1. The sample values given below are the numbers of cases of measles reported to the Illinois Department of Public Health:
1,356   28   18   9   59   2   3   8   1   2

Find the following: (a) mean $= 148.6$ (b) median $= 8.5$ (c) mode $= 2$ (d) midrange $= 678.5$ (e) range $= 1335$
(f) standard deviation $= 424.6$ (g) variance $= 180296.5$ [You may use the STAT/LIST features of your calculator.]

2. In a study of Americans over 65 years of age, it is found that 255 have Alzheimer's disease and 2302 do not (based on data from the Alzheimer's Association). If an American over 65 years of age is randomly selected, what is the estimated probability that he or she has Alzheimer's disease? Based on that probability and the range rule of thumb, would it be significantly low for this one American over 65 years of age to have Alzeheimer's disease?
0.0997; No, it is not a significant.

3. A batch of 40 fuel filters is produced by the Detroit Auto Supply Company, and 12 of them are defective. Two different filters are selected from this batch. Find the probability that both of them are good.   0.485

4. A lottery is won by selecting the correct five numbers (in any order) from the numbers 1, 2, ..., 38. Find the probability of winning this lottery.   1 in 501942 i.e. 0.00000199

5. A study of 400 randomly selected American Airlines flights showed that 344 arrived on time (based on data from the Department of Transportation). What is the estimated probability of an American Airlines flight arriving late? Using the range rule of thumb, is it signficantly low for an American Airlines flight to arrive late?
0.14; No it is not significant.

6. You have a quiz with 5 multiple-questions. Each question has 4 possible answers. If you randomly guess on each question, what is the probability that you will get at least one correct?   0.763

7. A 4-member FBI investigative team is to be formed from a list of 28 agents not already assigned to a special project. How many different possible ways can the team be formed? If 12 of the 28 agents are women, how many ways can they form the FBI team if 2 of the 4 agents must be women.   20475; 7920

8. Recent developments appear to make it possible for couples to dramatically increase the likelihood that they will conceive a child with the gender of their choice. In a test of a gender-selection method, 10 couples try to have baby girls. If this gender-selection method has no effect, what is the probability that the 10 babies will be all girls?   0.000977

9. Consider the following ages of people in a club.   21   22   23   24   27   30   72
Find the percentile corresponding to the age 30. 71st percentile

10. For men aged between 18 and 24 years, the serum cholesterol levels (in mg/100 mL) have a mean of 178.1 and a standard deviation of 40.7 (based on data from the National Health Survey). Find the z-score corresponding to a male in that age group who has a serum cholesterol level of 259.0 mg/100 mL. Is this level significantly high?   1.99; No, it is not significantly high

11. Scores on a quiz have a mean of 10.8 with a standard deviation of 1.4. Scores on an exam have a mean of 78.9 with a standard deviation of 5.6. Which score – 12 on the quiz or an 82 on the exam – is relatively better?   Quiz: $z = 0.86$ Exam:
$z = 0.55 \Rightarrow$ Quiz is relatively better.

12. In a survey, 18 people were asked how many minutes on average they work out each day. The results are given below.

0   30   60   45   20   60   40   50   90   45   30   70   45   60   80   50   70   40

(a). Construct a frequency distribution with a class width of 10. Use the frequency distribution to construct a histogram. Construct the relative and cumulative frequency distributions with the same class width.

(b). Find the 10th Percentile and the first Quartile. $P_{10} = 20$ min.; $Q_1 = 40$ min.

13. This table summarizes results from pedestrian deaths that were caused by accidents (based on data from the National Highway Traffic Safety Administration).

	Pedestrian intoxicated	Pedestrian not intoxicated
Driver intoxicated	59	79
Driver not intoxicated	266	581

If one of the pedestrian deaths is randomly selected, find the probability that the pedestrian was intoxicated or the driver was not intoxicated. .920

14. In a study of drivers under the age of 32, of the 47 who were ticketed, 39 were male, and of the 35 who were not ticketed, 11 were male (based on data from the Department of Transportation). If one of the drivers in the study is randomly selected, find the probability of getting someone who was not ticketed, given that the randomly selected person is female. .75

15. On April 15, 1912, when the Titanic sank, 706 people survived (332 of whom were men), and 1517 died (1360 of whom were men). If someone aboard the Titanic was randomly selected, what is the probability of getting a man or someone who died in the sinking of the ship? .832

