|  |  |  |
| --- | --- | --- |
| **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 at  random 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** |
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| --- | --- | --- | --- |
| **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 at  random 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) |
|  |  |  |