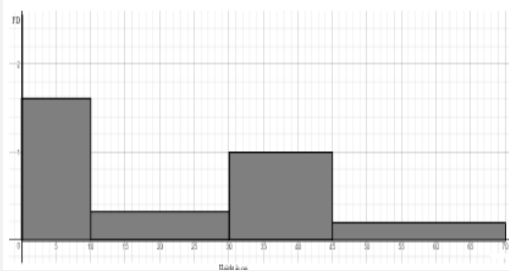
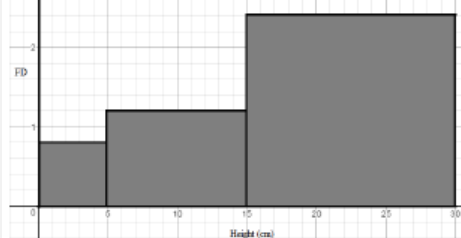
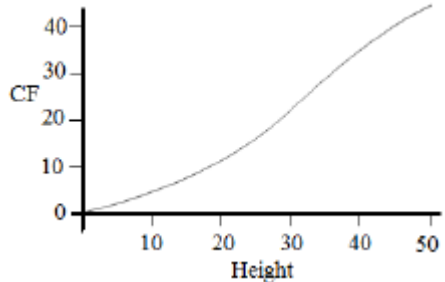
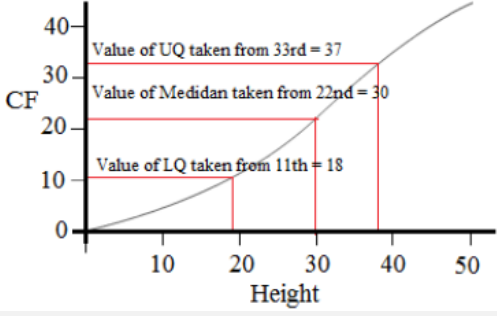


## Topic: Histograms and Cumulative Frequency

Topic/Skill	Definition/Tips	Example										
1. Histograms	<p>A visual way to display frequency data using bars.</p> <p>Bars can be <b>unequal in width</b>.</p> <p>Histograms show <b>frequency density</b> on the <b>y-axis</b>, not frequency.</p> <p style="text-align: center;"><b>Frequency Density = <math>\frac{\text{Frequency}}{\text{Class Width}}</math></b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Height(cm)</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td><math>0 &lt; h \leq 10</math></td> <td>8</td> </tr> <tr> <td><math>10 &lt; h \leq 30</math></td> <td>6</td> </tr> <tr> <td><math>30 &lt; h \leq 45</math></td> <td>15</td> </tr> <tr> <td><math>45 &lt; h \leq 70</math></td> <td>5</td> </tr> </tbody> </table>	Height(cm)	Frequency	$0 < h \leq 10$	8	$10 < h \leq 30$	6	$30 < h \leq 45$	15	$45 < h \leq 70$	5	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><b>Frequency Density (FD)</b></p> <p style="text-align: center;"><math>8 \div 5 = 1.6</math></p> <p style="text-align: center;"><math>6 \div 20 = 0.3</math></p> <p style="text-align: center;"><math>15 \div 15 = 1</math></p> <p style="text-align: center;"><math>5 \div 25 = 0.2</math></p> </div> 
Height(cm)	Frequency											
$0 < h \leq 10$	8											
$10 < h \leq 30$	6											
$30 < h \leq 45$	15											
$45 < h \leq 70$	5											
2. Interpreting Histograms	<p>The <b>area</b> of the bar is proportional to the <b>frequency</b> of that class interval.</p> <p style="text-align: center;"><b>Frequency = Freq Density <math>\times</math> Class Width</b></p>	<p>A histogram shows information about the heights of a number of plants. 4 plants were less than 5cm tall. Find the number of plants more than 5cm tall.</p>  <p>Above 5cm:  <math>1.2 \times 10 + 2.4 \times 15 = 12 + 36 = 48</math></p>										
3. Cumulative Frequency	<p>Cumulative Frequency is a <b>running total</b>.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Age</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td><math>0 &lt; a \leq 10</math></td> <td>15</td> </tr> <tr> <td><math>10 &lt; a \leq 40</math></td> <td>35</td> </tr> <tr> <td><math>40 &lt; a \leq 50</math></td> <td>10</td> </tr> </tbody> </table>	Age	Frequency	$0 < a \leq 10$	15	$10 < a \leq 40$	35	$40 < a \leq 50$	10	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><b>Cumulative Frequency</b></p> <p style="text-align: center;">15</p> <p style="text-align: center;"><math>15 + 35 = 50</math></p> <p style="text-align: center;"><math>50 + 10 = 60</math></p> </div>		
Age	Frequency											
$0 < a \leq 10$	15											
$10 < a \leq 40$	35											
$40 < a \leq 50$	10											
4. Cumulative Frequency Diagram	<p>A cumulative frequency diagram is a <b>curve that goes up</b>. It looks a little like a stretched-out <b>S shape</b>.</p> <p>Plot the cumulative frequencies at the <b>end-point</b> of each interval.</p>											

<p>5. Quartiles from Cumulative Frequency Diagram</p>	<p><b>Lower Quartile (Q1):</b> 25% of the data is less than the lower quartile.  <b>Median (Q2):</b> 50% of the data is less than the median.  <b>Upper Quartile (Q3):</b> 75% of the data is less than the upper quartile.  <b>Interquartile Range (IQR):</b> represents the middle 50% of the data.</p>	 <p style="text-align: center;"><math>IQR = 37 - 18 = 19</math></p>
<p>6. Hypothesis</p>	<p><b>A statement that might be true, which can be tested.</b></p>	<p>Hypothesis: 'Large dogs are better at catching tennis balls than small dogs'.</p> <p>We can test this hypothesis by having hundreds of different sized dogs try to catch tennis balls.</p>