

## Solving equations using a table

When you have an equation equal to a constant, eg:	$2x + 7 = 15$	$3x^2 + x - 7 = 0$	$30 \times 1.3^x = 75$																																																
Enter the LHS into the calculator: [Y=]	<pre> Plot1 Plot2 Plot3 Y1=2X+7 Y2= Y3= Y4= Y5= Y6= Y7=                     </pre>	<pre> Plot1 Plot2 Plot3 Y1=3X^2+X-7 Y2= Y3= Y4= Y5= Y6= Y7=                     </pre>	<pre> Plot1 Plot2 Plot3 Y1=30*1.3^X Y2= Y3= Y4= Y5= Y6= Y7=                     </pre>																																																
View the table: [TABLE] (via [2nd][GRAPH])	<table border="1"> <thead> <tr><th>X</th><th>Y1</th></tr> </thead> <tbody> <tr><td>0</td><td>7</td></tr> <tr><td>1</td><td>9</td></tr> <tr><td>2</td><td>11</td></tr> <tr><td>3</td><td>13</td></tr> <tr><td>4</td><td>15</td></tr> <tr><td>5</td><td>17</td></tr> <tr><td>6</td><td>19</td></tr> </tbody> </table> <p>X=0</p>	X	Y1	0	7	1	9	2	11	3	13	4	15	5	17	6	19	<table border="1"> <thead> <tr><th>X</th><th>Y1</th></tr> </thead> <tbody> <tr><td>0</td><td>-7</td></tr> <tr><td>1</td><td>-3</td></tr> <tr><td>2</td><td>3</td></tr> <tr><td>3</td><td>13</td></tr> <tr><td>4</td><td>29</td></tr> <tr><td>5</td><td>52</td></tr> <tr><td>6</td><td>107</td></tr> </tbody> </table> <p>X=0</p>	X	Y1	0	-7	1	-3	2	3	3	13	4	29	5	52	6	107	<table border="1"> <thead> <tr><th>X</th><th>Y1</th></tr> </thead> <tbody> <tr><td>0</td><td>30</td></tr> <tr><td>1</td><td>39</td></tr> <tr><td>2</td><td>50.7</td></tr> <tr><td>3</td><td>65.91</td></tr> <tr><td>4</td><td>85.683</td></tr> <tr><td>5</td><td>111.39</td></tr> <tr><td>6</td><td>144.8</td></tr> </tbody> </table> <p>X=0</p>	X	Y1	0	30	1	39	2	50.7	3	65.91	4	85.683	5	111.39	6	144.8
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If you do not get an exact answer then change the table step and start point: [TBLSET] (via [2nd][WINDOW])		<pre> TABLE SETUP TblStart=1 ΔTbl=.1 Indent: Ask Depend: Auto Ask                     </pre>	<pre> TABLE SETUP TblStart=3 ΔTbl=.1 Indent: Auto Ask Depend: Auto Ask                     </pre>																																																
This enables you to zoom in to a set of values to find the answer to a greater degree of accuracy.		<table border="1"> <thead> <tr><th>X</th><th>Y1</th></tr> </thead> <tbody> <tr><td>1.1</td><td>-3</td></tr> <tr><td>1.2</td><td>-2.27</td></tr> <tr><td>1.3</td><td>-1.48</td></tr> <tr><td>1.4</td><td>-.63</td></tr> <tr><td>1.5</td><td>.28</td></tr> <tr><td>1.6</td><td>1.25</td></tr> </tbody> </table> <p>X=1</p>	X	Y1	1.1	-3	1.2	-2.27	1.3	-1.48	1.4	-.63	1.5	.28	1.6	1.25	<table border="1"> <thead> <tr><th>X</th><th>Y1</th></tr> </thead> <tbody> <tr><td>3.4</td><td>65.91</td></tr> <tr><td>3.41</td><td>67.662</td></tr> <tr><td>3.42</td><td>69.461</td></tr> <tr><td>3.43</td><td>71.307</td></tr> <tr><td>3.44</td><td>73.203</td></tr> <tr><td>3.45</td><td>75.149</td></tr> <tr><td>3.46</td><td>77.147</td></tr> </tbody> </table> <p>X=3.4</p>	X	Y1	3.4	65.91	3.41	67.662	3.42	69.461	3.43	71.307	3.44	73.203	3.45	75.149	3.46	77.147																		
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	The answer is clearly 4 since when X is 4 Y is 15	The answer lies between 1.3 and 1.4	The answer lies between 3.4 and 3.5																																																

### Top tip:

In the IB you are supposed to give your answers to 3 significant figures.

To be able to do that in the right hand example we need to take the table to even greater accuracy.

We can see in the shot on the right that the answer lies between 3.49 and 3.50. However we can also see that it is less than 3.495 so it will round to "3.49 (to 3sf)"

X	Y1
3.48	74.756
3.485	74.854
3.49	74.952
3.495	75.05
3.5	75.149
3.505	75.248
3.51	75.346

X=3.48

Always make sure you have checked which side of the mid point (in this case 3.495) your answer lies, otherwise you are just guessing whether to round up or down.