

Cumulative Frequency and Cumulative Data

Our textbook says that sometimes we would like to know the number of scores that are above or below a certain value. You may have noticed that I always post our test statistics so that you can figure this out. When we study normal distributions, we will be looking for scores above and below a given “standard deviation” range.

Sometimes the cumulative frequency graph is a smooth curve and other times the graph is a collection of connected line segments. The CFG is sometimes called an ogive.

Here is a very simple cumulative frequency graph.

<http://www.cliffsnotes.com/WileyCDA/CliffsReviewTopic/Ogive-Cumulative-Line-Graph-.topicArticleId-25951,articleId-25896.html>

For example, if you saved \$300 in both January and April and \$100 in each of February, March, May, and June, an ogive would look like Figure 1 .



Figure 1 Ogive of accumulated savings for one year.

Consider the points on the graph:

(0, 0), (Jan, 300), (Feb, 400), (Mar, 500), (Apr, 800),
(May, 900), and (Jun, 1000)

Here is an example of a smooth cumulative frequency
graph:

<http://www.tutorvista.com/content/math/statistics-and-probability/statistics-graphical-representation/ogive.php>

Let's look at Example 11 on page 442

Image from Google Image



<i>Weight (w kg)</i>	<i>frequency</i>
$55 \leq w < 60$	2
$60 \leq w < 65$	3
$65 \leq w < 70$	12
$70 \leq w < 75$	14
$75 \leq w < 80$	19
$80 \leq w < 85$	37
$85 \leq w < 90$	22
$90 \leq w < 95$	8
$95 \leq w < 100$	2
$100 \leq w < 105$	1

Here is our data

Our textbook first makes a cumulative frequency table. The cumulative frequency is just a running total – think of the money saved in our first graph.

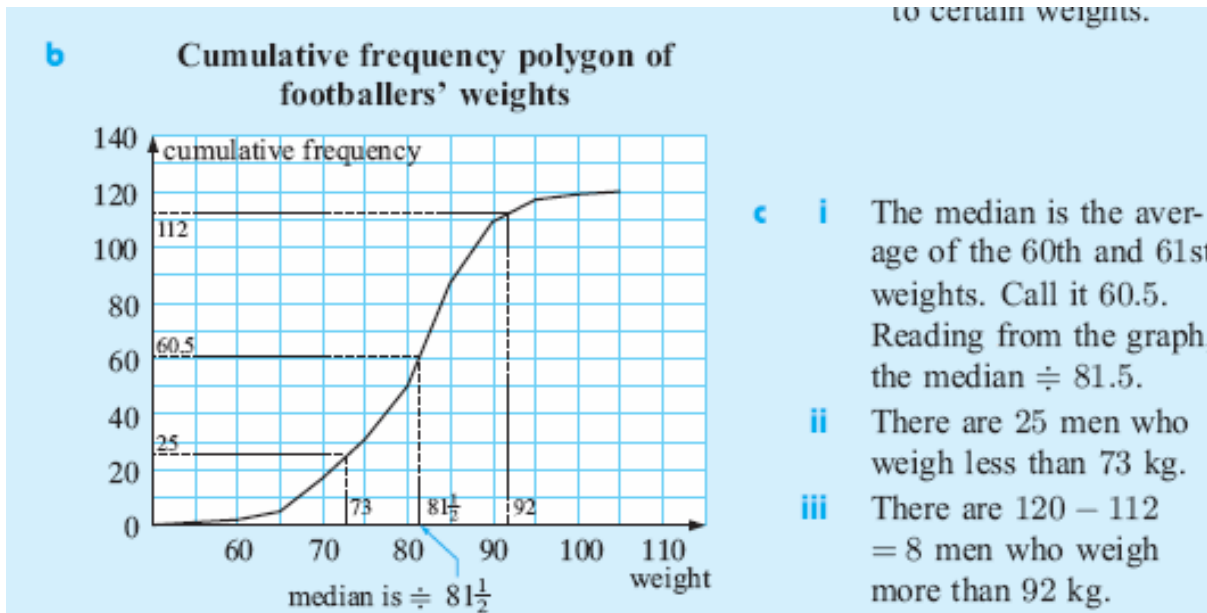
a

<i>Weight (w kg)</i>	<i>frequency</i>	<i>cumulative frequency</i>
$55 \leq w < 60$	2	2
$60 \leq w < 65$	3	5
$65 \leq w < 70$	12	17
$70 \leq w < 75$	14	31
$75 \leq w < 80$	19	50
$80 \leq w < 85$	37	87
$85 \leq w < 90$	22	109
$90 \leq w < 95$	8	117
$95 \leq w < 100$	2	119
$100 \leq w < 105$	1	120

this is $2 + 3$
 this is $2 + 3 + 12$, etc.
 this 50 means that there are 50 players who weigh less than 80 kg

Note: The cumulative frequency gives a *running total* of the number of players up to certain weights.

Now let's look at the graph. What do you notice about the graph? Note: this graph is small and hard to read!



Things to consider:

We need to find the boundaries for each interval.

We need to find the cumulative frequency.

We need to plot the correct points, then make the line segments.

Let's look at an example from the Alan Wicks IBSL textbook.

Here is a table of values with the boundaries already given.

This data gives us an upper class boundary for the heights of a set of employees.

Boundary L1	Frequency	Cum. Freq. L2
≤ 154.5	0	0
≤ 159.5	5	5
≤ 164.5	8	13
≤ 169.5	8	21
≤ 174.5	10	31
≤ 179.5	10	41
≤ 184.5	6	47
≤ 189.5	3	50
≤ 194.5	2	52
≤ 199.5	1	53

We can use our TI to make a cumulative frequency graph.

