Ch 4.1 Discrete vs Continuous Probability

Discrete Probability - exact number of outcomes
ex) # of aces in a deck of cards, # of students who are left handed, # kids absent today.....

Continuous Probability - infinitely many outcomes
ex) time, height, weight, length.....
measurable amounts are rounded

Apr 13-3:13 PM

Probability Distribution table - list of all the different number of outcomes and the probability for each outcome.

The probability of ***all*** the different number of outcomes for an an event = ***1***.

Ex1) All the different outcomes for rolling a die.

...comes	Probability
6	_____
	=

Apr 13-3:17 PM

Ex1b) List the number of outcomes for tossing a coin.

type of outcome	probability
heads	
tails	_____
	=

Ex1c) Could this represent a probability distribution table?

# of outcomes for x	probability
0	1/19
1	3/19
2	4/19
3	5/19
4	7/19

Apr 13-3:23 PM

Ex1d) Given this table find the missing probability:

# outcomes for x	probability
0	0.125
1	0.375
2	0.375
3	?

Apr 13-3:27 PM

Ex2) ***Binomial distributions***- are when the variable of interest has 2 outcomes.

examples: pass or fail
heads or tails
true or false
boy or girl
correct or incorrect

Apr 13-3:29 PM

Binomial Distribution Tables- represent all the different outcomes and the probabilities.

*For the total number of outcomes do 2^n, because there is always 2 outcomes for every given event.

Ex 2a) Make a binomial probability table to represent the number of boys a couple could have, if they have 3 children.

x = # boys	p(x)
0	
1	
2	
3	_____
	=

Apr 13-3:32 PM

Ex 2b) Make a binomial probability table to represent the number of heads you get when flipping a coin 4 times.

x = # heads p(x)

0 ${}_4C_0 \cdot 1/16$

1 ${}_4C_1 \cdot 4/16$

2 ${}_4C_2 \cdot 6/16$

3 ${}_4C_3 \cdot 4/16$

4 ${}_4C_4 \cdot 1/16$

=

Apr 13-3:32 PM

Ex 2c) Make a binomial probability table to represent the number of correct answers you could get a 5 multiple choice.

x = # correct p(x)

0 ${}_5C_0 = 1/32$

1 ${}_5C_1 = 5/32$

2 ${}_5C_2 = 10/32$

3 ${}_5C_3 = 10/32$

4 ${}_5C_4 = 5/32$

5 ${}_5C_5 = 1/32$

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Apr 13-3:32 PM

Did you notice any patterns in the tables that could be used as good short cuts?

Apr 14-8:32 AM

Ex3) The probability for the event is given.

Ex3a) Make a probability distribution table to represent the number of students that pass the exam, if the probability of passing was 89% and were obly looking at 4 students.

* p(x) = take the # ways it can happen times p(happening).

x = # students passing p(x)

0 $1(.11)^4 = .0000$

1 $4(.89)(.11)^3 = .0017$

2 $6(.89)^2(.11)^2 = .0575$

3 $4(.89)^3(.11) = .3482$

4 $1(.89)^4 = .6274$

=

Apr 14-8:40 AM

Ex3b) Make a probability distribution table to represent the number of people who purchase an item inside the gas station as well as the gas is .30. We are looking at 5 people at the pump.

x = # purchase p(x)

0 $1(.70)^5 = .16807$

1 $5(.70)^4(.30)^1 = .36015$

2 $10(.70)^3(.30)^2 = .3087$

3 $10(.70)^2(.30)^3 = .1323$

4 $5(.70)^1(.30)^4 = .02835$

5 $1(.30)^5 = .00243$

=

Apr 14-8:40 AM

Try:
Make a probability distribution table for 3 friends who are applying for jobs at company ABC. The probability they get the job is .85.

x = who gets a job p(x)

0 $1(.15)^3 = .003375$

1 $3(.85)(.15)^2 = .057375$

2 $3(.85)^2(.15) = .325125$

3 $1(.85)^3 = .614125$

$\sum = 1$

Apr 14-3:00 PM