

**Edexcel (U.K.) Pre 2017**

**Questions By Topic**

**S1 Chap08 Discrete Random Variables**

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**Last updated: February 10, 2026**



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6. A fair blue die has faces numbered 1, 1, 3, 3, 5 and 5. The random variable  $B$  represents the score when the blue die is rolled.

(a) Write down the probability distribution for  $B$ . (2)

(b) State the name of this probability distribution. (1)

(c) Write down the value of  $E(B)$ . (1)

A second die is red and the random variable  $R$  represents the score when the red die is rolled.

The probability distribution of  $R$  is

$r$	2	4	6
$P(R = r)$	$\frac{2}{3}$	$\frac{1}{6}$	$\frac{1}{6}$

(d) Find  $E(R)$ . (2)

(e) Find  $\text{Var}(R)$ . (3)

Tom invites Avisha to play a game with these dice.

Tom spins a fair coin with one side labelled 2 and the other side labelled 5. When Avisha sees the number showing on the coin she then chooses one of the dice and rolls it. If the number showing on the die is greater than the number showing on the coin, Avisha wins, otherwise Tom wins.

Avisha chooses the die which gives her the best chance of winning each time Tom spins the coin.

(f) Find the probability that Avisha wins the game, stating clearly which die she should use in each case. (4)

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7. The random variable  $X$  has probability distribution

$x$	1	3	5	7	9
$P(X = x)$	0.2	$p$	0.2	$q$	0.15

(a) Given that  $E(X) = 4.5$ , write down two equations involving  $p$  and  $q$ . (3)

Find

(b) the value of  $p$  and the value of  $q$ , (3)

(c)  $P(4 < X \leq 7)$ . (2)

Given that  $E(X^2) = 27.4$ , find

(d)  $\text{Var}(X)$ , (2)

(e)  $E(19 - 4X)$ , (1)

(f)  $\text{Var}(19 - 4X)$ . (2)

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3. The random variable  $X$  has probability function

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

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

(3)

Find

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

(2)

(c) the exact value of  $E(X)$ .

(2)

(d) Show that  $\text{Var}(X) = 1.97$  to 3 significant figures.

(4)

(e) Find  $\text{Var}(2 - 3X)$ .

(2)

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6. The discrete random variable  $X$  has probability function

$$P(X = x) = \begin{cases} a(3-x) & x = 0, 1, 2 \\ b & x = 3 \end{cases}$$

(a) Find  $P(X = 2)$  and complete the table below.

$x$	0	1	2	3
$P(X = x)$	$3a$	$2a$		$b$

(1)

Given that  $E(X) = 1.6$

(b) Find the value of  $a$  and the value of  $b$ .

(5)

Find

(c)  $P(0.5 < X < 3)$ ,

(2)

(d)  $E(3X - 2)$ .

(2)

(e) Show that the  $\text{Var}(X) = 1.64$

(3)

(f) Calculate  $\text{Var}(3X - 2)$ .

(2)

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