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# Daffodil International University

**Department of Business Administration**
**Faculty of Business and Entrepreneurship**
**Semester Final Examination, Fall 2024**
**Course Code: 0542-213, Course Title: Statistics for Decision-Making**
**Teachers' Initials: DMSA, AS, UFU**

**Time: 02:00 Hours** **Marks: 40**

[Answer all the following questions. The figures in the right margin indicate the full marks and corresponding course outcomes]

**1. a)** **Explain** six-step procedure for testing a hypothesis [3] CLO 1, 3 L-2, 4

**b)** **Distinguish** between variable and random variable [2]

**c)** **Define** correlation and regression with example. [2]

**2 a)** A survey of 545 college students asked: What is your favorite winter sport? And what type of college do you attend? The results are summarize below: [3] CLO 2 L-3

| | Favorite | Winter | Sport | |
|---|---|---|---|---|
| College type | Snowboarding | Skiing | ICE Scatting | Total |
| Junior College | 68 | 41 | 46 | 155 |
| Four-Year College | 84 | 56 | 70 | 210 |
| Graduate School | 59 | 74 | 47 | 180 |
| Total | 211 | 171 | 163 | 545 |

**If, a student is selected randomly, Identify the below probabilities; ii) The student's favorite game is skiing and he is a junior college student, iii) If the student selected is a four year college student, what is the probability that the student prefer ICE skating?**

**b)** The chair of the board of directors says, **"There is a 50% chance this company will** earn a profit, a 30% chance it will break even, and a 20% chance it will lose money next quarter." Identify the chance the company will not lose money next quarter. [2] CLO 2 L-3

**c)** The Auto World sells new cars for Toyota. The Auto World sells the largest number of cars on Saturday. He has developed the following probability distribution for the number of cars he expects to sell on a particular Saturday: [3] CLO 2 L-3

| No. of cars sold | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Probability | 0.1 | 0.2 | 0.3 | 0.3 | 0.1 |

**Identify** the mean and standard deviation from above data.

**3.** Suppose, the monthly demand for potatoes (in '000 metric tons) and the corresponding supply (in '000 metric tons) of Dhaka city are shown below: CLO 2 L-3

| **Demand** | **10** | **20** | **40** | **50** | **70** | **90** | **110** |
|---|---|---|---|---|---|---|---|
| **Supply** | **8** | **25** | **55** | **62** | **68** | **70** | **85** |

**a)** **Identify** the regression coefficient. **Build** the estimated regression line/model [5]

**b)** **Analyze** the supply when demand goes to 100 thousand metric tons. [2] CLO 3 L-4

**c)** **Identify** the correlation coefficient "r" and explain your findings. [3] CLO 2 L-3

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| | | | | |
|---|---|---|---|---|
| 4. | a) | The price of rice in Bangladesh was found to follow a normal distribution with a mean of 60 taka and a variance of 10. **Identify** the probability that<br>i) the price of rice is between 65 to 75 taka; ii)the price is less than 68 taka; iii) The price is less than 55 taka. | [5] | CLO 2<br>L-3 |
| | b) | A box of shirts consists 10 pieces of shirts; 7 are white color and 3 are black color. In a sample of 4 shirts, solve the probability that exactly 2 are white shirts. Assume the samples are drawn without replacement. | [3] | CLO 2<br>L-3 |
| | c) | In the past, schools in Los Angeles County have closed an average of 3 days each year for weather emergencies. Solve the probability that schools in Los Angeles County will close 4 days next year | [3] | CLO 2<br>L-3 |
| | d) | Rahimafrooz Bangladesh Ltd wants to test the claim that their batteries last more than 40 hours. Using a simple random sample of 15 batteries yielded a mean of 44.9 hours, with a standard deviation of 8.9 hours. Test this claim using a significance level of 0.05. Can we **assume** that battery performance is more than 40 hours? | [4] | CLO 4<br>L-5 |

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| | 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 |

