

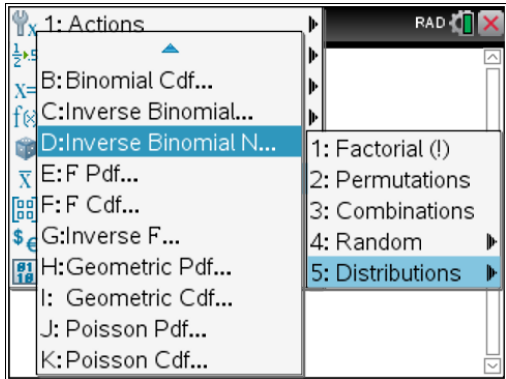
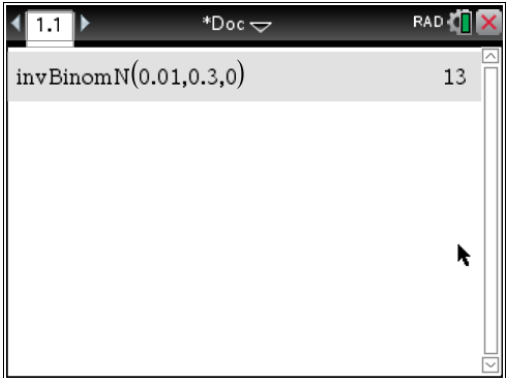
Inverse Binomial N on TI Nspire and TI Nspire CAS

To find the least number of trials (n) given cumulative probability, probability of success (p) and number of successful outcomes.

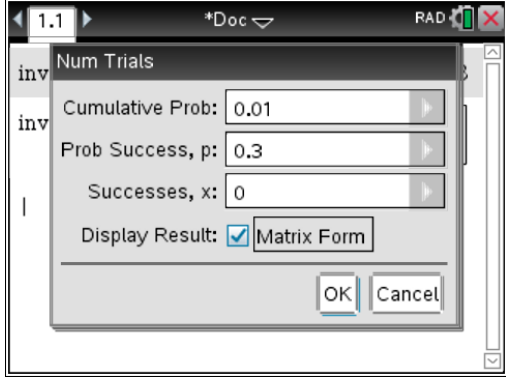
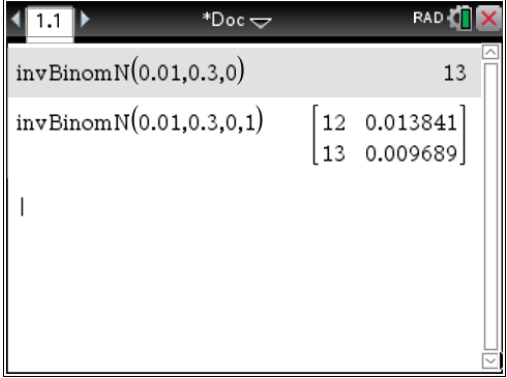
Example 1

Jack shoots arrows at a target, with probability of 0.3 of hitting the target. All shots are independent of each other.

Calculate the minimum number of shots required for the probability of at least one shot hitting the target to exceed 0.99.

<p>In the Calculator screen Menu Probability Distributions Inverse Binomial N</p> 	<p>Probability of zero shots is $1 - 0.99 = 0.01$</p>  <p>The minimum number of shots is 13</p>
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This can alternatively be displayed in matrix form by selecting the matrix box:

	 <p>As can be seen we need 13 trials for the required probability.</p>
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NOTE:

In some questions where the exact number of successes is given, invBinomN cannot be used as this command refers only to $\Pr(X \leq x)$.

Example 2

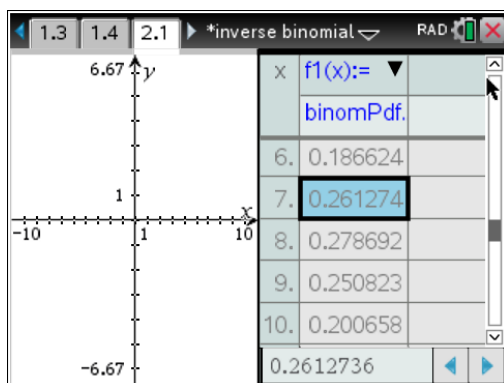
Harry shoots 10 arrows at a target, with probability of 0.6 of hitting the target. All shots are independent of each other.

What is the minimum number of shots needed for the probability of Harry hitting the target exactly five times to be more than 0.25?

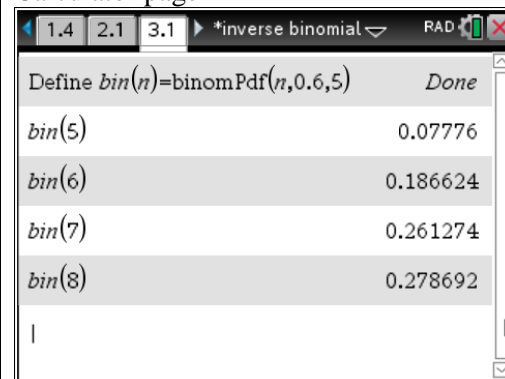
We have here $X \sim Bi(n, 0.6)$, $x = 5$ and $\Pr(X = x) > 0.25$

We can enter the function $f1(x) = \text{binompdf}(x, 0.6)$ in Graph page, then ctrl T to see the table and read the answer.

