | 15 Marks | 15 |
| | | **Total Marks** | **50** |

## SECTION A

A1. The daily exchange rate of one dollar in euros during the first three months of 2017 can be inferred to have the following distribution.

| x | P(x) |
|---|---|
| 0.73 | 0.05 |
| 0.74 | 0.10 |
| 0.75 | 0.25 |
| 0.76 | 0.40 |
| 0.77 | 0.15 |
| 0.78 | 0.05 |

a) Show that P(x) is a probability distribution.

b) What is the probability that the exchange rate on a given day during this period will be at least 0.75%

c) What is the probability that the exchange rate on a given day during this period will be less than 0.77%



Turn Over

A2. 47% of children say that chocolate chip cookie is their favorite kind of cookie. If you randomly select 12 children find the probability that:

a) At least 10 of them say that chocolate chip cookie is their favorite cookie.

b) Four of them say that chocolate chip cookie is their favorite cookie.

c) Find the mean and standard deviation for this sample.

A3. On average, 6 birds hit the Washington Monument and are killed each week. Bill Garcy, an official of the National Parks Services, has requested that congress allocate funds for equipment to scare birds away from the monument. A Congressional subcommittee has replied that funds cannot be allocated unless the probability of more than three birds being killed in any week exceeds 0.8. Will the funds be allocated?

A4. A tire company finds the lifespan for one brand of its tires is normally distributed with a mean if 47,500 miles and a standard deviation of 3,000 miles. If the manufacturer is willing to replace no more than 10% of the tires, what should be the approximate number of miles for the warranty?

A5. A random sample of 100 credit sales in a department store showed an average sale of $120.00. From past data, it is known that the standard deviation of the population is $40.00.

a. Determine the standard error of the mean.

b. With a 0.95 probability, determine the margin of error.

c. What is the 95% confidence interval of the population mean?

## SECTION B

B1. Military radar and missile detection system are designed to warn a country of an enemy attack. A reliability question is whether a detection system will be able to identify an attack and issue a warning. Assume that a particular detection system has a .90 probability of detecting a missile attack. Use the binomial probability distribution to answer the following questions.

a) What is the probability that a single detection system will detect an attack?

b) If two detection systems are installed in the same area and operate independently, what is the probability that at least one of the systems will detect the attack?

c) If three systems are installed, what is the probability that at least one of the systems will detect the attack?

d) Would you recommend that multiple detection system be used? Explain.

B2. An industry sewing machine uses ball bearings that are targeted to have a diameter of 0.75 inch. The lower and upper specification limits under which the ball bearing can operate are 0.74 inch (lower) and 0.76 inch (upper). Past experience has indicated that the actual diameter of the bearing is approximately normally distributed with a mean of 0.754 inch and a standard deviation of 0.004inch. If you select a random sample of 25 ball bearings, what is the probability that the sample mean is:

a). Between the target and the population mean?

b). between the lower specification limit and the target?

c). greater than the upper specification limit

d). For the same sample of 25 ball bearings, the probability is 93% that the sample mean diameter will be greater than what value?

B3. The Manager of an automobile dealership is considering a new bonus plan designed to increase sales volume. Currently, the mean sales volume is 14 automobiles per month. The manager wants to conduct a research study to see whether the new bonus plan increases sales volume. To collect data on the plan, a sample of sales personnel will be allowed to sell under the new bonus plan for a one –month period.

a) Develop the null and alternate hypotheses most appropriate for this research situation.
b) Comment on the conclusion when H0 can't be rejected.
c) Comment on the conclusion when H0 can be rejected.

## SECTION C

### Case # Grahak Anusandhan kendra

Grahak Anusandhan kendra, a consumer research organization, conducts surveys designed to evaluate a wide variety of products and services available to consumers. In one particular study, the company looked at consumer satisfaction with the performance of automobiles produced by a major manufacturer. A questionnaire sent to owners of one of the manufacturer's full-sized cars reviewed several complaints about early transmission problems. Nationwide, the population mean mileage is 80,000 miles, with a population standard deviation of 18,000 miles.

To learn more about the transmission failures, Grahak Anusandhan kendra used a sample of actual transmission repairs provided by a transmission repair firm in the NCR area. The following data show the actual number of miles driven for 50 vehicles at the time of transmission failure.

| | | | | |
|---|---|---|---|---|
| 85092 | 66998 | 77437 | 79294 | 121352 |



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Turn Over

| | | | | |
|---|---|---|---|---|
| 39323 | 67202 | 116803 | 138114 | 69922 |
| 64342 | 89341 | 59817 | 64090 | 86813 |
| 74276 | 88798 | 72069 | 63436 | 85586 |
| 74425 | 59465 | 53500 | 95774 | 59902 |
| 37831 | 94219 | 85288 | 77098 | 85861 |
| 77539 | 67998 | 32534 | 64544 | 69568 |
| 32609 | 40001 | 92857 | 53402 | 35662 |
| 89641 | 118444 | 101769 | 32464 | 116269 |
| 61978 | 73341 | 25066 | 65605 | 82256 |

For the sample, descriptive statistics are :

| | n | MEAN | STDEV | SE | MIN | MAX |
|---|---|---|---|---|---|---|
| MILES | 50 | 73340 | 24899 | 3521 | 25066 | 138114 |

Prepare a managerial report summarizing the results of the survey. Your report should address the following issue.

1. At 95% confidence, what is the margin of error? What is the 95% confidence interval estimate of the population mean? Clearly state your conclusions based on this information.

2. What would happen to the confidence interval if you increased the sample size to 200? Why? What are the new margin of error and confidence interval?

3. Use hypothesis testing to determine whether the sample data support the conclusion that the mean mileage of vehicles produced by this manufacturer is lower than the national average mileage at transmission failure. Be sure to clearly state your hypotheses. Include the test statistic, rejection rule, and conclusions in your answer.



