Discrete Random Variables Exam Questions

Q1 (OCR 4766, Jun 2016, Q4) [Modified]

The probability distribution of the random variable X is given by the formula

$$P(X=r)=\frac{k}{r(r-1)} \text{ for } r=2,3,4,5,6.$$

(i) Show that the value of k is 1.2. Using this value of k, show the probability distribution of X in a table. **[3]**

Q2 (OCR 4766, Jun 2014, Q5) [Modified]

The probability distribution of the random variable X is given by the formula

$$P(X=r)=k+0.01r^2 \text{ for } r=1,2,3,4,5.$$

(i) Show that $k=0.09$. Using this value of k, display the probability distribution of X in a table. **[3]**

Q3 (OCR 4766, Jan 2013, Q2) [Modified]

The probability distribution of the random variable X is given by the formula

$$P(X=r)=k(r^2-1) \text{ for } r=2,3,4,5.$$

(i) Show the probability distribution in a table, and find the value of k. **[3]**

Q4 (OCR 4766, Jan 2011, Q4) [Modified]

The probability distribution of the random variable X is given by the formula

$$P(X=r)=kr(r+1) \quad \text{for } r=1,2,3,4,5.$$

(i) Show that $k=\frac{1}{70}$. **[2]**

Q5, (Edexcel 6683, Jan 2007, Q3)

The random variable X has probability function

$$P(X=x)=\frac{(2x-1)}{36} \qquad x=1,2,3,4,5,6.$$

(a) Construct a table giving the probability distribution of X.

(3)

Find

(b) $P(2<X\leqslant 5)$,

(2)

Q6, (Edexcel 6683, Jan 2008, Q7)

Tetrahedral dice have four faces. Two fair tetrahedral dice, one red and one blue, have faces numbered 0, 1, 2, and 3 respectively. The dice are rolled and the numbers face down on the two dice are recorded. The random variable R is the score on the red die and the random variable B is the score on the blue die.

(a) Find P(R=3 and B=0).

(2)

The random variable T is R multiplied by B.

(b) Complete the diagram below to represent the sample space that shows all the possible values of T.

3				
2		2		
1	0			
0				
B / R	**0**	**1**	**2**	**3**

Sample space diagram of *T*

(3)

(c) The table below represents the probability distribution of the random variable T.

t	0	1	2	3	4	6	9
P(T=t)	a	b	1/8	1/8	c	1/8	d

Find the values of a, b, c and d.

(3)

Q7, (Edexcel 6683, Jan 2011, Q6a,e-g)

The discrete random variable X has the probability distribution

x	1	2	3	4
$P(X = x)$	k	$2k$	$3k$	$4k$

(a) Show that $k = 0.1$

(1)

Two independent observations X_1 and X_2 are made of X.

(e) Show that $P(X_1 + X_2 = 4) = 0.1$

(2)

(f) Complete the probability distribution table for $X_1 + X_2$

(2)

y	2	3	4	5	6	7	8
$P(X_1 + X_2 = y)$	0.01	0.04	0.10		0.25	0.24	

(g) Find $P(1.5 < X_1 + X_2 \leqslant 3.5)$

(2)