**6A Discreet Random Variables (DRVs)**

1. Three fair coins are tossed.
2. Write down all the possible outcomes when the three coins are tossed.

A random variable, $X$, is defined as the number of heads when the three coins are tossed.

1. Write the probability distribution of $X$ as:
2. A table
3. A probability mass function
4. A biased four sided dice with faces numbered 1, 2, 3 and 4 is rolled. The number on the bottom face is modelled as a random variable $x$.

Given that $P\left(X=x\right)=\frac{k}{x}$

1. Find the value of $k$
2. Give the probability distribution of $X$ in table form.
3. Find the Probability that:
4. $X>2$
5. $1<X<4$
6. $X>4$
7. The spinner below is spun until it lands on red, or has been spun 4 times in total. Find the probability distribution of the random variable $S$, the number of times the spinner is spun.

**6B The Binomial Distribution**

1. Gary is playing chess against Nigel, and has a $\frac{2}{3}$ chance of winning each game.
2. If they play 5 games, what is the probability of Gary winning exactly 3?
3. Find the term containing $x^{3}$ in the following expansion:

$$\left(x+y\right)^{5}$$

1. If the probability of Gary winning a chess match is $\frac{2}{3}$, find the probability of him winning exactly 3 games out of 5
2. Give the probability distribution of $X$ in table form.

Notes:

1. Gary is playing chess against Nigel, and has a $\frac{2}{3}$ chance of winning each game. If they play 5 games, what is the probability of Gary winning exactly 3?
2. The random variable $X\~B\left(12,\frac{1}{6}\right)$. Find:
3. $P(X=2)$
4. $P(X=9)$
5. $P(X\leq 1)$
6. The probability that a randomly chosen member of a reading group is left-handed is 0.15. A random sample of 20 members of the group is taken.
7. Suggest a suitable model for the random variable $X$, the number of members in the sample who are left handed. Justify your choice.
8. Use your model to calculate the probability that:
9. Exactly 7 sample members are left handed
10. Less than two members are left-handed

**6C Cumulative Probabilities on The Binomial Distribution**

1. The random variable $X\~B(20, 0.4)$. Find:
2. $P\left(X\leq 7\right)$
3. $P(X<6)$
4. $P(X\geq 15)$
5. A spinner is designed so that the probability it lands on red is 0.3. Jane has 12 spins. Find the probability that Jane obtains:
6. No more than 2 reds
7. At least 5 reds
8. Jane decides to use this spinner for a class competition. She wants the probability of winning a prize to be less than 0.05. Each member of the class has 12 spins and the number of reds is recorded.

Find how many reds should be needed to win a prize