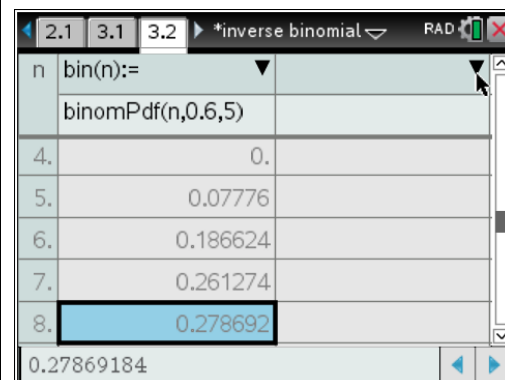
We can enter the function $f1(x) = \text{binompdf}(x, 0.6)$ in Graph page, then ctrl T to see the table and read the answer.



Alternatively we can define the function in Calculator page



Or display in Lists & Spreadsheet page press ctrlT and scroll down



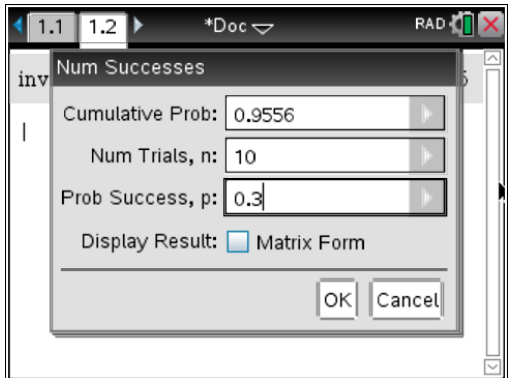
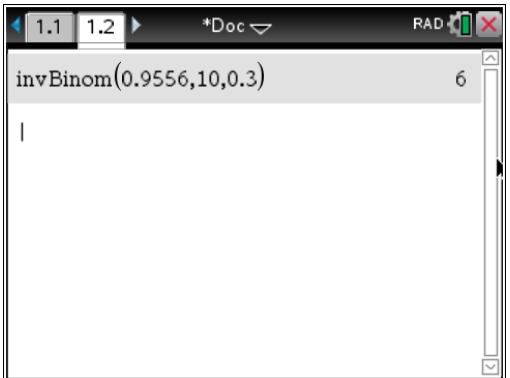
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To find x (the number of successful outcomes) given p , n and $P(X \leq x)$.

Example 3

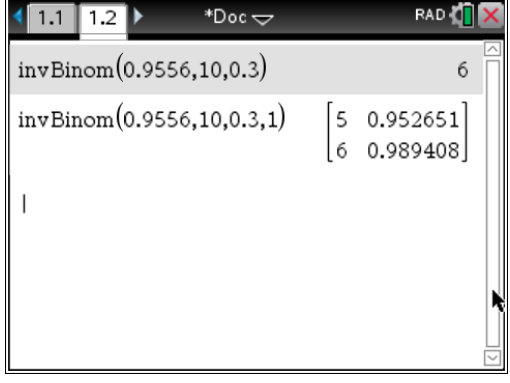
Jack shoots 10 arrows at a target, with probability of 0.3 of hitting the target. All shots are independent of each other.

Find the range of successful outcomes for the cumulative probability of 0.9556.

 <p>The dialog box titled 'Num Successes' is shown. It contains the following fields: 'Cumulative Prob:' with value 0.9556, 'Num Trials, n:' with value 10, and 'Prob Success, p:' with value 0.3. There is a checkbox for 'Display Result: Matrix Form' which is currently unchecked. 'OK' and 'Cancel' buttons are at the bottom.</p>	 <p>The calculator screen shows the command <code>invBinom(0.9556,10,0.3)</code> and the result <code>6</code>.</p>
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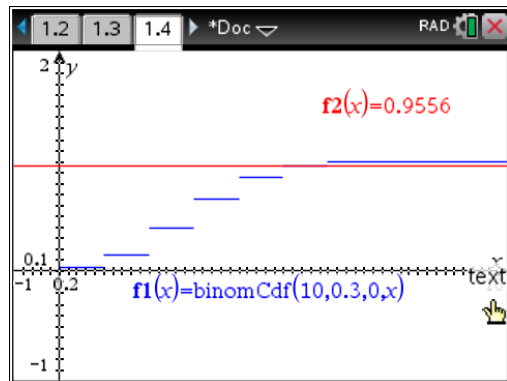
The range is 0-6 trials.

When matrix display is selected:

 <p>The calculator screen shows the command <code>invBinom(0.9556,10,0.3)</code> with result <code>6</code>. Below it, the command <code>invBinom(0.9556,10,0.3,1)</code> is shown with a matrix result: $\begin{bmatrix} 5 & 0.952651 \\ 6 & 0.989408 \end{bmatrix}$.</p>	
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The same result can be obtained in any OS without using Inverse Binomial by either Graph or using Lists & Spreadsheet page:

Graphing the step graph and identifying the number of trials for the cumulative probability to reach 0.9556



Ctrl T for a table of values:

