## MAT 135, Discussion Questions 3.23

1. What are the properties of the binomial distribution?

fixed freals constant probability

2 outcomes: Success of failure

2. What are some situations we can use the binomial distribution to model? Give at least three.

# & head in neariflips

# & 4's in n decè rolls.

# & boys in a class & n shedents

ansevers will vans

3. The formula for the binomial distribution is given by  $P(X = x) = \binom{n}{x} p^x (1-p)^{n-x}$ . What do p, n, and x stand for?

n # of trials p = probability of success x # of Successes

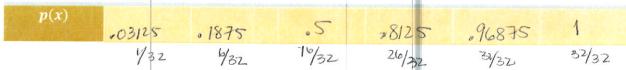
4. For the scenario in which we flip 5 fair coins and count the number of heads, state the probability distribution in the table below.

# of Heads 0 1 2 3 4 5 p(x) .03125 .15625 .3125 .3125 .15625 .03125

binomial (5,  $\sqrt{3}$ 2,  $\sqrt{4}$ 4 heads)  $\sqrt{3}$ 2  $\sqrt{3}$ 2  $\sqrt{3}$ 2  $\sqrt{3}$ 2  $\sqrt{3}$ 2

5. Give the cumulative distribution for the above scenario in the table below.

# of 0 1 2 3 4 5 Heads



can r	ound your	stribution change if answers to 4 decima	we are rolling 5 al places.	dice and co	ounting the number	of 4s? You
# of 4s	f 0	1	2	3	4	5
p(x)	.4018	8 .40188	016075	\$3215	.003215	1.286×10-4
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7. Suppose that 90% of all batteries from a certain factory have acceptable voltages. A certain type of flashlight requires two D batteries, and the flashlight will work only if both batteries have acceptable voltages. Among ten randomly selected flashlights, what is the probability that that at least nine will work?

8. What are the formulas for the mean and standard deviation of the binomial distribution?

9. There are two ways to describe results that are unusual: a) something that occurs less than 5% of the time, b) an event more than two standard deviations from the mean. In the binomial distribution for rolling a standard 6-sided dice for 20 trials, we are interested in the number of results of rolls that come up as 2s. How many successful results (how many 2s) would be considered unusual according to definition a? What about definition b?

$$\mu = 20 \cdot 1/6 = 3.3\overline{3}$$

$$\Gamma = \sqrt{20 \cdot 1/6 \cdot 7/6} \approx 1.67$$

$$20 \cdot 1/6 \cdot 7/6 \approx 1.67$$

by standard deviations only ortcomes greater than 7 would be unusual (since goncan't go less than 0)

however o I's is likely only 2.6% of The hime and so unusual by the first definition as are outcomes Torhigher