1. Determine whether the given procedure results in a binomial distribution. For those that are not binomial, identify at least one requirement that is not satisfied.
    a) Surveying people by asking them what they think of the current president.
    b) Rolling a fair die 20 times.
    c) Rolling a loaded die 20 times and finding the number of times that a 5 occurs.
    d) Recording the gender of 10 newborn babies.
    e) Determining whether each of 15 heart pacemakers is acceptable or defective.

2. An insurance sales representative sells policies to 5 men, all of identical age and in good health. According to the actuarial table, the probability that a man of this particular age will be alive for another 30 years is 2/3. Find the probability that for another 30 years,
    a) All 5 men will be alive.
    b) At least 3 men will be alive.

3. It is known that 50% of mice inoculated with a serum are not protected from a certain disease. If 5 mice are inoculated, find the probability that
    a) None contracts the disease.
    b) Fewer than 2 contract the disease.
    c) More than 3 contract the disease.

4. In testing, 20% of the computer hard disc are found to be corrupted. Determine what kind of distribution is this? Of the next 12 hard disc tested, find the probability that
    a) From 4 to 7 are corrupted.
    b) More than 4 passed the test.

5. If the probability that a fluorescent light has a useful life of at least 800 hours is 0.9, find the probability among 20 such lights
    a) Exactly 18 will have a useful life of at least 800 hours.
    b) At least 15 will have useful life of at least 800 hours.
    c) At least 2 will not have a useful life of at least 800 hours.

6. On average a certain intersection results in 3 traffic accidents per month. What is the probability that in any given month at this intersection
    a) Exactly 5 accidents will occur?
    b) Less than 3 accidents will occur?
    c) At least 2 accidents will occur?

7. A certain newspaper contains an average of 1.3 typing errors per page. Find the probability that the number of typing errors on a randomly selected page will be
    a) Exactly 4.
    b) More than 3.
    c) Less than 4.

8. Suppose there is an average of 2 suicides per year per population of 50,000. In a city of 100,000, find the probability by using probability distribution table that in a given year there is/are
    a) 0 suicide.
    b) 2 suicides.
    c) 2 or more suicides.

9. Assume that the number of car accidents at Jalan Bukit Beruang follows a Poisson distribution with an average of two per week. Find the probability that
    a) No accidents happened during a 1-week period.
    b) At least three accidents happened during a 2-week period.

10. The number of student arriving per minute at MMU mini market is assumed to follow a Poisson distribution with mean $\lambda = 3$. Find the probability that
    a) Exactly 6 students will arrive in a 2-minute period.
    b) At least 3 students will arrive in a 2 minute period.
    c) At least 3 students and at most 7 students will arrive in a 2-minute period.
    d) At most 4 students will arrive in a 3-minute period.

11. Given that X has normal distribution with a mean of 20 and a variance of 4, find the value of k:
    a) $P(X > k) = 0.2119$
    b) $P(X < k) = 0.9678$
    c) $P(X \leq k) = 0.00347$

12. A research scientist reports that mice will live an average of 40 months when their diets are sharply restricted an enriched with vitamins and proteins. Assuming that the life span of such mice are normally distributed with a standard deviation of 6.3 months, find the probability that a given mouse will live
    a) More than 32 months.
    b) Less than 28 months.
    c) Between 37 and 49 months.

13. The life span of a computer is normally distributed with an average of 40 years and a standard deviation of 6 years. Find the probability that the life span of any given computer is
    a) Between 35 to 38 years.
    b) Greater than 49 years.
    c) Less than 40.5 years.
    d) Less than population mean by 4 years or more.

14. The time taken for servicing a car is a random variable having a normal distribution with an average time of 18 minutes and a standard deviation of 2.5 minutes. Find
    a) The probability that the time taken for servicing John's car is less than 15 minutes.
    b) The probability that the time taken for servicing Ali's car is between 17 to 21 minutes.
    c) The maximum time taken such that 22.36% of cars were serviced.

15. A company pays its employees an average wage of RM15.90 an hour with a standard deviation of RM 1.50. If the wages are approximately normally distributed.
    a) What is the probability that the workers receive wages between RM13.75 and RM 16.22 an hour inclusive?
    b) What is the probability that the workers receive wages within RM 3.90 from the average?
    c) What is the probability that the workers receive wages less than the average wage by RM 2.50 or more?

Answer:

1)	a) No	b) No	c) Yes	d) Yes	e) Yes
2)	a) 0.1350	b) 0.7950			
3)	a) 0.01313	b) 0.1875	c) 0.1875		
4)	a) 0.2048	b) 0.9994			
5)	a) 0.2852	b) 0.9887	c) 0.6083		
6)	a) 0.1008	b) 0.4232	c) 0.8009		
7)	a) 0.0324	b) 0.0431	c) 0.9569		
8)	a) 0.0183	b) 0.1465	c) 0.9084		
9)	a) 0.1353	b) 0.7619			
10)	a) 0.1606	b) 0.9380	c) 0.6820	d) 0.0550	
11)	a) 0.54	b) -1.72	c) 1.28		
12)	a) 0.8980	b) 0.0287	c) 0.6080		
13)	a) 0.1674	b) 0.0668	c) 0.5319	d 0.2514	
14)	a) 0.1151	b) 0.5403	c) 16.1		
15)	a) 0.5068	b) 0.99068	c) 0.0475		