|  |  |  |
| --- | --- | --- |
| **Graph** | **Formula** | **Conditions** |
|  | **NOT NEEDED AND NOT GIVEN BUT DOES EXIST:** | * Bell shaped curve
* Tendency to take on central value
* Symmetrical
* No min or max (in theory)
 |
| **Scenario** | NORMAL DISTRIBUTION “continuous data”**\*** | **Parameters** |
| Students heights are normally distributed with a mean of 1.4m and a standard deviation of 0.15m  |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability a student chosen atrandom is less than 1.2m tall? | What is the probability a student chosen at random is between 1.3 and 1.5m tall? | What is the probability a student chosen at random is greater than 1.3m tall? |
|  |  |  |
| **Example 4** | **Example 5** | **Example 6** |
| Inverse 1 | Inverse 2 | “Continuity Correction”\* |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Graph** | **Formula** | **Conditions** |
|  |  | * Two possible outcomes – success and failure
* Fixed number of identical trials
* Probability of success remains constant
* Each trial is independent
 |
| **Scenario** | BINOMIAL DISTRIBUTION“discrete data” | **Parameters** |
| A random class of 30 students, in a Year level that has 105 boys and 95 girls. |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability that the class has 10 or fewer boys? | What is the probability that the class has between 12 and 15 boys? | What is the probability that more than half of the class are boys? |
|  |  |   |
| **Example 4** | **Example 5** | **Example 6** |
|  |  |  |
|  |  |  |
| **Graph** | **Formula** | **Conditions** |
|  |  | Discrete events within continuous interval* Rare event that occurs randomly (can’t be predicted)
* Two events can’t occur at same time
* The probability of event occuring is proportional to size of interval
* Each occurrence is independent of others
 |
| **Scenario** | POISSON DISTRIBUTION“discrete data” | **Parameters** |
| Lightning strikes in a certain park at a rate of 1.4 strikes per month.  |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability that lightning does not strike in a particular month? | What is the probability that lightning stikes between 2 and 4 times in a particular month? | What is the probability lightning strikes 5 or more times in a particular month? |
|  |  |  |
| **Example 4** | **Example 5** | **Example 6** |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Graph** | **Formula** | **Conditions** |
|  |  | * Function is modelled by triangle with min, max and mode
* Assumes a straight line is a reasonable model between these three points
* Definite max and min
* Good for skewed distributions
 |
| **Scenario** | TRIANGULAR DISTRIBUTION“continuous data” | **Parameters** | **Piecewise function** |
| The time taken to solve a maths problem takes between 4 and 20 minutes. Most students take 8 minutes.  |  |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability a student chosen atrandom takes less than 7 minutes to solve the problem? | What is the probability a student chosen at random takes between 5 and 10 minutes to solve the problem? | What is the probability a student chosen at random takes more than 15 minutes to solve the problem? |
|  |  |  |
| Use your answer to find  | Use your answer to find  | Use your answer to find  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Graph** | **Formula** | **Conditions** |
| https://upload.wikimedia.org/wikipedia/commons/thumb/9/96/Uniform_Distribution_PDF_SVG.svg/2000px-Uniform_Distribution_PDF_SVG.svg.png |  | * All intervals have same probability
* Max and min given but no mode
* No knowledge distribution
* Equally likely
 |
| **Scenario** | UNIFORM DISTRIBUTION “continuous data” | **Parameters** |
|  |  |
| The bus in Auckland arrives at a stop every ten minutes. If a turn up at the bus stop how long will I expect to wait for a bus?  |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability on any random day you will wait more than 5 minutes for the bus? | What is the probability on any random day you you will wait between 2 and 8 minutes? | What is the probability on any random day you will wait more than 8 minutes for the bus? |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Graph** | **Formula** | **Conditions** |
| Discrete uniform probability mass function for n = 5 | Not given  | * All outcomes are equally likely (have same probability)
 |
| **Scenario** | UNIFORM DISTRIBUTION“discrete data” | **Parameters** |
| The number shown when a 12 sided dice is thrown. |  |
| **Example 1** | **Example 2** | **Example 3** |
| What is the probability the number is less than 5? | What is the probability the number rolled is between 4 and 10? | What is the probability the number rolled is greater than 9? |
|  |  |  |
| P(number is odd prime) | P(umber is even prime) | P(X is odd | >9) |
|  |  |  |