			12001201201	
Stat	tisti	CS	300	

Quiz #7

Summer 2007 5:30-7:50 p.m.

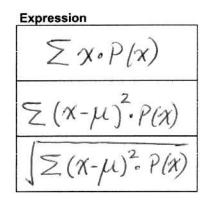
Name:

Solution

(3 points, 2 minutes)

1. What are the appropriate expressions (formulas) for the mean, variance, and standard deviation in the context of a discrete probability distribution?

Para	amete
	μ
(	5 <sup>2</sup>
	σ



(7 points: 7 minutes)

- 2. For each of the problems below (here and on next page), determine whether a valid probability distribution is described and, if so, calculate the mean, variance, and standard deviation.
- (a) A manufacturer makes a product that can have defects in 5 different ways, so some of the product will have 0 defects, some 1, 2, 3, 4, or 5 defects. The manufacturer claims that 82.8% have 0 defects, 12.8% have 1, 1.3% have 2, 0.9% have 3, 0.2% have 4, and 0.1% have 5 defects.

$$\sigma^2 =$$

X	P(x)				
0	0,828				
i	0.128				
2	0.013	~ N)	nt-		,
2	6110	10	Ra	Valid	d
3	0.009	di	51 0		1
4	0.001	A	LW ?	17	
5	0.001	/'		100	_
		/		1	E5
		1			l

- 2. (Continued)
- (b) Use the relative frequency in the recent past as a probability distribution for the near future. Judges in an ice skating contest award scores from 1 through 6 for 288 contestants. Ten judges awarded a total of 2880 scores in the proportions listed as probabilities in the distribution below. What are the mean, variance and standard deviation of this distribution?

	(x-m) = P(x)						
μ= <u>3,48</u>	x	P(x)	x, P(x)	₹			
$\sigma^{2} = 2.189$ $\sigma = 1.48$	1 2 3 4 5	0.11 0.17 0.21 0.26 0.14 0.11	0.11 0.34 0.63 1.04 0.70	0.677 0.372 0.048 0.070 0.323 0.699	2.		
	11	Zx u =	3.48	Ž	(x-µ)	) <sup>2</sup> . p(x) 189 =	02
				0=	Jo2 =	1.48	

(5 points: 4 minutes)

3. Larry is sitting in an airport waiting for his son's flight, which will arrive in 8 hours. Larry is bored. He will get 12 M&Ms from a candy machine. The proportion of "RED" M&Ms among all the M&Ms made is 31%. If Larry's 12 M&Ms are a random selection from the population of all M&Ms, what is the probability that his 12 M&Ms will include exactly 5 RED candies?

p = P(rod) = 0.31 P(rot Red) = q = 0.69 n = 12 x = 5 random and small sample from large population implies "Endependence" and p stays the same from one  $M \neq m$  to the next. Birmial  $x \sim B(6, 0.31)$ 

$$P(\chi=3) = C_5(0.31)^5(0.69)^7 = (0.169)$$

(9 points: 7 minutes)

4. (a) The percentage of "RED" M&Ms among all the M&Ms that are made is 31%. What are the mean and standard deviation for the number of RED M&Ms in randomly selected samples of 1800 M&Ms?

BiNomial: n = 1800 p = 0.31 p = 19.6

(b) In a random sample of 1800 M&Ms, would it be unusual to find more than 580 RED M&Ms?

1=580

μ= 558 % from part (a) 0=19.6 from part (a)

 $Z = \frac{\chi - \mu}{\sigma} = \frac{580 - 538}{19.6} = 1.12$ Not unusual