(8) 1. Answer True (T) or False (F):

(a) Social insurance number is an example of a quantitative data. _____

(b) A statistic is a numerical value summarizing all the data of a sample. _____

(c) If the odds in favor of event A are 2 to 5, then $P(A) = \frac{2}{5}$. _____

(d) The function $f(x) = \frac{4-x}{5}$ for $x = 1, 2, 3, 4, 5$ is a probability function. _____

(e) If the sets of sample points belonging to two different events do not intersect, the events are mutually exclusive. _____

(f) A binomial experiment has three or more possible outcomes to each trial. _____

(g) If a random variable z is the standard normal score, then $z(0.6) + z(0.4) = 0$._____

(h) ${}_6P_4 = 240$. _____

(4) 2. Of all the employees currently working at a local supermarket, 20 are selected and data are collected for the following 5 variables.
V: Level of satisfaction with their jobs
W: Marital Status
X: Number of children they have
Y: Total cost of clothes and toys per year
Z: Method of payment used for purchasing toys and clothes

(a) What is the population?

(b) What is the sample?

(c) Classify the five variables as nominal, ordinal, discrete or continuous.

(10) 3. Nixon corporation manufactures computer monitors. The following data are the number of computer monitors produced at the company for a sample of 12 days.

24, 32, 27, 23, 35, 33, 29, 29, 40, 23,28, 29

(a) Rank the data and find the mean, median, mode, midrange and range.

(b) Give the 5-number summary and draw a box and whiskers plot.

(c) Find P_{30}.

(3) 4. A club consists of 5 members: Gary, Laura, Sara, Alan and Thomas. Suppose a sample of 3 members are selected from this club.

(a) In how many ways can this sample be selected?

(b) What is the probability that this sample consists of Gary, Sara and Thomas?

(14) 5. A sample of 80 adults was taken and these adults were asked about the number of credit cards they posses. The following table gives the frequency distribution of their responses.

# of Credit Cards (Class limits)	# of Adults f	Class Mark (x)	xf	x^2f	Cumulative Freq.	Cum. Rel. Freq.
0–4	18					
4–8	26					
8–12	22					
12–16	11					
16–20	3					

(a) Complete the table above and find the mean and standard deviation for this distribution.

(b) What is the median?

(c) Draw a histogram and ogive for the distribution.

(4) 6. For two events A and B, if $P(A) = 0.45$, $P(B) = 0.6$ and $P(A \cap B) = 0.1$, find the following:

(a) $P(\overline{A})$

(b) $P(A \cup B)$

(c) $P(A|B)$

(d) $P(A \cap \overline{B})$

(8) 7. Two dice, one blue and one red are tossed, and the up face on each die is recorded. define the following events:
E : {The difference of numbers is 3 or more} and **F** : {A number 6 on the blue die}

(a) List the elements of E:

(b) List the elements of F:

(c) List the elements of $E \cap F$:

(d) Find $P(E)$:

(e) Find $P(F)$:

(f) Find $P(E \cap F)$:

(g) Find $P(F|E)$:

(h) Are E and F independent?

(5) 8. In a survey of 261 people, the following data were obtained relating gender to political orientation:

	Republican (R)	Democrat (D)	Independent (I)	Total
Male(M)	91	66	29	186
Female(F)	41	23	11	75
Total	132	89	40	261

A person is randomly selected from this particular population. What is the probability that the person is:

(a) Male?

(b) Male and a Democrat?

(c) Male given that the person is a Democrat?

(d) Republican given that the person is Male?

(e) Female given that the person is an Independent?

(3) 9. Jason attends his high school reunion. Of the attendees, 50% are female. Common knowledge has it that 88% of people are right-handed. Being a left-handed male, Jason knows that of a given crowd of males, only approximately 6% are left-handed. If Jason talks to the first person he meets at the reunion, what is the probability that the person is a male **or** left-handed? (Hint: Consider the complement events!)

(4) 10. Given the following discrete probability distribution find the mean and the standard deviation, using an extension table:

x	2	4	5	7
p(x)	0.2	0.2	0.2	0.4

(4) 11. Suppose that 30% of all current Canadian taxpayers cheat on their tax returns. Find the probability that the number of Canadian taxpayers in a random sample of 14 who cheat on their tax returns is:

(a) exactly 2

(b) at most 3

(4) 12. The number of accidents that occur at a busy intersection is Poisson distributed with a mean of 3.5 per week. Find the probability of the following events:

(a) No accidents in 1 week

(b) Two or more accidents in 1 week

(c) One accident today

(5) 13. Draw a picture, shade the area which is represented, and evaluate:

(a) $P(z > 2.32)$

(b) $P(z < -1.54)$

(c) $P(-1.56 < z < 2.31)$

(d) $t(13, 0.975)$

(e) $P(-z_0 < z < z_0) = 0.8442$, what is z_0?

(4) 14. The combined math and verbal scores for students taking a national standardized exam for college admission is normally distributed with a mean of 510 and a standard deviation of 300. If a college requires a student to be in the top 10%, what is the minimum score that such a student can obtain and still qualify for admission?

(4) 15. An office supply company conducted a survey before marketing a new paper shredder designed for home use. In the survey, 80% of the people who tried the shredder were satisfied with it. During a certain month, 100 customers bought this shredder. Find the probability that of these 100 customers 75 to 85 are satisfied? (Use the normal approximation to binomial distribution!)

(4) 16. Assume that the weights of all packages of a certain brand of cookies are normally distributed with a mean of 32 ounces and a standard deviation of 0.3 ounces. Find the probability that the mean weight, $\bar{x}$, of a random sample of 20 packages of this brand of cookies will be between 31.8 and 31.9 ounces?

(4) 17. The alumni association wants to estimate the mean debt of this year's college graduates. it is known that the population standard deviation of the debts of this year's college graduates is 11800\$. How large a sample should be selected so that the estimate with a 99% confidence level is within 800\$ of the population mean?

(4) 18. Dr. Moore wanted to estimate the mean cholesterol level for all adult men living on the West Island. He took a sample of 25 adult men and found that the mean cholesterol level for this sample is 186 mg/dL with a standard deviation of 12 mg/dL. Assume that the cholesterol level of all adult men on the West Island is approximately normally distributed. Construct a 95% confidence interval for the population mean μ.

(4) 19. According to a survey conducted in June 2009, 44% of people aged 18 to 29 years said that religion is very important to them. Suppose this result is based on a sample of 1000 people aged 18 to 29 years. Find a 90% confidence interval for the percentage of all people aged 18 to 29 years who will say that religion is very important to them.