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

x	P(x)	x	P(x)	$x \cdot P(x)$	x^2	$x^2 \cdot P(x)$	
0	0+	0	0+	0	0	0	
1	0 101	1	0.101	0.101	1	0.101	
- -	0.101	2	0.435	0.870	4	1.740	$\mu = 2.5 \sigma = 0.9 \text{ (rounded)}$
2	0.435	3	0.326	0.978	9	2.934	
3	0.326	4	0.138	0.552	16	2.208	
4	0.138		Total:	2.501		6.983	

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 unusually high? Justify your answer. It is unusually high since $P(x \ge 4) = .0036 < .05$.
- (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 unusually 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 Cold Case 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 Cold Ca	ase? $\mu = 1.8 \ \sigma = 1.2$
(b). What is the probability that exactly 3 tv sets are tuned to Cold Case?	P(x=3) = 0.172
(c). What is the probability that at least 3 tv sets are tuned to Cold Case?	$P(x \ge 3) = 0.264$
(d). Would it be unusual to find that no sets are tuned to Cold Case?	It is not unusual since $P(x=0) = .142 \ge .05$

(e). If no sets are tuned to Cold Case, 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 Cold Case. 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 usual values.
- (c). Is the actual result of 152 yellow peas unusual? What does this result suggest about Mendel's theory? No, it is not unusual since it is within the range of usual values. It does not provide strong evidence against Mendel's theory.

6. Currently, an average of 7 residents of the village of Westport (population 760) die each year.	[Poisson]
(a). Find the mean number of deaths per day.	$\mu = .0192$
(b). Find the probability that on any given day there are no deaths.	P(x = 0) = .981
(c). Find the probability that on a given day, there is one death.	P(x = 1) = .0188
(d). Find the probability that on a given day, there is more than one death.	P(x > 1) = .0002

 $\min = 124.2$ and $\max = 165.8$

7.	For	the	standard	normal	distribution,
					,

(a). Find the probability that z is less than -1.32	(b). Find t	the probability that z is gr	eater than 1.8.
(c). Find the 70^{th} percentile (P_{70})	(a) .0934	(b) .0359	(c) $z = .52$

8. Given a normal distribution with mean 15.8 and standard deviation of 1.7, Find

(a). P(x = 10) = 0 (b). P(x < 10) = .0003 (c). P(x > 15.0) = .6808 (d). P(5 < x < 20) = .9931

9. Women's heights are normally distributed with mean 63.6 in. and standard deviation 2.5 in. The U.S. Army requires women's heights to be between 58 in. and 80 in.

- (a). Find the percentage of women who meet this height requirement. 98.74%
- (b). Find the maximum height allowed so that all but the tallest 3% would be able to join the army. 68.3 in.

10. A manager of a small consulting company keeps a daily log of the number of referrals he receives. The number of referrals for 4 days are 6, 9, 9, and 7. Assume that samples of size 2 are randomly selected with replacement from this population of 4 values.

- (b). Find the probability of each sample. Create a table describing the sampling distribution of sample means. $\frac{\bar{x} \quad 6 \quad 6.5 \quad 7 \quad 7.5 \quad 8 \quad 9}{P(\bar{x}) \quad 1/16 \quad 2/16 \quad 1/16 \quad 4/16 \quad 4/16 \quad 4/16}$
- (c). Find the mean of the sampling distribution. Show your work.
- (d). How is the mean of the sampling distribution related to the mean of the population. $\mu = 7.75 = \mu_{\bar{x}}$

11. The incubation time for Allen hummingbird eggs are (approximately) normally distributed with a mean of 16 days and a standard deviation of 2 days. Suppose we have a random sample of 30 hummingbird eggs in an incubator. Find the probability that

(a). A single egg will have an incubation time greater than 15 days.	P(x > 15) = 0.6915
(b). The random sample of 30 will have a mean incubation time greater than 15 days.	$P(\bar{x} > 15) = 0.9969$
(c). The random sample will have a mean incubation time between 16 and 17 days.	$P(16 < \bar{x} < 17) = .4969$

 $\mu_{\bar{x}} = 7.75$