

KINGSWAY CHRISTIAN COLLEGE

MATHS DEPARTMENT5

Course:	Mathematics Methods Year 12						
Assessment Task:	Test 5 – Discreet Random Variables and The Binomial Distribution						
Student Name:							
Date:	10 & 11 th August 2017						
Assessment Score:	/ 45						
Year Score:							
Comments:							
Teacher signature:							
reacher signature.							
Parent/ Guardian sig	gnature:						
Comments:							

METHODS YEAR 12

Test 5 2017

Discreet Random variables and Distributions

Calculator Allowed Time: 45 mins Marks: /45

Calculators are allowed for this test, but no notes. Please show work out where needed.

Question 1 (3,4,3 = 10 marks)

The discrete random variable X can only take the values 0, 1, 2, 3, 4, 5. The probability distribution of X is given by the following

$$P(X = 0) = P(X = 1) = P(X = 2) = a$$

$$P(X = 3) = P(X = 4) = P(X = 5) = b$$

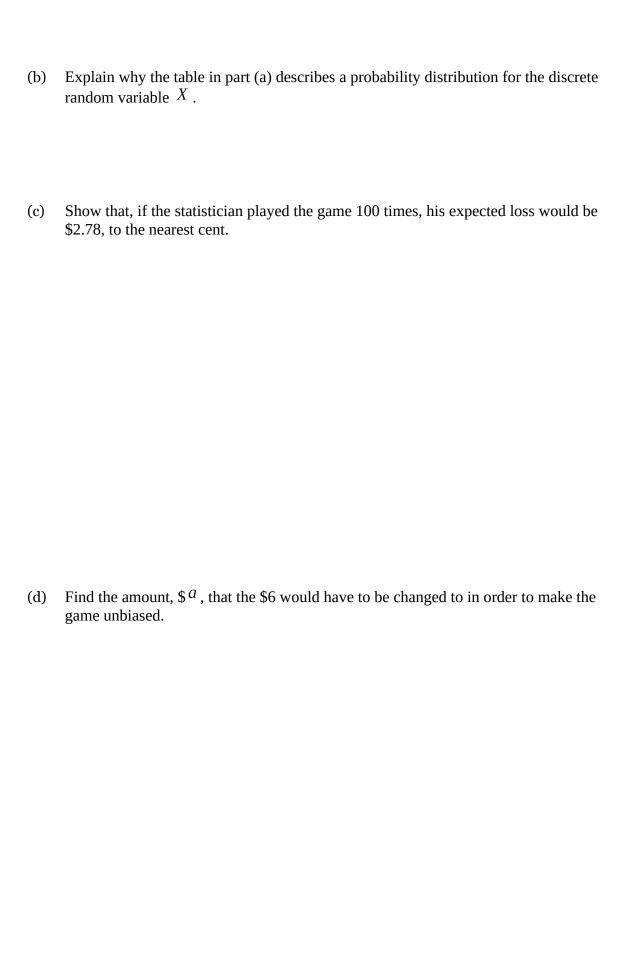
 $P(X \ge 2) = 3P(X < 2)$

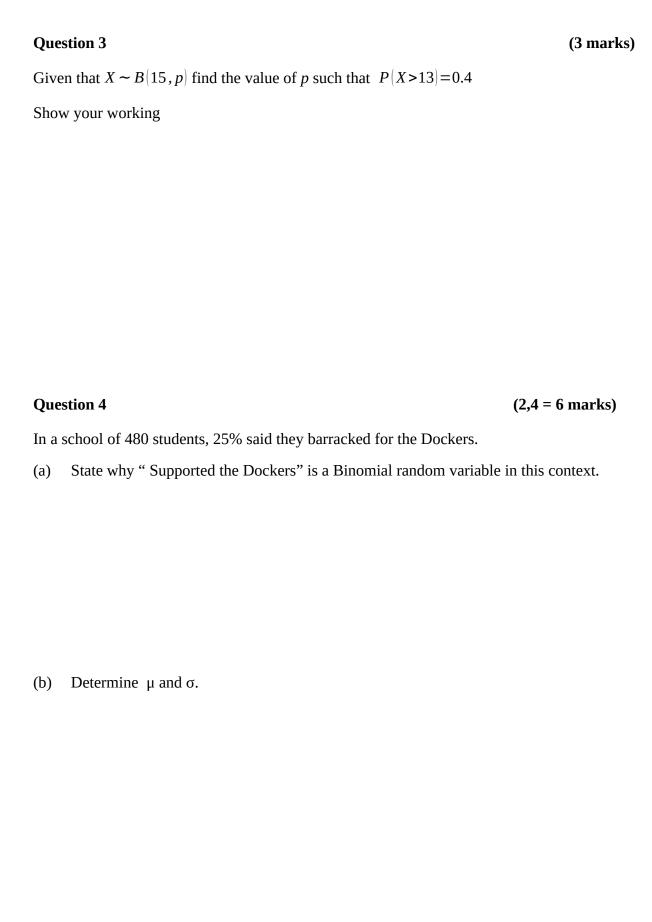
where a and b are constants.

(a) Determine the values of a and b.

(b) Show that the expectation of X is $\frac{1}{8}$ and determine the exact variance of X.

(c)	Determine the exact probability that the sum of two independent observations from his distribution exceeds 7.				
Ques	stion 2			(3,2,	2,3= 10 marks)
	long train journey, a st two ordinary dice whic			to play a dice g	ame. The game
statis	e total score is 12, the stician is paid \$3 by the tician pays the gamble	gambler. Howe	ever, if both or e	ither dice show a	
Let \$	X be the amount paid	to the statisticia	ın by the gamble	r.	
(a)	Complete the table be	low.			
	X		0	3	6
	P(X = x)				





A Study found that 75 per cent of people exhibiting common influenza symptoms recovered without taking any medication. A random sample of 20 people who had developed influenza symptoms was taken.

Let X denote the number of people in this sample who recovered without taking any medication.

(a) State why X is classified as discrete and not continuous?

(b) State the probability distribution of X and the mean and standard deviation of this distribution.

- (c) What is the probability, correct to three decimal places that
 - (i) Exactly 16 people recovered without any medication?

(ii) At least 13 but no more than 16 recovered without any medication?

A manufacturer of hockey gloves produces 4 times as many left-handed gloves as right-handed ones. The gloves are randomly packed in boxes of 100.

Let the Discreet Random Variable X = the number of right handed gloves per box.

- (a) Find the probability that in a box there are
 - (i) an equal number of left-handed and right-handed gloves

(ii) at least 30 right-handed gloves.

(iii) fewer than 20 right-handed gloves.

- (b) A random sample of 8 boxes is taken from the production line. Use your answer from question (iii), to find the probability that exactly 5 of the boxes contain fewer than 20 right-handed gloves.
 - *Let the Discreet Random Variable Y= the number of boxes that contain fewer than 20 right-handed gloves.*

EXTRA WORKING