Turn Over

Some important Formulae

$$P(x) = \binom{n}{x} p^x q^{(n-x)} = \frac{n!}{x!(n-x)!} p^x q^{(n-x)} \quad ; \mu = np \quad ; \sigma^2 = npq$$

$$P(x) = \frac{\mu^x e^{-\mu}}{x!} \text{ for } x = 1,2,3,\ldots \quad ; \quad z = \frac{x - \mu}{\sigma}$$

$$\frac{\bar{X} - \mu}{\sigma/\sqrt{n}} \qquad \frac{\bar{X} - \mu}{s/\sqrt{n}} \qquad \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$

$$\frac{\bar{X} - \mu_0}{\sigma/\sqrt{n}} \qquad \frac{\bar{X} - \mu_0}{s/\sqrt{n}} \qquad \frac{(\hat{p} - p_0)}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

$$\bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \qquad \bar{X} \pm t_{(\frac{\alpha}{2}, n-1)} \frac{s}{\sqrt{n}} \qquad n = \frac{(z_{\alpha/2})^2 \sigma^2}{E^2}$$

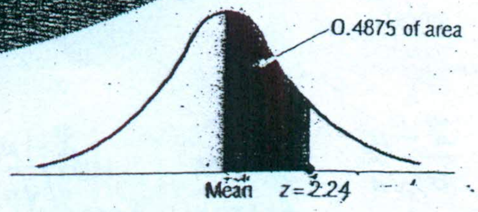
Finite Correction Factor : $\sqrt{\frac{N-n}{N-1}}$

$$N\bar{X} \pm N\left(t_{\alpha/2, n-1}\right) \frac{S}{\sqrt{n}} \sqrt{\frac{(N-n)}{(N-1)}}$$

$$Y_i = b_0 + b_1 X \qquad b_0 = \bar{y} - b_1 \bar{x}$$

$$b_1 = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}} \qquad b_1 = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

# Appendix Tables

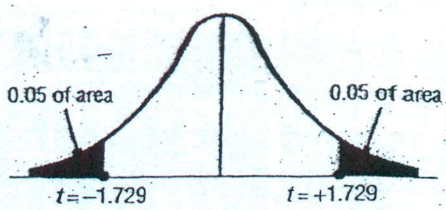



**EXAMPLE:** TO FIND THE AREA UNDER THE CURVE BETWEEN THE MEAN AND A POINT 2.24 STANDARD DEVIATIONS TO THE RIGHT OF THE MEAN, LOOK UP THE VALUE OPPOSITE 2.2 AND UNDER 0.04 IN THE TABLE; 0.4875 OF THE AREA UNDER THE CURVE LIES BETWEEN THE MEAN AND A $z$ VALUE OF 2.24.

**APPENDIX TABLE 1** AREAS UNDER THE STANDARD NORMAL PROBABILITY DISTRIBUTION BETWEEN THE MEAN AND POSITIVE VALUES OF $z$

| $z$ | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0000 | 0.0040 | 0.0080 | 0.0120 | 0.0160 | 0.0199 | 0.0239 | 0.0279 | 0.0319 | 0.0359 |
| 0.1 | 0.0398 | 0.0438 | 0.0478 | 0.0517 | 0.0557 | 0.0596 | 0.0636 | 0.0675 | 0.0714 | 0.0753 |
| 0.2 | 0.0793 | 0.0832 | 0.0871 | 0.0910 | 0.0948 | 0.0987 | 0.1026 | 0.1064 | 0.1103 | 0.1141 |
| 0.3 | 0.1179 | 0.1217 | 0.1255 | 0.1293 | 0.1331 | 0.1368 | 0.1406 | 0.1443 | 0.1480 | 0.1517 |
| 0.4 | 0.1554 | 0.1591 | 0.1628 | 0.1664 | 0.1700 | 0.1736 | 0.1772 | 0.1808 | 0.1844 | 0.1879 |
| 0.5 | 0.1915 | 0.1950 | 0.1985 | 0.2019 | 0.2054 | 0.2088 | 0.2123 | 0.2157 | 0.2190 | 0.2224 |
| 0.6 | 0.2257 | 0.2291 | 0.2324 | 0.2357 | 0.2389 | 0.2422 | 0.2454 | 0.2486 | 0.2517 | 0.2549 |
| 0.7 | 0.2580 | 0.2611 | 0.2642 | 0.2673 | 0.2704 | 0.2734 | 0.2764 | 0.2794 | 0.2823 | 0.2852 |
| 0.8 | 0.2881 | 0.2910 | 0.2939 | 0.2967 | 0.2995 | 0.3023 | 0.3051 | 0.3078 | 0.3106 | 0.3133 |
| 0.9 | 0.3159 | 0.3186 | 0.3212 | 0.3238 | 0.3264 | 0.3289 | 0.3315 | 0.3340 | 0.3365 | 0.3389 |
| 1.0 | 0.3413 | 0.3438 | 0.3461 | 0.3485 | 0.3508 | 0.3531 | 0.3554 | 0.3577 | 0.3599 | 0.3621 |
| 1.1 | 0.3643 | 0.3665 | 0.3686 | 0.3708 | 0.3729 | 0.3749 | 0.3770 | 0.3790 | 0.3810 | 0.3830 |
| 1.2 | 0.3849 | 0.3869 | 0.3888 | 0.3907 | 0.3925 | 0.3944 | 0.3962 | 0.3980 | 0.3997 | 0.4015 |
| 1.3 | 0.4032 | 0.4049 | 0.4066 | 0.4082 | 0.4099 | 0.4115 | 0.4131 | 0.4147 | 0.4162 | 0.4177 |
| 1.4 | 0.4192 | 0.4207 | 0.4222 | 0.4236 | 0.4251 | 0.4265 | 0.4279 | 0.4292 | 0.4306 | 0.4319 |
| 1.5 | 0.4332 | 0.4345 | 0.4357 | 0.4370 | 0.4382 | 0.4394 | 0.4406 | 0.4418 | 0.4429 | 0.4441 |
| 1.6 | 0.4452 | 0.4463 | 0.4474 | 0.4484 | 0.4495 | 0.4505 | 0.4515 | 0.4525 | 0.4535 | 0.4545 |
| 1.7 | 0.4554 | 0.4564 | 0.4573 | 0.4582 | 0.4591 | 0.4599 | 0.4608 | 0.4616 | 0.4625 | 0.4633 |
| 1.8 | 0.4641 | 0.4649 | 0.4656 | 0.4664 | 0.4671 | 0.4678 | 0.4686 | 0.4693 | 0.4699 | 0.4706 |
| 1.9 | 0.4713 | 0.4719 | 0.4726 | 0.4732 | 0.4738 | 0.4744 | 0.4750 | 0.4756 | 0.4761 | 0.4767 |
| 2.0 | 0.4772 | 0.4778 | 0.4783 | 0.4788 | 0.4793 | 0.4798 | 0.4803 | 0.4808 | 0.4812 | 0.4817 |
| 2.1 | 0.4821 | 0.4826 | 0.4830 | 0.4834 | 0.4838 | 0.4842 | 0.4846 | 0.4850 | 0.4854 | 0.4857 |
| 2.2 | 0.4861 | 0.4864 | 0.4868 | 0.4871 | 0.4875 | 0.4878 | 0.4881 | 0.4884 | 0.4887 | 0.4890 |
| 2.3 | 0.4893 | 0.4896 | 0.4898 | 0.4901 | 0.4904 | 0.4906 | 0.4909 | 0.4911 | 0.4913 | 0.4916 |
| 2.4 | 0.4918 | 0.4920 | 0.4922 | 0.4925 | 0.4927 | 0.4929 | 0.4931 | 0.4932 | 0.4934 | 0.4936 |
| 2.5 | 0.4938 | 0.4940 | 0.4941 | 0.4943 | 0.4945 | 0.4946 | 0.4948 | 0.4949 | 0.4951 | 0.4952 |
| 2.6 | 0.4953 | 0.4955 | 0.4956 | 0.4957 | 0.4959 | 0.4960 | 0.4961 | 0.4962 | 0.4963 | 0.4964 |
| 2.7 | 0.4965 | 0.4966 | 0.4967 | 0.4968 | 0.4969 | 0.4970 | 0.4971 | 0.4972 | 0.4973 | 0.4974 |
| 2.8 | 0.4974 | 0.4975 | 0.4976 | 0.4977 | 0.4977 | 0.4978 | 0.4979 | 0.4979 | 0.4980 | 0.4981 |
| 2.9 | 0.4981 | 0.4982 | 0.4982 | 0.4983 | 0.4984 | 0.4984 | 0.4985 | 0.4985 | 0.4986 | 0.4986 |
| 3.0 | 0.4987 | 0.4987 | 0.4987 | 0.4988 | 0.4988 | 0.4989 | 0.4989 | 0.4989 | 0.4990 | 0.4990 |

