

* Problems with (*) are higher level

Problem 1 - 4 refer to the following table:

X	P	Product
a	0.2	d
0	0.1	e
1	b	0.4
2	c	?
5	0.2	?
		$E(X) = 1.7$

- The value of a in the above table is
 [A] 0.1 [B] 0.2 [C] 0.3 [D] 0.4 [E] 0.5
- The value of b in the above table is
 [A] 0.1 [B] 0.2 [C] 0.3 [D] 0.4 [E] 0.5
- The value of c in the above table is
 [A] 0 [B] 0.1 [C] 0.2 [D] 0.3 [E] 0.4
- The value of d and e in the above table is
 [A] $d = 0.1, e = 0$ [B] $d = 0.2, e = 0$
 [C] $d = 0.1, e = 0.1$ [D] $d = 0.1, e = 0.2$ [E] $d = 0.1, e = 0.3$

Problem 5- 8 refer to the following problem:

A fair die is rolled 50 times. A random variable is defined as the number of times the die comes up 2.

- The expected value μ is:
 [A] 10 [B] 8.33 [C] 41.67 [D] 2.63 [E] 6.94
- The variance is:
 [A] 10 [B] 8.33 [C] 41.67 [D] 2.63 [E] 6.94
- The standard deviation is:
 [A] 10 [B] 8.33 [C] 41.67 [D] 2.63 [E] 6.94

Problem 8 and 9 refer to the following problem:

A fair die is rolled 10 times. A random variable is defined as the number of times the die comes up a number larger than 4.

- The expected value μ is:
 [A] 3.5 [B] 3.33 [C] 2.22 [D] 1.49 [E] 5
- The variance is:
 [A] 3.5 [B] 3.33 [C] 2.22 [D] 1.49 [E] 5

Problem 10 and 11 refer to the following table:

X	P	Product
-1	b	-0.15
-2	0.1	-0.2
2	0.3	0.6
3	c	0.75
a	0.2	-0.6

10. The value of **a**, **b** and **c** in the above table are:

- [A] $a = -2, b = 0.15, c = 0.25$
- [B] $a = -3, b = 0.25, c = 0.15$
- [C] $a = -3, b = 0.15, c = 0.25$
- [D] $a = -3, b = 0.15, c = 0.15$
- [E] $a = 3, b = 0.15, c = 0.25$

*11. The variance of the above table is

- [A] 4.6
- [B] 5.64
- [C] 22.84
- [D] -22.76
- [E] 5.4

Problem 12 and 13 refer to the following problem: (see example B in section 5.3 in the book)

The height of adult females are normally distributed with a mean of 5 feet 6 inches and a standard deviation of 3 inches. Find the probability that a randomly selected adult female have a height:

12. Between 5 feet 4 inches and 5 feet 11 inches

- [A] 0.2514
- [B] 0.7011
- [C] 0.7486
- [D] 0.7514
- [E] 0.9525

13. At least 5 feet 4 in

- [A] 0.2514
- [B] 0.7011
- [C] 0.7486
- [D] 0.7514
- [E] 0.9525

Problem 14- 16 refer to the following problem: Given $n = 100$ and $p = 0.7$.

14. The probability of $Pr [X \geq 65]$ is given by:

- [A] $Pr [Z \geq -1.2]$
- [B] $Pr [Z \geq 1.2]$
- [C] $Pr [Z \geq -1.09]$
- [D] $Pr [Z \geq -0.98]$
- [E] None of the above

15. The probability of $Pr [55 \leq X \leq 65]$ is given by:

- [A] $Pr [-3.38 \leq Z \leq -0.98]$
- [B] $Pr [-3.28 \leq Z \leq -1.09]$
- [C] $Pr [-3.17 \leq Z \leq -1.2]$
- [D] $Pr [-3.38 \leq Z \leq -1.2]$
- [E] None of the above

16. The probability of $Pr [X = 55]$ is given by:

- [A] $Pr [-3.38 \leq Z \leq -3.28]$
- [B] $Pr [Z = -3.28]$
- [C] $Pr [-3.38 \leq Z \leq -3.17]$
- [D] $Pr [-3.17 \leq Z \leq -3.28]$
- [E] None of the above

- *17. A true-false test contains 50 questions. A passing grade is answering at least 60% of the questions correctly. What is the probability that the student passes the test?
 [A] 7.93% [B] 10.2% [C] 35.94% [D] 6.18% [E] 0.0668
18. An exam consists of 8 true-false questions and 4 multiple choice questions (4 options per question), each with exactly 1 correct answer. If a student selects answers at random, what is the expected value of correct answers?
 [A] 4 [B] 5 [C] 6 [D] 7 [E] 8
19. In a carnival game the probability that you win \$100 is 0.04, the probability that you win \$10 is 0.3 and the probability that you lose \$5 is 0.66. What is your expected return per game?
 [A] -5 [B] 10.3 [C] 1 [D] 3.7 [E] 7
20. The weight of NFL lineman are normally distributed with a mean weight of 280 pounds and a standard deviation of 20 pounds. The probability that an NFL lineman weights at least 310 pounds is:
 [A] 0.3413 [B] 0.8413 [C] 0.6587 [D] 0.1587 [E] 0.0668
21. Bolts produced by a machine are acceptable provided that their length is within the range 5.95 to 6.05 inches. Suppose that the length of the bolts produced are normally distributed with mean of 6 inches and standard deviation of 0.02 inches. what is the probability that a bolt will be an acceptable length?
 [A] 0.9876 [B] 0.9938 [C] 0.0062 [D] 0.8413 [E] 0.9693
22. It was found that 60% of students in a local college are residents. If 600 students are interviewed, the probability that at least 340 of them are resident is given by:
 [A] $Pr [Z \geq -1.67]$ [B] $Pr [Z \geq -1.708]$ [C] $Pr [Z \geq -1.625]$
 [D] $Pr [Z \geq 1.708]$ [E] None of the above

