Week 3/4
Term 2
2021

HAWKER COLLEGE
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Learning Brief SMM4: Discrete Random Variables

Goals

By the end of this brief, you should be able to:

- understand probability distributions for discrete random variables
- distinguish between discrete and continuous random variables
- construct probability histograms
- compute the central tendency and variability of discrete distributions (i.e. find the mean and variance of a discrete probability distribution)
- compute the 95% confidence interval for a random variable, given the mean and the variance

Theoretical Components

You will require Chapter 10 of Quest Mathematical Methods 12 (collect paper copy)

Read through Section 10B on Discrete Probability Distributions. Study and make notes on Examples 12-17.

http://www.youtube.com/watch?v=j__Kredt7vY&list=PL4C863861E3B2E380

http://www.youtube.com/watch?v=OvTEhNL96v0&list=TL1pBhdAQ4PrpbEtsIhLFJqszYvaUiVnhp

Study and make notes on Examples 18-31.

Nice set of notes and useful examples:

http://www.intmath.com/counting-probability/11-probability-distributions-concepts.php

Practical Components

Do the following questions.
Review Probability

Ex 10A: As many as you can

EX 10B: 1,3,5,7,8,11,13,17,24

EX 10C: 1, 3, 10, 12, and 18

EX 10D: 3, 5, 7, 14, 15, and 20

Investigation

See the following page

Quiz on mathspace. It will be available by Monday week 4.

WEEK 4 INVESTIGATION

Question 1

A bag contains seven marbles, three of which are white and four of which are red. A random sample of four marbles is drawn from the bag without replacement. Find the probability distribution table of the number of white marbles in the sample.

Question 2

A door-to-door telecommunications representative has recorded her day-by-day sales figures over a period of time. She knows that her probability of selling X packages on any one day follows the probability distribution shown in the table.

x	0	1	2	3	4	5	>5
$\Pr(X = y)$	$2t^2$	$3t$	$2t^2$	$2t$	$4t^2 + t$	t	0

i. Find the value of t.
ii. Find the probability that she sells at least 2 packages on any one day.
iii. Find the probability that she sells at most 4 packages on any one day.
iv. Find the number of packages she can expect to sell each day.
v. Calculate the Var(X) and standard deviation of X, correct to 4 decimal places.
vi. Find Pr($\mu - 2\sigma \leq X \leq \mu + 2\sigma$).
vii. If the representative receives a commission of $25 per package sold and a bonus of $200 if she sells 4 or more packages in one day, find her expected daily earnings from commissions and bonuses.
viii. Given that the representative will sell at least two packages tomorrow, find the probability that she will get her $200 bonus.