Put the values of the boundaries in L1 and the cumulative frequencies in L2.

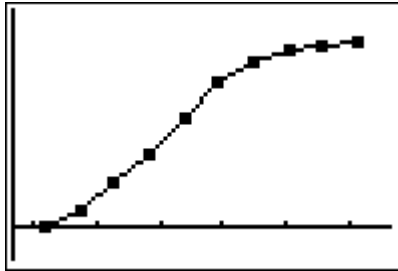
L1		L2
154.5	0	-----
159.5	5	
164.5	13	
169.5	21	
174.5	31	
179.5	41	
184.5	47	

L2 = {0, 5, 13, 21, 31, 41, 47}

Now go to STATPLOT and make the following choices:

Plot1	Plot2	Plot3
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
Xlist: L1		
Ylist: L2		
Mark: <input type="checkbox"/> + .		

Now choose ZOOMSTAT to get our beautiful graph!



Check your points with TRACE

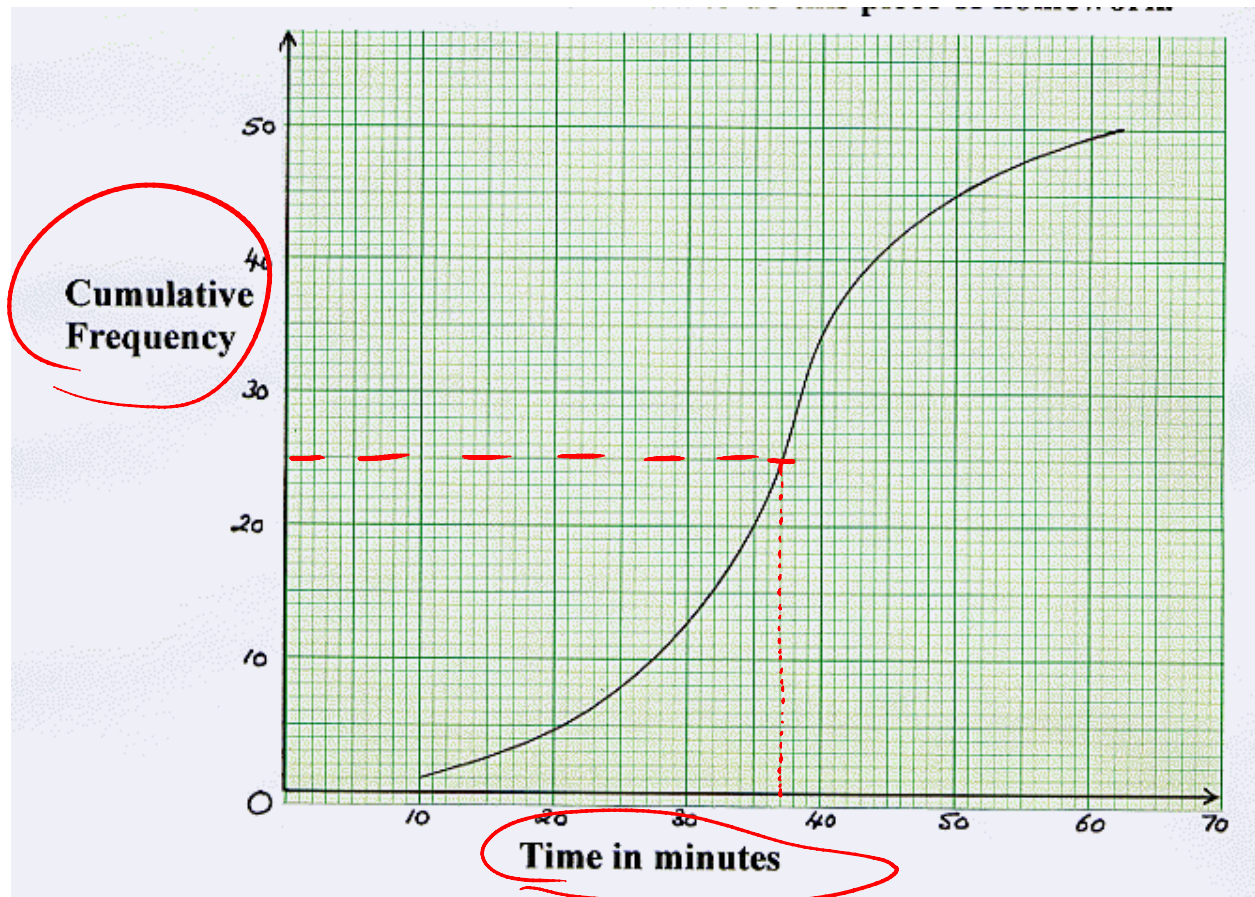
So far, the IB exams usually have you read a cumulative frequency graph, rather than make one. To make one is very time consuming with a TI.

So here is a problem that I found that looks like a typical IB problem:

From: <http://www.gcsemathspastpapers.com/images/p5j04q13.htm>

50 girls were each asked to record how many minutes it took them to complete a piece of maths homework.

The cumulative frequency graph below gives information about the times it took them to do this piece of homework.



Use the cumulative frequency graph to estimate the median time.

Here is another:

<http://www.gcsemathspastpapers.com/images/p5j99q10.htm>

That being said – your homework is page 443 #3 and #4
Try using your TI to verify your graph

ALSO

Finish the rest of Calculus Review 22B