**EXAMPLE:** TO FIND THE VALUE OF *t* THAT CORRESPONDS TO AN AREA OF 0.10 IN BOTH TAILS OF THE DISTRIBUTION COMBINED, WHEN THERE ARE 19 DEGREES OF FREEDOM, LOOK UNDER THE 0.10 COLUMN, AND PROCEED DOWN TO THE 19 DEGREES OF FREEDOM ROW; THE APPROPRIATE *t* VALUE THERE IS 1.729.




**APPENDIX TABLE 2** AREAS IN BOTH TAILS COMBINED FOR STUDENT'S *t* DISTRIBUTION

| Degrees of Freedom | Area in Both Tails Combined | | | |
|---|---|---|---|---|
| | **0.10** | **0.05** | **0.02** | **0.01** |
| 1 | 6.314 | 12.706 | 31.821 | 63.657 |
| 2 | 2.920 | 4.303 | 6.965 | 9.925 |
| 3 | 2.353 | 3.182 | 4.541 | 5.841 |
| 4 | 2.132 | 2.776 | 3.747 | 4.604 |
| 5 | 2.015 | 2.571 | 3.365 | 4.032 |
| 6 | 1.943 | 2.447 | 3.143 | 3.707 |
| 7 | 1.895 | 2.365 | 2.998 | 3.499 |
| 8 | 1.860 | 2.306 | 2.896 | 3.355 |
| 9 | 1.833 | 2.262 | 2.821 | 3.250 |
| 10 | 1.812 | 2.228 | 2.764 | 3.169 |
| 11 | 1.796 | 2.201 | 2.718 | 3.106 |
| 12 | 1.782 | 2.179 | 2.681 | 3.055 |
| 13 | 1.771 | 2.160 | 2.650 | 3.012 |
| 14 | 1.761 | 2.145 | 2.624 | 2.977 |
| 15 | 1.753 | 2.131 | 2.602 | 2.947 |
| 16 | 1.746 | 2.120 | 2.583 | 2.921 |
| 17 | 1.740 | 2.110 | 2.567 | 2.898 |
| 18 | 1.734 | 2.101 | 2.552 | 2.878 |
| 19 | 1.729 | 2.093 | 2.539 | 2.861 |
| 20 | 1.725 | 2.086 | 2.528 | 2.845 |
| 21 | 1.721 | 2.080 | 2.518 | 2.831 |
| 22 | 1.717 | 2.074 | 2.508 | 2.819 |
| 23 | 1.714 | 2.069 | 2.500 | 2.807 |
| 24 | 1.711 | 2.064 | 2.492 | 2.797 |
| 25 | 1.708 | 2.060 | 2.485 | 2.787 |
| 26 | 1.706 | 2.056 | 2.479 | 2.779 |
| 27 | 1.703 | 2.052 | 2.473 | 2.771 |
| 28 | 0.701 | 2.048 | 2.467 | 2.763 |
| 29 | 1.699 | 2.045 | 2.462 | 2.756 |
| 30 | 1.697 | 2.042 | 2.457 | 2.750 |
| 40 | 1.684 | 2.021 | 2.423 | 2.704 |
| 60 | 1.671 | 2.000 | 2.390 | 2.660 |
| 120 | 1.658 | 1.980 | 2.358 | 2.617 |
| Normal Distribution | 1.645 | 1.960 | 2.326 | 2.576 |