Problem 23-25 refer to the following problem:

The prices in a store are normally distributed with mean of 200 and a standard deviation of 25. Use the table to find the probability of prices that are:

23. Less than 180
 [A] 0.2061 [B] 0.2119 [C] 0.2177 [D] 0.7881 [E] None of the above
24. Greater than 180
 [A] 0.2061 [B] 0.2119 [C] 0.2177 [D] 0.7881 [E] None of the above
25. Between 190 and 230
 [A] 0.5516 [B] 0.5368 [C] 0.5403 [D] 0.5290 [E] None of the above

26. An experiment consists of flipping a fair coin until 1 head occur or 3 flips. A random variable X is defined as the number of times the coin was flipped. Find expected value of the random variable.
 [A] $13/8$ [B] $7/4$ [C] $1/2$ [D] $9/8$ [E] 0.0668

27. A basketball player makes each free throw with a probability of 0.75. What is the probability of making exactly 5 out of 7 shots?
[A] 0.9885 [B] 0.6885 [C] 0.0115 [D] 0.3115 [E] 0.6826

28. A basketball player makes each free throw with a probability of 0.75. If he tries 75 shots, what is the probability of making between 60 and 65 successful shots?
[A] 11.53% [B] 14.88% [C] 18.54% [D] 12.24% [E] None of the above

* 29. If $\mu = 5$ and $\sigma = 3$. Find c such that $Pr(X < c) = 0.9726$.

[A] 0.76 [B] 10.76 [C] 1.92
[D] -1.92 [E] 3.84

* 30. If $\mu = 5$ and $\sigma = 3$. Find c such that $Pr(X < c) = 0.0721$.

[A] 0.62 [B] 9.38 [C] -1.46
[D] 1.46 [E] 2.92

31. Ten percent of the students at a certain college are non resident. A reporter for the student paper would like to interview at least 5 non resident. If the reporter randomly selects 100 names from the student directory and begins contacting them, what is the probability that she will contact at least 5 non resident students? (*round your answer to the nearest*)

[A] 0.0334 [B] 0.9666 [C] 0.9525
[D] 0.0475 [E] 0.0675

32. At a local carnival a game can be played with a fishpond containing 100 fish: 90 are white, 9 are red, and 1 is blue. A contestant randomly catches a fish and receives payment as follows:

White: \$0.30

Red: \$1.00

Blue: \$10.00

If it costs \$.60 to play this game, how much (on the average) does the carnival gain on each play?

[A] -\$0.14 [B] 0.46 [C] 0.14
[D] 0.35 [E] -0.4

33. Repeat the above problem if the question was: how much (on the average) does the contestant gain on each play?

[A] -\$0.14 [B] 0.46 [C] 0.14
[D] 0.35 [E] -0.4

*34. There are two urns a and b . Urn a contains 2 red balls and 1 blue ball; urn b contains 1 red ball and 1 blue ball. An experiment consists of drawing a ball at random from urn a , noting its color, placing it in urn b , and then drawing a ball at random from urn b and noting its color. A random variable X is defined by assigning to each outcome the total number of red balls drawn. Find the expected value of X

[A] $7/9$ [B] $5/9$ [C] $11/9$
[D] $13/9$ [E] $4/9$

35. An experiment consists of selecting 2 coins from a collection of 3 nickels, 2 dimes, and 1 quarter. What is the expected value?

- [A] 20 [B] 30 [C] 15
 [D] 25 [E] 10

* 36. A student is taking a quiz with 4 questions, and each questions has 5 possible answers with only one correct response. A passing grade is answering at least 50% of the questions correctly. What is the probability that the student passes the test if he is guessing every answer?

- [A] 0.175 [B] 0.1808 [C] 0.2405
 [D] 0.3505 [E] 0.2805

37. Using the following data regarding the price of microwave ovens: \$450 , \$420, \$440, \$440, \$485, \$450, and \$500. Find the median and the mode

- [A] (440) , (440,450) [B] (455) , (450,450) [C] (420) , (450)
 [D] (450) , (440,450) [E] (440) , (450)

38. Compute the expected value for the following table:

Scores (x)	<i>Frequency</i>	<i>P</i>	
0	2		
1	3		
2	2		
3	3		
<i>Total</i>	<i>10</i>		

- [A] 2.6 [B] 1.6 [C] 1.5
 [D] 2.5 [E] 1.4

39. A team of 2 people to be selected out of 5 men and 5 women. A random variable X is defined to be the number of men selected. Find the standard deviation. (*hint: create a table and find the expected value, then create another table to find the variance and the standard deviation*)

- [A] 0.444 [B] 1 [C] 0.333
 [D] 0.222 [E] 0.667

* 40. The entrance exam at a university is normally distributed with a mean of 520 and a standard deviation of 75. If only the top 10% of the students are accepted. Approximately, what is the lowest score for admittance into the university? (*round your answer*)

- [A] 625 [B] 630 [C] 617
 [D] 610 [E] 600