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**TABLE A-3** *t* Distribution: Critical *t* Values

| | Area in One Tail | | | | |
|---|---|---|---|---|---|
| | 0.005 | 0.01 | 0.025 | 0.05 | 0.10 |
| Degrees of Freedom | Area in Two Tails | | | | |
| | 0.01 | 0.02 | 0.05 | 0.10 | 0.20 |
| 1 | 63.657 | 31.821 | 12.706 | 6.314 | 3.078 |
| 2 | 9.925 | 6.965 | 4.303 | 2.920 | 1.886 |
| 3 | 5.841 | 4.541 | 3.182 | 2.353 | 1.638 |
| 4 | 4.604 | 3.747 | 2.776 | 2.132 | 1.533 |
| 5 | 4.032 | 3.365 | 2.571 | 2.015 | 1.476 |
| 6 | 3.707 | 3.143 | 2.447 | 1.943 | 1.440 |
| 7 | 3.499 | 2.998 | 2.365 | 1.895 | 1.415 |
| 8 | 3.355 | 2.896 | 2.306 | 1.860 | 1.397 |
| 9 | 3.250 | 2.821 | 2.262 | 1.833 | 1.383 |
| 10 | 3.169 | 2.764 | 2.228 | 1.812 | 1.372 |
| 11 | 3.106 | 2.718 | 2.201 | 1.796 | 1.363 |
| 12 | 3.055 | 2.681 | 2.179 | 1.782 | 1.356 |
| 13 | 3.012 | 2.650 | 2.160 | 1.771 | 1.350 |
| 14 | 2.977 | 2.624 | 2.145 | 1.761 | 1.345 |
| 15 | 2.947 | 2.602 | 2.131 | 1.753 | 1.341 |
| 16 | 2.921 | 2.583 | 2.120 | 1.746 | 1.337 |
| 17 | 2.898 | 2.567 | 2.110 | 1.740 | 1.333 |
| 18 | 2.878 | 2.552 | 2.101 | 1.734 | 1.330 |
| 19 | 2.861 | 2.539 | 2.093 | 1.729 | 1.328 |
| 20 | 2.845 | 2.528 | 2.086 | 1.725 | 1.325 |
| 21 | 2.831 | 2.518 | 2.080 | 1.721 | 1.323 |
| 22 | 2.819 | 2.508 | 2.074 | 1.717 | 1.321 |
| 23 | 2.807 | 2.500 | 2.069 | 1.714 | 1.319 |
| 24 | 2.797 | 2.492 | 2.064 | 1.711 | 1.318 |
| 25 | 2.787 | 2.485 | 2.060 | 1.708 | 1.316 |
| 26 | 2.779 | 2.479 | 2.056 | 1.706 | |
| 27 | 2.771 | 2.473 | 2.052 | 1.703 | 1.314 |
| 28 | 2.763 | 2.467 | 2.048 | 1.701 | 1.313 |
| 29 | 2.756 | 2.462 | 2.045 | 1.699 | 1.311 |
| 30 | 2.750 | 2.457 | 2.042 | 1.697 | 1.310 |
| 31 | 2.744 | 2.453 | 2.040 | 1.696 | 1.309 |
| 32 | 2.738 | 2.449 | 2.037 | 1.694 | 1.309 |
| 34 | 2.728 | 2.441 | 2.032 | 1.691 | 1.307 |
| 36 | 2.719 | 2.434 | 2.028 | 1.688 | 1.306 |
| 38 | 2.712 | 2.429 | 2.024 | 1.686 | 1.304 |
| 40 | 2.704 | 2.423 | 2.021 | 1.684 | 1.303 |
| 45 | 2.690 | 2.412 | 2.014 | 1.679 | 1.301 |
| 50 | 2.678 | 2.403 | 2.009 | 1.676 | 1.299 |
| 55 | 2.668 | 2.396 | 2.004 | 1.673 | 1.297 |
| 60 | 2.660 | 2.390 | 2.000 | 1.671 | 1.296 |
| 65 | 2.654 | 2.385 | 1.997 | 1.669 | 1.295 |
| 70 | 2.648 | 2.381 | 1.994 | 1.667 | 1.294 |
| 75 | 2.643 | 2.377 | 1.992 | 1.665 | 1.293 |
| 80 | 2.639 | 2.374 | 1.990 | 1.664 | 1.292 |
| 90 | 2.632 | 2.368 | 1.987 | 1.662 | 1.291 |
| 100 | 2.626 | 2.364 | 1.984 | 1.660 | 1.290 |
| 200 | 2.601 | 2.345 | 1.972 | 1.653 | 1.286 |
| 300 | 2.592 | 2.339 | 1.968 | 1.650 | 1.284 |
| 400 | 2.588 | 2.336 | 1.966 | 1.649 | 1.284 |
| 500 | 2.586 | 2.334 | 1.965 | 1.648 | 1.283 |
| 750 | 2.582 | 2.331 | 1.963 | 1.647 | 1.283 |
| 1000 | 2.581 | 2.330 | 1.962 | 1.646 | 1.282 |
| 2000 | 2.578 | 2.328 | 1.961 | 1.646 | 1.282 |
| Large | 2.576 | 2.326 | 1.960 | 1.645 | 1.282 |