ClassPad II Help Series	The Tuition Centre, Claremont, WA	www.thetuitioncentre.com.au	Author	Charlie Watson
CP576	Simulating Confidence Interval Sample Mean		Date	June 2016
			CPII OS	02.00.4000.0000

This simulation follows on from CP575.

Sampling from binomial distribution
A machine makes three times as many black lollies as red and randomly packs them into packets of 20.

90% confidence intervals are constructed based on the mean number of red lollies per packet from random samples of 25 packets.

If X is the number of red lollies per packet so that X~B(n,p) then $\bar{x} = np = 5$ and $sd = \sqrt{np(1-p)} = 1.936$.

What fraction of 90% confidence intervals constructed in this way contain the known population mean of 5?

The z-score for a 90% CI is 1.645. Calculate the associated standard error.

Simulate taking a random sample of 25 packets and use the mean number of reds per packet to determine the sample mean.

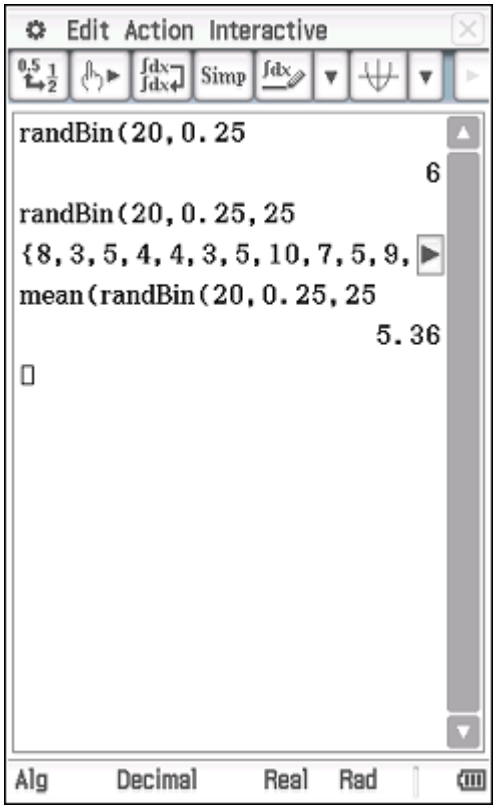
Calculate the lower and upper bounds of the 90% confidence interval.

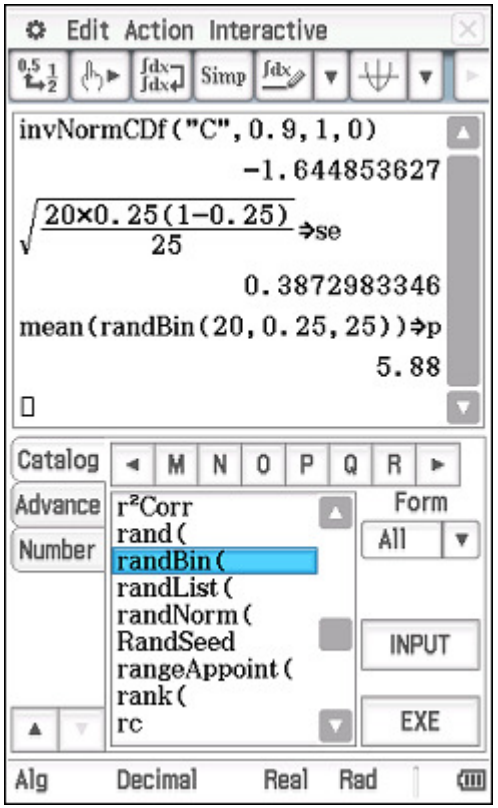
Judge whether the interval contains the known population mean of 5.

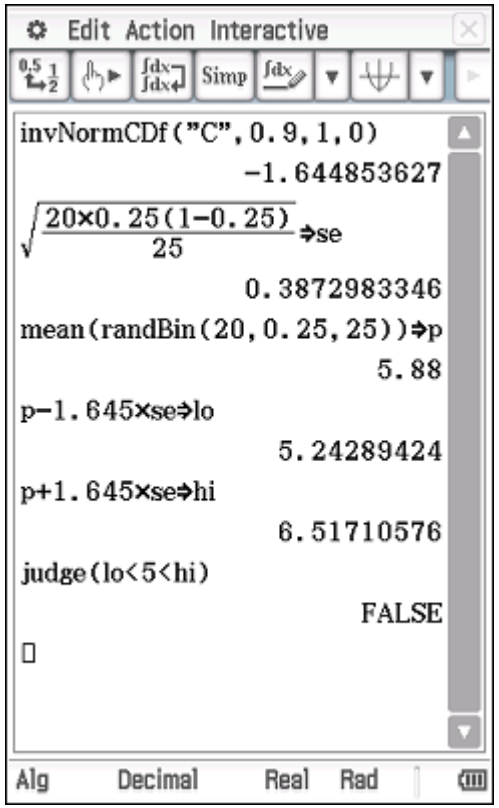
Tap back on the top line and press EXE to repeat the simulation...

