New goal sheet: Chapter 5 - the binomial probability distribution.

objective for the day: Find the mean and standard deviation of a probability distribution.

Random Variable

Numerical value which depends on chance.

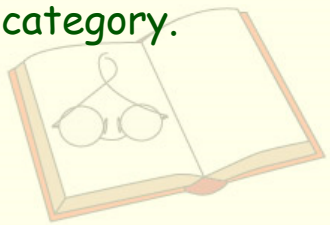
Discrete - countable

number of eggs in each nest . . .
number of students who . . .
number of participants who . . .
"count"

Continuous -

"measure"
Things like distance, time, weight . . .

Distinct = mutually exclusive- Every outcome fits into one category.



Distinct - Every outcome fits into one category.

probability distribution: This math helps in situations where the data is distinct.

Every time we roll the dice, the result fits into one of the 5 categories. If you add up the probabilities you will get 1

	1	2	3	4	5	6
probability	1/6	1/6	1/6	1/6	1/6	1/6

Cars Owned x	Number of families f	Relative frequency
0	17	0.00425
1	877	0.21925
2	1767	0.44175
3	1107	0.27675
4	200	0.05000
5	32	0.00800
	4000	1

Can be called relative frequency Or valid probability distribution.
Notice it is distinct because every answer fit into one category
The data collected is discrete - we count the number of cars.
Discuss how did they get the numbers in the last column.
Important that the total at the bottom is 1.

$$\mu = \sum xP(x) =$$

$$\sigma = \sqrt{\Sigma(x - \mu)^2 P(x)}$$

These formulas are used for distinct data.
We will do in our calculator

We tracked the ages of students who enrolled in the nursing school at Mount Rike nursing school overall there have been 25,466 students.

Age Range(yr)	Midpoint x	Percent of Nurses
20-29	24.5	5.7%
30-39	34.5	9.7%
40-49	44.5	19.7%
50-59	54.5	29.2%
60-69	64.5	25.0%
70-79	74.5	9.1%
80+	84.5	1.8%

a) Using the age midpoints x and the percents of nurses, do we have a valid probability distribution?

Add up to see if it makes 100%
Are the events distinct? does each nurse have one and only one age?

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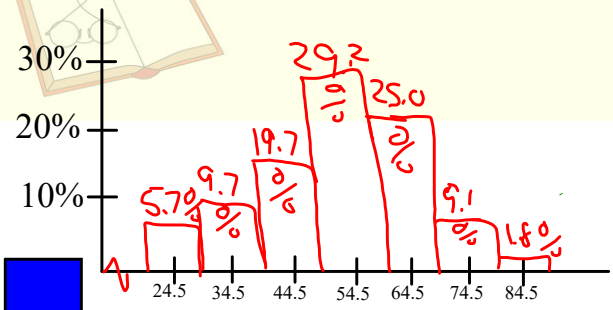
80+	84.5	1.8%

b) Use a histogram to graph the probability distribution of part a.



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c) Find the probability that a nursing student selected at random would be 60 years of age or older.

P (60-69 or 70-79 or 80+)

25 + 9.1 + 1.8 = 35.9

Add up the percents/probabilities for 60-69, 70-79 and 80+

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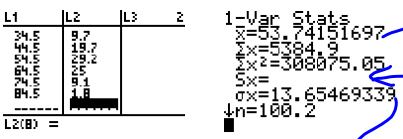
d) Compute the expected age μ and the standard deviation σ of the students at the nursing school Think grouped data.

enter x values in L_1 and percents in L_2 do Stat - Calc - 1 VarStats- L_1, L_2 enter



μ = 53.74

missing 8% total 100% because they

13.65

After long term studies Mrs.Cohen's data showed that 25% of her statistics students that enter college will drop out before getting their degree.
Let x = number of statistic students out of 5 who drop out of college.

x	0	1	2	3	4	5
P(x)	0.237	0.396	0.264	0.088	0.015	0.001

a) Find the probability that one or more of the five students will drop out

Add up the probabilities for P(1)+P(2)+P(3)+P(4)+P(5)

OR do 1 - P(0) 1 − .237 = .763

b) Find the probability that two or more of the five students will drop out before getting their degree.

Add up the probabilities for P(2)+P(3)+P(4)+P(5)

1 − (.237 + .396)

OR do 1 - [P(0) + P(1)] .367

x	0	1	2	3	4	5
P(x)	0.237	0.396	0.264	0.088	0.015	0.001

b) Compute μ the expected number of drop outs out of five and σ, the standard deviation for the expected number of drop outs out of five.

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1-Var Stats
 x̄=1.251748252
 Σx=1.253
 Σx²=2.509
 Sx=
 σx=.9693398892
↓n=1.001
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Closure:

Define each word, discrete, continuous, distinct

Write out the steps for how to find the mean and standard deviation if you are given a valid probability distribution.

Pair - share - and fix your answers.