16. How many different arrangements of letters of the word FOSSILIZES are there? 302400

17. The instructions for a product confuse 34% of the people who read them. Suppose 4 people independently read these instructions. Find the probability that at least one of them is confused by the instructions. .810

18. The table below gives the Body Mass Index (BMI) for 10 males and 10 females.

Males	23.8	24.6	23.5	21.5	26.5	27.8	25.2	31.9	33.2	26.6
Females	19.6	19.6	25.2	21.4	27.5	33.5	29.9	24.0	37.7	19.8

(a). Using the BMI data for males, find the 5-number summary and construct a boxplot.
$\min x = 21.5, Q_1 = 23.8, \text{median} = 25.85, Q_3 = 27.8, \max = 33.2$

(b). Using the BMI data for females, find the 5-number summary and construct a boxplot.
$\min x = 19.6, Q_1 = 19.8, \text{median} = 24.6, Q_3 = 29.9, \max = 37.7$

(c). Do the results appear to be substantially different between parts (a) and (b)?
Although the medians are similar, the female data shows more variation.

1. Does the following table represent a probability distribution? If so, find the mean and standard deviation.

x	$P(x)$
0	0+
1	0.101
2	0.435
3	0.326
4	0.138

x	$P(x)$	$x \cdot P(x)$	x^2	$x^2 \cdot P(x)$
0	0+	0	0	0
1	0.101	0.101	1	0.101
2	0.435	0.870	4	1.740
3	0.326	0.978	9	2.934
4	0.138	0.552	16	2.208
	Total:	2.501		6.983

$\mu = 2.5 \quad \sigma = 0.9 \text{ (rounded)}$

2. "Inability to get along with others" is the reason cited in 17% of worker firings (based on data from Robert Half International, Inc.). Concerned about her company's working conditions, the personnel manager at a company plans to investigate the five employee firings that occurred over the past year.   [Binomial]

(a). Assuming the 17% rate applies, find the probability that among those five employees, the number fired because of inability to get along with others is 3. $P(x = 3) = 0.0338$

(b). Is 4 employees fired because of inability to get along with others significantly high? Justify your answer.
It is significantly high since $P(x \geq 4) = .0036 < .05$.

(c). If she finds that 4 employees were fired because of inability to get along with others, what does this imply about the company relative to other companies?   Since it is significantly high, it would suggest that her company has more issues with employees getting along than other companies.

3. A local club is holding a raffle in which each ticket costs $2. There is a 1 in 5000 chance that you will win the prize of a $500 gift certificate to Best Buy. What is the expected value from buying one ticket? $E = -\$1.90$

4. Based on Nielson Media Research, 15% of tv sets are tuned to The Voice when it is on. A special focus group consists of 12 randomly selected households (with one tv set per household). For such a focus group,   [Binomial]

(a). What is the mean number and standard deviation of tv sets tuned to The Voice? $\mu = 1.8 \quad \sigma = 1.2$

(b). What is the probability that exactly 3 tv sets are tuned to The Voice? $P(x = 3) = 0.172$

(c). What is the probability that at least 3 tv sets are tuned to The Voice? $P(x \geq 3) = 0.264$

(d). Would it be significantly low to find that no sets are tuned to The Voice?   It is not significant since $P(x = 0) = .142 \geq .05$.

(e). If no sets are tuned to The Voice, does it appear that the 15% value is wrong?   No, since the probability is high enough (see part (d)) it would not be surprising if 0 sets are tuned to The Voice. There is no evidence that the 15% is wrong.

5. When Mendel conducted his famous genetics experiments with peas, one sample of offspring consisted of 580 peas, and Mendel theorized that 25% of them would be yellow peas.   [Binomial]

(a). If Mendel's theory is correct, find the mean and standard deviation for the numbers of yellow peas in such groups of 580 offspring peas. $\mu = 145.0; \sigma = 10.4$

(b). Find the minimum and maximum significant values.   min = 124.2 and max = 165.8

(c). Is the actual result of 152 yellow peas significantly high? What does this result suggest about Mendel's theory?
No, it is not significantly high since it is within the range of not significant values. It does not provide strong evidence against Mendel's theory.