IBDP Mathematics Analysis and approaches (SL) Probability distribution



Probability distribution

- x can be any outcome
- P(X = x) is the probability for that outcome

Sum of all the probabilities equals to 1

1.

x	0	1	2	3	4
P(X = x)	0.1	0.2	0.4	k	0.1

Find the value of k.

2.

X	0	1	2	3	4
P(X = x)	0.04	0.19	0.42	0.02	k

Find the value of k.



Expectation E(x) = np

n is the number of trials p is the probability of occurring in each of trials

1. A basketball player has probability 0.72 of making a free throw. How many free throw would he expect to make form 120 attempts?

2. If a dice is rolled 230 times, how many times of number 1 faces down would be expected?

Exercise

Paper 1



1. A bag contains black and white chips. Rose pays \$10 to play a game where she draws a chip from the bag. The following table gives the probability of choosing each colour chip.

Outcome	Black	White
Probability	0.4	0.6

Rose gets no money if she draws a white chip, and gets k if she draws a black chip.

The game is fair. Find the value of k.

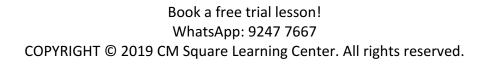


2. B A discrete random variable *X* has the following probability distribution.

X	0	1	2	3
P(X=x)	3	4	2	p
	$\overline{10}$	$\overline{10}$	10	

(a) Find *p*.

(b) Find E(*X*).



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Paper 2

1. A test has five questions. To pass the test, at least three of the questions must be answered correctly.

The probability that Mark answers a question correctly is $\frac{1}{5}$. Let X be the number of questions that Mark answers correctly.

(a) (i) Find E(X).

(ii) Find the probability that Mark passes the test.

Bill also takes the test. Let Y be the number of questions that Bill answers correctly.

The following table is the probability distribution for Y.

У	0	1	2	3	4	5
P(Y = y)	0.67	0.05	a + 2b	a – b	2a + b	0.04

(b) (i) Show that 4a + 2b = 0.24.

(ii) Given that E(Y) = 1, find a and b.

(c) Find which student is more likely to pass the test.