| n | r | 0.37 | 0.38 | 0.39 | 0.40 | 0.41 | 0.42 | 0.43 | 0.44 | 0.45 | 0.46 | 0.47 | 0.48 | 0.49 | 0.50 | r | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 0 | 0.0039 | 0.0032 | 0.0027 | 0.0022 | 0.0018 | 0.0014 | 0.0012 | 0.0010 | 0.0008 | 0.0006 | 0.0005 | 0.0004 | 0.0003 | 0.0002 | 12 | |
| | 1 | 0.0276 | 0.0237 | 0.0204 | 0.0174 | 0.0148 | 0.0126 | 0.0106 | 0.0090 | 0.0075 | 0.0063 | 0.0052 | 0.0043 | 0.0036 | 0.0029 | 11 | |
| | 2 | 0.0890 | 0.0800 | 0.0716 | 0.0639 | 0.0567 | 0.0502 | 0.0442 | 0.0388 | 0.0339 | 0.0294 | 0.0255 | 0.0220 | 0.0189 | 0.0161 | 10 | |
| | 3 | 0.1742 | 0.1634 | 0.1526 | 0.1419 | 0.1314 | 0.1211 | 0.1111 | 0.1015 | 0.0923 | 0.0836 | 0.0754 | 0.0676 | 0.0604 | 0.0537 | 9 | |
| | 4 | 0.2302 | 0.2254 | 0.2195 | 0.2128 | 0.2054 | 0.1973 | 0.1886 | 0.1794 | 0.1700 | 0.1602 | 0.1502 | 0.1405 | 0.1306 | 0.1208 | 8 | |
| | 5 | 0.2163 | 0.2210 | 0.2246 | 0.2270 | 0.2284 | 0.2285 | 0.2276 | 0.2256 | 0.2225 | 0.2184 | 0.2134 | 0.2075 | 0.2008 | 0.1934 | 7 | |
| | 6 | 0.1482 | 0.1580 | 0.1675 | 0.1766 | 0.1851 | 0.1931 | 0.2003 | 0.2068 | 0.2124 | 0.2171 | 0.2208 | 0.2234 | 0.2250 | 0.2256 | 6 | |
| | 7 | 0.0746 | 0.0830 | 0.0918 | 0.1009 | 0.1103 | 0.1198 | 0.1295 | 0.1393 | 0.1489 | 0.1585 | 0.1678 | 0.1768 | 0.1853 | 0.1934 | 5 | |
| | 8 | 0.0274 | 0.0318 | 0.0367 | 0.0420 | 0.0479 | 0.0542 | 0.0611 | 0.0684 | 0.0762 | 0.0844 | 0.0930 | 0.1020 | 0.1113 | 0.1208 | 4 | |
| | 9 | 0.0071 | 0.0087 | 0.0104 | 0.0125 | 0.0148 | 0.0175 | 0.0205 | 0.0239 | 0.0277 | 0.0319 | 0.0367 | 0.0418 | 0.0475 | 0.0537 | 3 | |
| | 10 | 0.0013 | 0.0016 | 0.0020 | 0.0025 | 0.0031 | 0.0038 | 0.0046 | 0.0056 | 0.0068 | 0.0082 | 0.0098 | 0.0116 | 0.0137 | 0.0161 | 2 | |
| | 11 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0008 | 0.0010 | 0.0013 | 0.0016 | 0.0019 | 0.0024 | 0.0029 | 1 | |
| | 12 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0 | 12 |
| 15 | 0 | 0.0010 | 0.0008 | 0.0006 | 0.0005 | 0.0004 | 0.0003 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 15 | |
| | 1 | 0.0086 | 0.0071 | 0.0058 | 0.0047 | 0.0038 | 0.0031 | 0.0025 | 0.0020 | 0.0016 | 0.0012 | 0.0010 | 0.0008 | 0.0006 | 0.0005 | 14 | |
| | 2 | 0.0354 | 0.0303 | 0.0259 | 0.0219 | 0.0185 | 0.0156 | 0.0130 | 0.0108 | 0.0090 | 0.0074 | 0.0060 | 0.0049 | 0.0040 | 0.0032 | 13 | |
| | 3 | 0.0901 | 0.0805 | 0.0716 | 0.0634 | 0.0558 | 0.0489 | 0.0426 | 0.0369 | 0.0318 | 0.0272 | 0.0232 | 0.0197 | 0.0166 | 0.0139 | 12 | |
| | 4 | 0.1587 | 0.1481 | 0.1374 | 0.1268 | 0.1163 | 0.1061 | 0.0963 | 0.0869 | 0.0780 | 0.0696 | 0.0617 | 0.0545 | 0.0478 | 0.0417 | 11 | |
| | 5 | 0.2051 | 0.1997 | 0.1933 | 0.1859 | 0.1778 | 0.1691 | 0.1598 | 0.1502 | 0.1404 | 0.1304 | 0.1204 | 0.1106 | 0.1010 | 0.0916 | 10 | |
| | 6 | 0.2008 | 0.2040 | 0.2059 | 0.2066 | 0.2060 | 0.2041 | 0.2010 | 0.1967 | 0.1914 | 0.1851 | 0.1780 | 0.1702 | 0.1617 | 0.1527 | 9 | |
| | 7 | 0.1516 | 0.1608 | 0.1693 | 0.1771 | 0.1840 | 0.1900 | 0.1949 | 0.1987 | 0.2013 | 0.2028 | 0.2030 | 0.2020 | 0.1997 | 0.1964 | 8 | |
| | 8 | 0.0890 | 0.0985 | 0.1082 | 0.1181 | 0.1279 | 0.1376 | 0.1470 | 0.1561 | 0.1647 | 0.1727 | 0.1800 | 0.1864 | 0.1919 | 0.1964 | 7 | |
| | 9 | 0.0407 | 0.0470 | 0.0538 | 0.0612 | 0.0691 | 0.0775 | 0.0863 | 0.0954 | 0.1048 | 0.1144 | 0.1241 | 0.1338 | 0.1434 | 0.1527 | 6 | |
| | 10 | 0.0143 | 0.0173 | 0.0206 | 0.0245 | 0.0288 | 0.0337 | 0.0390 | 0.0450 | 0.0515 | 0.0585 | 0.0661 | 0.0741 | 0.0827 | 0.0916 | 5 | |
