**Activity – 7.1**

 **Introduction to Binomial Distribution**

We use the Binomial Distribution when:

* **We have a fixed number of independent trials**

For example, we can’t just say “tossing a coin”, we must say “tossing a coin 20 times”

* **At each trial, the event we are interested in either happens or it doesn’t with a fixed probability of success**

For example, we can’t just look at rolling a dice, because then there are 6 possible outcomes, but we can look at whether or not we get a 3 when we roll a dice

We write  where n is the number of trials and p is the probability of success

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| --- | --- |
| **Situation** |  |
| How many times we get a 4 when we roll a dice 15 times |  |
| How many times we get heads when we toss a coin 30 times |  |
| How many times we get an even number when we roll a dice 12 times |  |
| How many times we get a number that is not 3 or 5 when we roll a dice 20 times |  |

The following situation CANNOT be modelled by a Binomial Distribution. Explain what you would need to change to model it as a Binomial Distribution, and write it in the form :

A bag contains 20 red ball and 15 green balls. We want to look at how many red balls are obtained when 10 balls are taken out of the bag without replacement

**Change:**

**Why?**

**Written as :**

**Using the Binomial Formula**

We can work out Binomial probabilities using the formula below:



(What this formula does is save us the hard work of drawing a massive tree diagram and working it out that way)

**Reminder: ** is the same thing as and you should have a button on your calculator to do this

**Example:**

Suppose  and we want to calculate 

**Exercise:**

Calculate the following Binomial probabilities

|  |  |  |
| --- | --- | --- |
|  |  | Working out and answer |
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