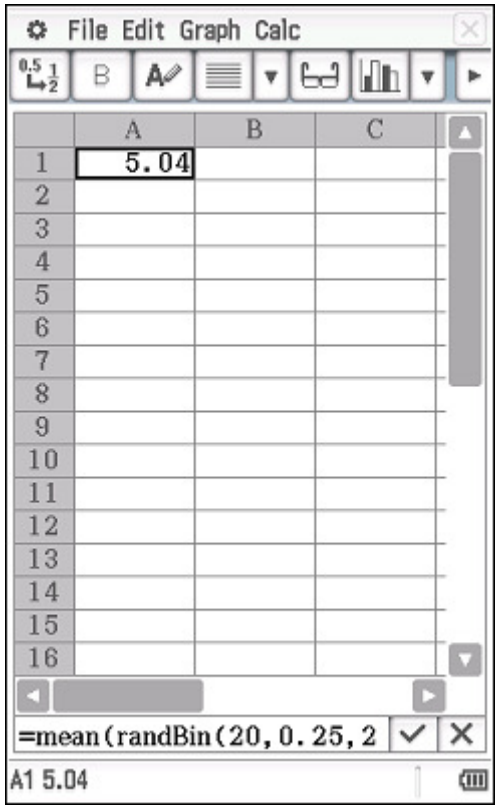
In Main, take a copy of the line to calculate the sample mean and then start a new spreadsheet, pasting the formula into cell A1.

A1 =mean(randBin(20,0.25,25))









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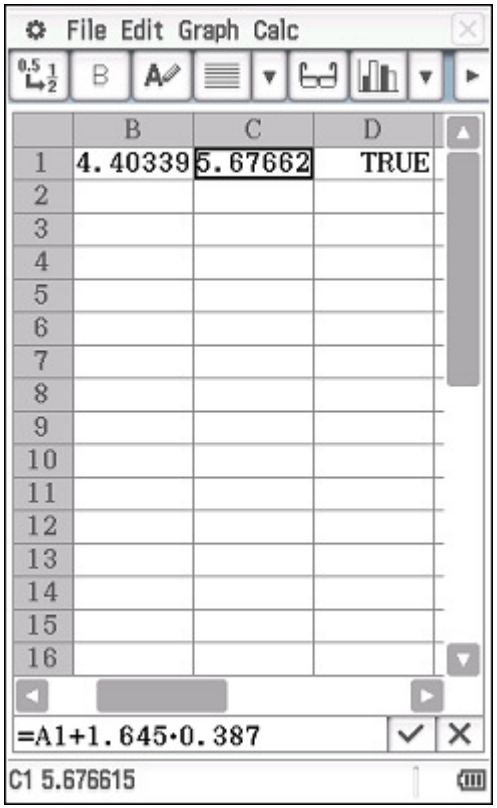
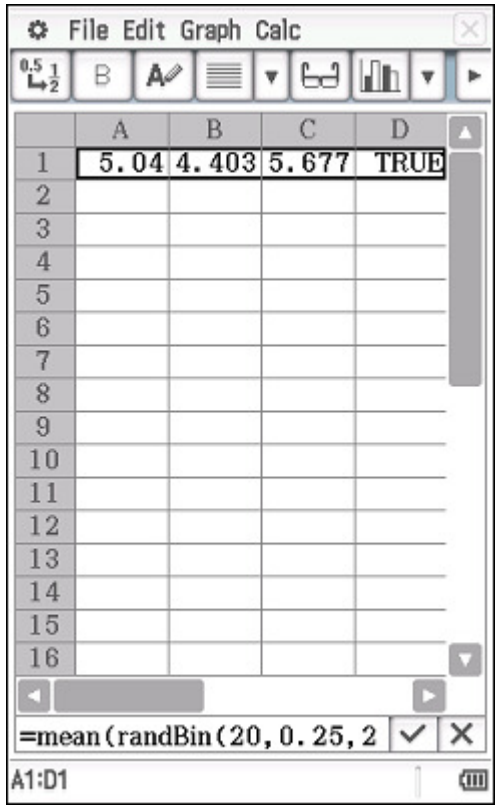
In cells B1 and C1 calculate the lower and upper bounds of the 90% confidence interval.

In cell D1 judge if the interval contains the population proportion.

B1 =A1-1.645x0.387
C1 =A1+1.645x0.387
D1 =judge(B1<5<C1)

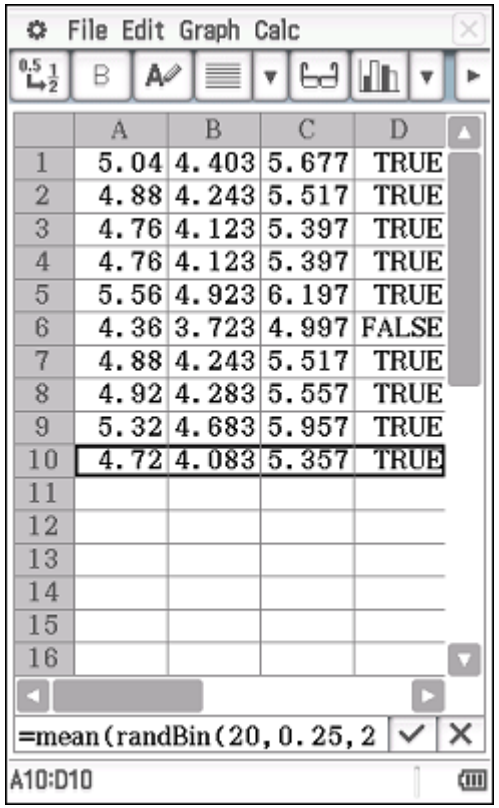


Adjust the column widths - select columns A to E, tap Edit, Format, Column Width and enter a width of 62.



Make ten copies of the first row.

We'd expect 9 out of 10 TRUE's for a 90% confidence interval.



Use File, Recalculate to repeatedly examine how many of the ten intervals contain the population proportion.

You may want to File, Save your spreadsheet.