| | 11 | 0.0038 | 0.0048 | 0.0060 | 0.0074 | 0.0091 | 0.0111 | 0.0134 | 0.0161 | 0.0191 | 0.0226 | 0.0266 | 0.0311 | 0.0361 | 0.0417 | 4 | |
| | 12 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0021 | 0.0027 | 0.0034 | 0.0042 | 0.0052 | 0.0064 | 0.0079 | 0.0096 | 0.0116 | 0.0139 | 3 | |
| | 13 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0010 | 0.0013 | 0.0016 | 0.0020 | 0.0026 | 0.0032 | 2 | |
| | 14 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 1 | |
| | 15 | – | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 15 |
| 20 | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | – | – | – | 20 | |
| | 1 | 0.0011 | 0.0009 | 0.0007 | 0.0005 | 0.0004 | 0.0003 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0000 | 0.0000 | 0.0000 | 19 | |
| | 2 | 0.0064 | 0.0050 | 0.0040 | 0.0031 | 0.0024 | 0.0018 | 0.0014 | 0.0011 | 0.0008 | 0.0006 | 0.0005 | 0.0003 | 0.0002 | 0.0002 | 18 | |
| | 3 | 0.0224 | 0.0185 | 0.0152 | 0.0123 | 0.0100 | 0.0080 | 0.0064 | 0.0051 | 0.0040 | 0.0031 | 0.0024 | 0.0019 | 0.0014 | 0.0011 | 17 | |
| | 4 | 0.0559 | 0.0482 | 0.0412 | 0.0350 | 0.0295 | 0.0247 | 0.0206 | 0.0170 | 0.0139 | 0.0113 | 0.0092 | 0.0074 | 0.0059 | 0.0046 | 16 | |
| | 5 | 0.1051 | 0.0945 | 0.0843 | 0.0746 | 0.0656 | 0.0573 | 0.0496 | 0.0427 | 0.0365 | 0.0309 | 0.0260 | 0.0217 | 0.0180 | 0.0148 | 15 | |
| | 6 | 0.1543 | 0.1447 | 0.1347 | 0.1244 | 0.1140 | 0.1037 | 0.0936 | 0.0839 | 0.0746 | 0.0658 | 0.0577 | 0.0501 | 0.0432 | 0.0370 | 14 | |
| | 7 | 0.1812 | 0.1774 | 0.1722 | 0.1659 | 0.1585 | 0.1502 | 0.1413 | 0.1318 | 0.1221 | 0.1122 | 0.1023 | 0.0925 | 0.0830 | 0.0739 | 13 | |
| | 8 | 0.1730 | 0.1767 | 0.1790 | 0.1797 | 0.1790 | 0.1768 | 0.1732 | 0.1683 | 0.1623 | 0.1553 | 0.1474 | 0.1388 | 0.1296 | 0.1201 | 12 | |
| | 9 | 0.1354 | 0.1444 | 0.1526 | 0.1597 | 0.1658 | 0.1707 | 0.1742 | 0.1763 | 0.1771 | 0.1763 | 0.1742 | 0.1708 | 0.1661 | 0.1602 | 11 | |
| | 10 | 0.0875 | 0.0974 | 0.1073 | 0.1171 | 0.1268 | 0.1359 | 0.1446 | 0.1524 | 0.1593 | 0.1652 | 0.1700 | 0.1734 | 0.1755 | 0.1762 | 10 | |
| | 11 | 0.0467 | 0.0542 | 0.0624 | 0.0710 | 0.0801 | 0.0895 | 0.0991 | 0.1089 | 0.1185 | 0.1280 | 0.1370 | 0.1455 | 0.1533 | 0.1602 | 9 | |
| | 12 | 0.0206 | 0.0249 | 0.0299 | 0.0355 | 0.0417 | 0.0486 | 0.0561 | 0.0642 | 0.0727 | 0.0818 | 0.0911 | 0.1007 | 0.1105 | 0.1201 | 8 | |
| | 13 | 0.0074 | 0.0094 | 0.0118 | 0.0146 | 0.0178 | 0.0217 | 0.0260 | 0.0310 | 0.0366 | 0.0429 | 0.0497 | 0.0572 | 0.0653 | 0.0739 | 7 | |
| | 14 | 0.0022 | 0.0029 | 0.0038 | 0.0049 | 0.0062 | 0.0078 | 0.0098 | 0.0122 | 0.0150 | 0.0183 | 0.0221 | 0.0264 | 0.0314 | 0.0370 | 6 | |
| | 15 | 0.0005 | 0.0007 | 0.0010 | 0.0013 | 0.0017 | 0.0023 | 0.0030 | 0.0038 | 0.0049 | 0.0062 | 0.0078 | 0.0098 | 0.0121 | 0.0148 | 5 | |
| | 16 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 0.0013 | 0.0017 | 0.0022 | 0.0028 | 0.0036 | 0.0046 | 4 | |
| | 17 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0005 | 0.0006 | 0.0008 | 0.0011 | 3 | |
| | 18 | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 2 | |
| | 19 | – | – | – | – | – | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1 | |
| | 20 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | 0 | 20 |
| n | r | 0.63 | 0.62 | 0.61 | 0.60 | 0.59 | 0.58 | 0.57 | 0.56 | 0.55 | 0.54 | 0.53 | 0.52 | 0.51 | 0.50 | r | n |

*p* (top scale: 0.37–0.50, read with left n, r; bottom scale: 0.63–0.50, read with right r, n)

**APPENDIX TABLE 3** BIONOMIAL PROBABILITIES

FOR A GIVEN COMBINATION OF $n$ AND $p$, ENTRY INDICATES THE PROBABILITY OF OBTAINING A SPECIFIED VALUE OF $r$. TO LOCATE ENTRY: WHEN $p \leq 0.50$, READ $p$ ACROSS THE TOP AND BOTH $n$ AND $r$ DOWN THE LEFT MARGIN; **WHEN $p \geq 0.50$**, READ $p$ ACROSS THE BOTTOM AND BOTH $n$ AND $r$ UP THE RIGHT MARGIN.

| | | *p* | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *n* | *r* | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 | 0.16 | 0.17 | 0.18 | *r* | *n* |
| 2 | 0 | 0.9801 | 0.9604 | 0.9409 | 0.9216 | 0.9025 | 0.8836 | 0.8649 | 0.8464 | 0.8281 | 0.8100 | 0.7921 | 0.7744 | 0.7569 | 0.7396 | 0.7225 | 0.7056 | 0.6889 | 0.6724 | 2 | |
| | 1 | 0.0198 | 0.0392 | 0.0582 | 0.0768 | 0.0950 | 0.1128 | 0.1302 | 0.1472 | 0.1638 | 0.1800 | 0.1958 | 0.2112 | 0.2262 | 0.2408 | 0.2550 | 0.2688 | 0.2822 | 0.2952 | 1 | |
| | 2 | 0.0001 | 0.0004 | 0.0009 | 0.0016 | 0.0025 | 0.0036 | 0.0049 | 0.0064 | 0.0081 | 0.0100 | 0.0121 | 0.0144 | 0.0169 | 0.0196 | 0.0225 | 0.0256 | 0.0289 | 0.0324 | 0 | 2 |
| 3 | 0 | 0.9703 | 0.9412 | 0.9127 | 0.8847 | 0.8574 | 0.8306 | 0.8044 | 0.7787 | 0.7536 | 0.7290 | 0.7050 | 0.6815 | 0.6585 | 0.6361 | 0.6141 | 0.5927 | 0.5718 | 0.5514 | 3 | |
| | 1 | 0.0294 | 0.0576 | 0.0847 | 0.1106 | 0.1354 | 0.1590 | 0.1816 | 0.2031 | 0.2236 | 0.2430 | 0.2614 | 0.2788 | 0.2952 | 0.3106 | 0.3251 | 0.3387 | 0.3513 | 0.3631 | 2 | |
| | 2 | 0.0003 | 0.0012 | 0.0026 | 0.0046 | 0.0071 | 0.0102 | 0.0137 | 0.0177 | 0.0221 | 0.0270 | 0.0323 | 0.0380 | 0.0441 | 0.0506 | 0.0574 | 0.0645 | 0.0720 | 0.0797 | 1 | |
| | 3 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0005 | 0.0007 | 0.0010 | 0.0013 | 0.0017 | 0.0022 | 0.0027 | 0.0034 | 0.0041 | 0.0049 | 0.0058 | 0 | 3 |
| 4 | 0 | 0.9606 | 0.9224 | 0.8853 | 0.8493 | 0.8145 | 0.7807 | 0.7481 | 0.7164 | 0.6857 | 0.6561 | 0.6274 | 0.5997 | 0.5729 | 0.5470 | 0.5220 | 0.4979 | 0.4746 | 0.4521 | 4 | |
| | 1 | 0.0388 | 0.0753 | 0.1095 | 0.1416 | 0.1715 | 0.1993 | 0.2252 | 0.2492 | 0.2713 | 0.2916 | 0.3102 | 0.3271 | 0.3424 | 0.3562 | 0.3685 | 0.3793 | 0.3888 | 0.3970 | 3 | |
| | 2 | 0.0006 | 0.0023 | 0.0051 | 0.0088 | 0.0135 | 0.0191 | 0.0254 | 0.0325 | 0.0402 | 0.0486 | 0.0575 | 0.0669 | 0.0767 | 0.0870 | 0.0975 | 0.1084 | 0.1195 | 0.1307 | 2 | |
| | 3 | 0.0000 | 0.0000 | 0.0001 | 0.0002 | 0.0005 | 0.0008 | 0.0013 | 0.0019 | 0.0027 | 0.0036 | 0.0047 | 0.0061 | 0.0076 | 0.0094 | 0.0115 | 0.0138 | 0.0163 | 0.0191 | 1 | |
| | 4 | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0008 | 0.0010 | 0 | 4 |
| 5 | 0 | 0.9510 | 0.9039 | 0.8587 | 0.8154 | 0.7738 | 0.7339 | 0.6957 | 0.6591 | 0.6240 | 0.5905 | 0.5584 | 0.5277 | 0.4984 | 0.4704 | 0.4437 | 0.4182 | 0.3939 | 0.3707 | 5 | |
| | 1 | 0.0480 | 0.0922 | 0.1328 | 0.1699 | 0.2036 | 0.2342 | 0.2618 | 0.2866 | 0.3086 | 0.3280 | 0.3451 | 0.3598 | 0.3724 | 0.3829 | 0.3915 | 0.3983 | 0.4034 | 0.4069 | 4 | |
| | 2 | 0.0010 | 0.0038 | 0.0082 | 0.0142 | 0.0214 | 0.0299 | 0.0394 | 0.0498 | 0.0610 | 0.0729 | 0.0853 | 0.0981 | 0.1113 | 0.1247 | 0.1382 | 0.1517 | 0.1652 | 0.1786 | 3 | |
| | 3 | 0.0000 | 0.0001 | 0.0003 | 0.0006 | 0.0011 | 0.0019 | 0.0030 | 0.0043 | 0.0060 | 0.0081 | 0.0105 | 0.0134 | 0.0166 | 0.0203 | 0.0244 | 0.0289 | 0.0338 | 0.0392 | 2 | |
| | 4 | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0007 | 0.0009 | 0.0012 | 0.0017 | 0.0022 | 0.0028 | 0.0035 | 0.0043 | 1 | |
| | 5 | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0 | 5 |
| 6 | 0 | 0.9415 | 0.8858 | 0.8330 | 0.7828 | 0.7351 | 0.6899 | 0.6470 | 0.6064 | 0.5679 | 0.5314 | 0.4970 | 0.4644 | 0.4336 | 0.4046 | 0.3771 | 0.3513 | 0.3269 | 0.3040 | 6 | |
| | 1 | 0.0571 | 0.1085 | 0.1546 | 0.1957 | 0.2321 | 0.2642 | 0.2922 | 0.3164 | 0.3370 | 0.3543 | 0.3685 | 0.3800 | 0.3888 | 0.3952 | 0.3993 | 0.4015 | 0.4018 | 0.4004 | 5 | |
| | 2 | 0.0014 | 0.0055 | 0.0120 | 0.0204 | 0.0305 | 0.0422 | 0.0550 | 0.0688 | 0.0833 | 0.0984 | 0.1139 | 0.1295 | 0.1452 | 0.1608 | 0.1762 | 0.1912 | 0.2057 | 0.2197 | 4 | |
| | 3 | 0.0000 | 0.0002 | 0.0005 | 0.0011 | 0.0021 | 0.0036 | 0.0055 | 0.0080 | 0.0110 | 0.0146 | 0.0188 | 0.0236 | 0.0289 | 0.0349 | 0.0415 | 0.0486 | 0.0562 | 0.0643 | 3 | |
| | 4 | – | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0002 | 0.0003 | 0.0005 | 0.0008 | 0.0012 | 0.0017 | 0.0024 | 0.0032 | 0.0043 | 0.0055 | 0.0069 | 0.0086 | 0.0106 | 2 | |
| | 5 | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0005 | 0.0007 | 0.0009 | 1 | |
| | 6 | – | – | – | – | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 6 |
| 7 | 0 | 0.9321 | 0.8681 | 0.8080 | 0.7514 | 0.6983 | 0.6485 | 0.6017 | 0.5578 | 0.5168 | 0.4783 | 0.4423 | 0.4087 | 0.3773 | 0.3479 | 0.3206 | 0.2951 | 0.2714 | 0.2493 | 7 | |
| | 1 | 0.0659 | 0.1240 | 0.1749 | 0.2192 | 0.2573 | 0.2897 | 0.3170 | 0.3396 | 0.3578 | 0.3720 | 0.3827 | 0.3901 | 0.3946 | 0.3965 | 0.3960 | 0.3935 | 0.3891 | 0.3830 | 6 | |
| | 2 | 0.0020 | 0.0076 | 0.0162 | 0.0274 | 0.0406 | 0.0555 | 0.0716 | 0.0886 | 0.1061 | 0.1240 | 0.1419 | 0.1596 | 0.1769 | 0.1936 | 0.2097 | 0.2248 | 0.2391 | 0.2523 | 5 | |
| | 3 | 0.0000 | 0.0003 | 0.0008 | 0.0019 | 0.0036 | 0.0059 | 0.0090 | 0.0128 | 0.0175 | 0.0230 | 0.0292 | 0.0363 | 0.0441 | 0.0525 | 0.0617 | 0.0714 | 0.0816 | 0.0923 | 4 | |
| | 4 | – | 0.0000 | 0.0000 | 0.0001 | 0.0002 | 0.0004 | 0.0007 | 0.0011 | 0.0017 | 0.0026 | 0.0036 | 0.0049 | 0.0066 | 0.0086 | 0.0109 | 0.0136 | 0.0167 | 0.0203 | 3 | |
| | 5 | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0012 | 0.0016 | 0.0021 | 0.0027 | 2 | |
| | 6 | – | – | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 1 | |
| | 7 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0 | 7 |
| *n* | *r* | 0.99 | 0.98 | 0.97 | 0.96 | 0.95 | 0.94 | 0.93 | 0.92 | 0.91 | 0.90 | 0.89 | 0.88 | 0.87 | 0.86 | 0.85 | 0.84 | 0.83 | 0.82 | *r* | *n* |
| | | *p* | | | | | | | | | | | | | | | | | | | |

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| X | λ = 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 3.6 | 3.7 | 3.8 | 3.9 | 4.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0450 | 0.0408 | 0.0369 | 0.0334 | 0.0302 | 0.0273 | 0.0247 | 0.0224 | 0.0202 | 0.0183 |
| 1 | 0.1397 | 0.1304 | 0.1217 | 0.1135 | 0.1057 | 0.0984 | 0.0915 | 0.0850 | 0.0789 | 0.0733 |
| 2 | 0.2165 | 0.2087 | 0.2008 | 0.1929 | 0.1850 | 0.1771 | 0.1692 | 0.1615 | 0.1539 | 0.1465 |
| 3 | 0.2237 | 0.2226 | 0.2209 | 0.2186 | 0.2158 | 0.2125 | 0.2087 | 0.2046 | 0.2001 | 0.1954 |
| 4 | 0.1734 | 0.1781 | 0.1823 | 0.1858 | 0.1888 | 0.1912 | 0.1931 | 0.1944 | 0.1951 | 0.1954 |
| 5 | 0.1075 | 0.1140 | 0.1203 | 0.1264 | 0.1322 | 0.1377 | 0.1429 | 0.1477 | 0.1522 | 0.1563 |
| 6 | 0.0555 | 0.0608 | 0.0662 | 0.0716 | 0.0771 | 0.0826 | 0.0881 | 0.0936 | 0.0989 | 0.1042 |
| 7 | 0.0246 | 0.0278 | 0.0312 | 0.0348 | 0.0385 | 0.0425 | 0.0466 | 0.0508 | 0.0551 | 0.0595 |
| 8 | 0.0095 | 0.0111 | 0.0129 | 0.0148 | 0.0169 | 0.0191 | 0.0215 | 0.0241 | 0.0269 | 0.0298 |
| 9 | 0.0033 | 0.0040 | 0.0047 | 0.0056 | 0.0066 | 0.0076 | 0.0089 | 0.0102 | 0.0116 | 0.0132 |
| 10 | 0.0010 | 0.0013 | 0.0016 | 0.0019 | 0.0023 | 0.0028 | 0.0033 | 0.0039 | 0.0045 | 0.0053 |
| 11 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0016 | 0.0019 |
| 12 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0006 |
| 13 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 |
| 14 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 |

