

Discussion 2

1. The normal distribution is a _____ distribution.
 - a. Discrete
 - b. Continuous
 - c. Positively Skewed
 - d. Negatively Skewed**ANSWER: b**
2. Which of the following statements is correct regarding the standard normal distribution?
 - a. It is also called the z distribution
 - b. Any normal distribution can be converted to the standard normal distribution
 - c. The mean is 0 and the standard deviation is 1.
 - d. All of the above are correct**ANSWER: d**
3. Which of the following statements is true about a probability distribution?
 - a. A probability distribution summarizes all possible experimental outcomes and their probability.
 - b. A probability distribution equals one.
 - c. A continuous probability distribution is used to summarize a discrete random variable.
 - d. A probability distribution shows the frequency of a random variable.**ANSWER: a**
4. The expected value, $E(X)$, of a binomial probability distribution with n trials and probability p of success is:
 - a. $n + p$
 - b. $np(1-p)$
 - c. np
 - d. $n + p - 1$**ANSWER: c**
5. Which probability distribution is appropriate when the events of interest occur randomly, independently of one another, and rarely?
 - a. Binomial distribution
 - b. Poisson distribution
 - c. Any discrete probability distribution
 - d. Any continuous probability distribution**ANSWER: b**
6. The variance of a binomial distribution for which $n = 100$ and $p = 0.20$ is:
 - a. 100
 - b. 80
 - c. 20
 - d. 16**ANSWER: d**
7. Given that Z is a standard normal random variable, $P(-1.0 \leq Z \leq 1.5)$ is
 - a. 0.7745
 - b. 0.8413
 - c. 0.0919
 - d. 0.9332**ANSWER: a**

8. Given that Z is a standard normal variable, the value z for which $P(Z \leq z) = 0.2580$ is
- 0.70
 - 0.758
 - 0.65
 - 0.242
- ANSWER: c**
9. If Z is a standard normal random variable, then $P(-1.75 \leq Z \leq -1.25)$ is
- 0.1056
 - 0.0401
 - 0.8543
 - 0.0655
- ANSWER: d**
10. If Z is a standard normal random variable, then the value z for which $P(-z \leq Z \leq z)$ equals 0.8764 is
- 0.3764
 - 1.54
 - 3.08
 - 1.16
- ANSWER: b**
11. If Z is a standard normal random variable, the area between $z = 0.0$ and $z = 1.30$ is 0.4032, while the area between $z = 0.0$ and $z = 1.50$ is 0.4332. What is the area between $z = -1.30$ and $z = 1.50$?
- 0.0300
 - 0.0668
 - 0.0968
 - 0.8364
- ANSWER: d**

Use the following to answer questions 12-14:

A company is studying the number of monthly absences among its 125 employees. The following probability distribution shows the likelihood that people were absent 0, 1, 2, 3, 4, or 5 days last month.

<u>Number of days absent</u>	<u>Probability</u>
0	0.60
1	0.20
2	0.12
3	0.04
4	0.04
5	0

12. What is the mean number of days absent?
- 1.00
 - 0.40
 - 0.72
 - 2.5

Answer: C

13. What is the variance of the number of days absent?

- A) 1.99
- B) 1.41
- C) 5.00
- D) 55.52

Answer: A

14. Given the probability distribution, which of the following predictions is correct?

- A) 60% of the employees will have more than one day absent for a month
- B) There is a 0.04 probability that an employee will be absent 1 day during a month
- C) There is a 0.12 probability that an employee will be absent 2 days during a month
- D) There is a 0.50 probability that an employee will be absent 0.72 days during a month.

Answer: C

15. The mean score of a college entrance test is 500; the standard deviation is 75. The scores are normally distributed. What percent of the students scored below 320?

- A) About 50.82%
- B) About 34.13%
- C) About 7.86%
- D) About 0.82%

Answer: D

16. The mean of a normally distributed group of weekly incomes of a large group of executives is \$1,000 and the standard deviation is \$100. What is the z-score for an income of \$1,100?

- A) 1.00
- B) 2.00
- C) 1.683
- D) -0.90

Answer: A

17. A new extended-life light bulb has an average service life of 750 hours, with a standard deviation of 50 hours. If the service life of these light bulbs approximates a normal distribution, about what percent of the bulbs have life between 600 hours and 900 hours?

- A) 95%
- B) 68%
- C) 34%
- D) 99.7%

Answer: D

Use the following to answer questions 18-20:

The average score of 100 students taking a statistics final was 70 with a standard deviation of 7.

18. Assuming a normal distribution, approximately how many scored 90 or higher?

- A) 0.4979
- B) 0.0021
- C) 0.9979
- D) 2.86

Answer: B

19. Assuming a normal distribution, approximately how many scored less than 60?

- A) 0.2271
- B) 0.3729
- C) 0.8929
- D) None of the above

Answer: D

20. Assuming a normal distribution, approximately how many scored greater than 65?

- A) 0.2611
- B) 0.2389
- C) 0.7611
- D) -0.714

Answer: C

21. Determine which of the following are not valid probability distributions, and explain why not.

a.

x	0	1	2	3
$p(x)$	0.15	0.25	0.35	0.45

b.

x	2	3	4	5
$p(x)$	-0.10	0.40	0.50	0.25

c.

x	-2	-1	0	1	2
$p(x)$	0.10	0.20	0.40	0.20	0.10

ANSWERS:

Table (a) is not a valid probability distribution because the probabilities don't sum to one, and Table (b) is not valid because it contains a negative probability. Table (c) is a valid probability distribution.

QUESTIONS 22 AND 23 ARE BASED ON THE FOLLOWING INFORMATION:

The probability distribution of a random variable X is shown below.

x	-4	0	4	8
$p(x)$	0.15	0.25	0.20	0.40

22. Find the following probabilities:

- a. $P(X \leq 0)$
- b. $P(X > 3)$
- c. $P(0 \leq X \leq 4)$
- d. $P(X = 5)$

ANSWERS:

- a. 0.40
- b. 0.60
- c. 0.45
- d. 0.00

23. a. Find $E(X)$.
b. Find $V(X)$.

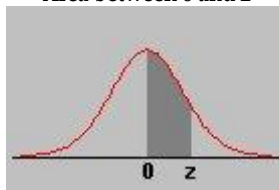
ANSWERS:

- a. 3.40
 - b. 19.64
24. The recent average starting salary for new college graduates in computer information systems is \$47,500. Assume salaries are normally distributed with a standard deviation of \$4,500.
- a. What is the probability of a new graduate receiving a salary between \$45,000 and \$50,000?
 - b. What is the probability of a new graduate getting a starting salary in excess of \$55,000?
 - c. What percent of starting salaries are no more than \$42,250?
 - d. What is the cutoff for the bottom 5% of the salaries?
 - e. What is the cutoff for the top 3% of the salaries?

ANSWERS:

- a. 0.4246
- b. 0.0475
- c. 12.10%
- d. \$40,097.5
- e. \$55,960

Area between 0 and 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