| X | λ = 4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 4.6 | 4.7 | 4.8 | 4.9 | 5.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0166 | 0.0150 | 0.0136 | 0.0123 | 0.0111 | 0.0101 | 0.0091 | 0.0082 | 0.0074 | 0.0067 |
| 1 | 0.0679 | 0.0630 | 0.0583 | 0.0540 | 0.0500 | 0.0462 | 0.0427 | 0.0395 | 0.0365 | 0.0337 |
| 2 | 0.1393 | 0.1323 | 0.1254 | 0.1188 | 0.1125 | 0.1063 | 0.1005 | 0.0948 | 0.0894 | 0.0842 |
| 3 | 0.1904 | 0.1852 | 0.1798 | 0.1743 | 0.1687 | 0.1631 | 0.1574 | 0.1517 | 0.1460 | 0.1404 |
| 4 | 0.1951 | 0.1944 | 0.1933 | 0.1917 | 0.1898 | 0.1875 | 0.1849 | 0.1820 | 0.1789 | 0.1755 |
| 5 | 0.1600 | 0.1633 | 0.1662 | 0.1687 | 0.1708 | 0.1725 | 0.1738 | 0.1747 | 0.1753 | 0.1755 |
| 6 | 0.1093 | 0.1143 | 0.1191 | 0.1237 | 0.1281 | 0.1323 | 0.1362 | 0.1398 | 0.1432 | 0.1462 |
| 7 | 0.0640 | 0.0686 | 0.0732 | 0.0778 | 0.0824 | 0.0869 | 0.0914 | 0.0959 | 0.1022 | 0.1044 |
| 8 | 0.0328 | 0.0360 | 0.0393 | 0.0428 | 0.0463 | 0.0500 | 0.0537 | 0.0575 | 0.0614 | 0.0653 |
| 9 | 0.0150 | 0.0168 | 0.0188 | 0.0209 | 0.0232 | 0.0255 | 0.0280 | 0.0307 | 0.0334 | 0.0363 |
| 10 | 0.0061 | 0.0071 | 0.0081 | 0.0092 | 0.0104 | 0.0118 | 0.0132 | 0.0147 | 0.0164 | 0.0181 |
| 11 | 0.0023 | 0.0027 | 0.0032 | 0.0037 | 0.0043 | 0.0049 | 0.0056 | 0.0064 | 0.0073 | 0.0082 |
| 12 | 0.0008 | 0.0009 | 0.0011 | 0.0014 | 0.0016 | 0.0019 | 0.0022 | 0.0026 | 0.0030 | 0.0034 |
| 13 | 0.0002 | 0.0003 | 0.0004 | 0.0004 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0013 |
| 14 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 |
| 15 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |

| X | λ = 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | 5.6 | 5.7 | 5.8 | 5.9 | 6.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0.0061 | 0.0055 | 0.0050 | 0.0045 | 0.0041 | 0.0037 | 0.0033 | 0.0030 | 0.0027 | 0.0025 |
| 1 | 0.0311 | 0.0287 | 0.0265 | 0.0244 | 0.0225 | 0.0207 | 0.0191 | 0.0176 | 0.0162 | 0.0149 |
| 2 | 0.0793 | 0.0746 | 0.0701 | 0.0659 | 0.0618 | 0.0580 | 0.0544 | 0.0509 | 0.0477 | 0.0446 |
| 3 | 0.1348 | 0.1293 | 0.1239 | 0.1185 | 0.1133 | 0.1082 | 0.1033 | 0.0985 | 0.0938 | 0.0892 |
| 4 | 0.1719 | 0.1681 | 0.1641 | 0.1600 | 0.1558 | 0.1515 | 0.1472 | 0.1428 | 0.1383 | 0.1339 |
| 5 | 0.1753 | 0.1748 | 0.1740 | 0.1728 | 0.1714 | 0.1697 | 0.1678 | 0.1656 | 0.1632 | 0.1606 |
| 6 | 0.1490 | 0.1515 | 0.1537 | 0.1555 | 0.1571 | 0.1584 | 0.1594 | 0.1601 | 0.1605 | 0.1606 |
| 7 | 0.1086 | 0.1125 | 0.1163 | 0.1200 | 0.1234 | 0.1267 | 0.1298 | 0.1326 | 0.1353 | 0.1377 |
| 8 | 0.0692 | 0.0731 | 0.0771 | 0.0810 | 0.0849 | 0.0887 | 0.0925 | 0.0962 | 0.0998 | 0.1033 |
| 9 | 0.0392 | 0.0423 | 0.0454 | 0.0486 | 0.0519 | 0.0552 | 0.0586 | 0.0620 | 0.0654 | 0.0688 |
| 10 | 0.0200 | 0.0220 | 0.0241 | 0.0262 | 0.0285 | 0.0309 | 0.0334 | 0.0359 | 0.0386 | 0.0413 |
| 11 | 0.0093 | 0.0104 | 0.0116 | 0.0129 | 0.0143 | 0.0157 | 0.0173 | 0.0190 | 0.0207 | 0.0225 |
| 12 | 0.0039 | 0.0045 | 0.0051 | 0.0058 | 0.0065 | 0.0073 | 0.0082 | 0.0092 | 0.0102 | 0.0113 |
| 13 | 0.0015 | 0.0018 | 0.0021 | 0.0024 | 0.0028 | 0.0032 | 0.0036 | 0.0041 | 0.0046 | 0.0052 |
| 14 | 0.0006 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0013 | 0.0015 | 0.0017 | 0.0019 | 0.0022 |
| 15 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0004 | 0.0005 | 0.0006 | 0.0007 | 0.0008 | 0.0009 |
| 16 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 |
| 17 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |