STA2023 TI-84 Skills

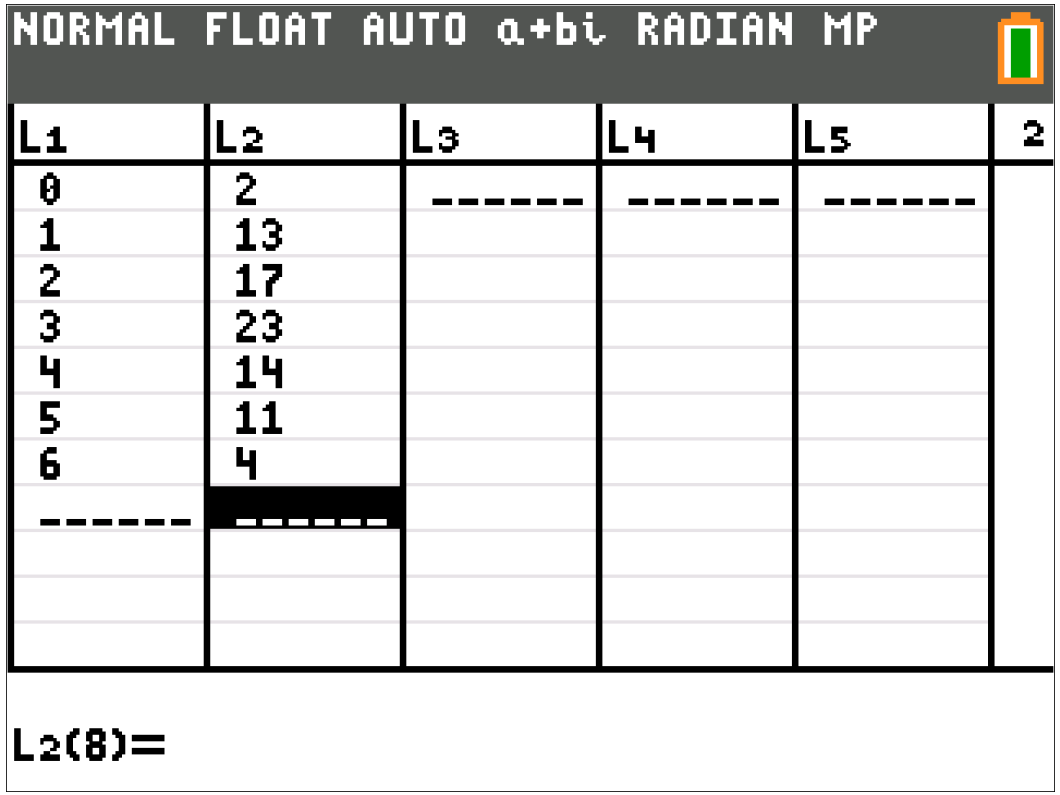
CH 4&5

The Plan

- Probability distribution in the List Menu
- Variance and Standard Deviation (in Probability) in the List Menu
- nCx, factorials, entering information correctly in BinomProb formula
- calculating z-scores
- CLT/StDev of sample means
- normalCDF with z, normalCDF with x
- invNorm
- binomPDF

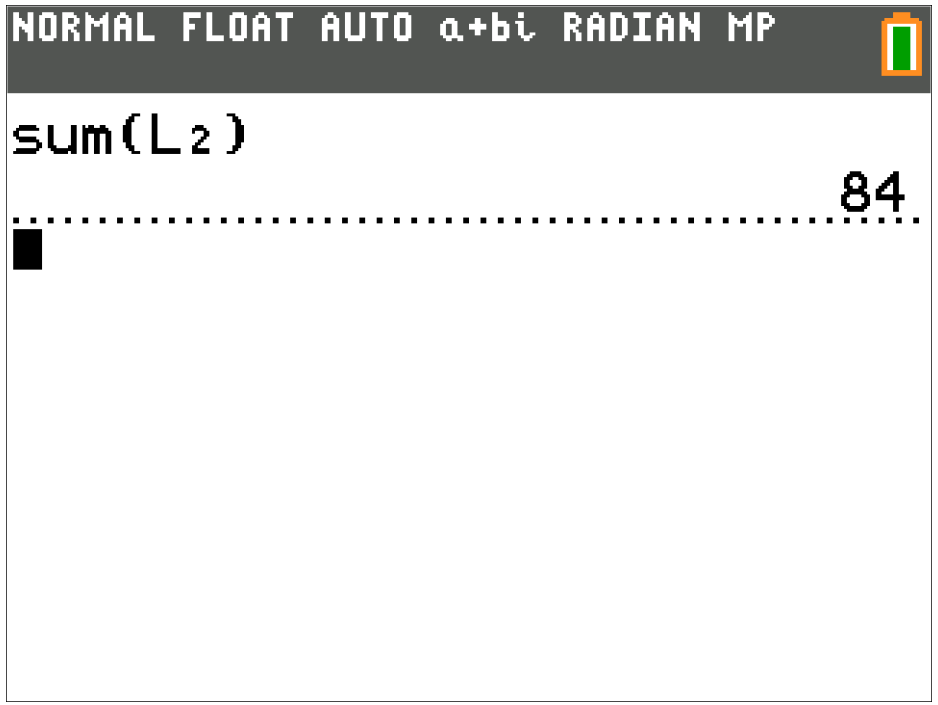
Probability Distribution in the List Menu

- When you're given x and frequency and you need to find the probability and the mean.
- x$\rightarrow L_1$ {0, 1, 2, 3, 4, 5, 6}
- f$\rightarrow L_2$ {2, 13, 17, 23, 14, 11, 4}



Probability Distribution in the List Menu

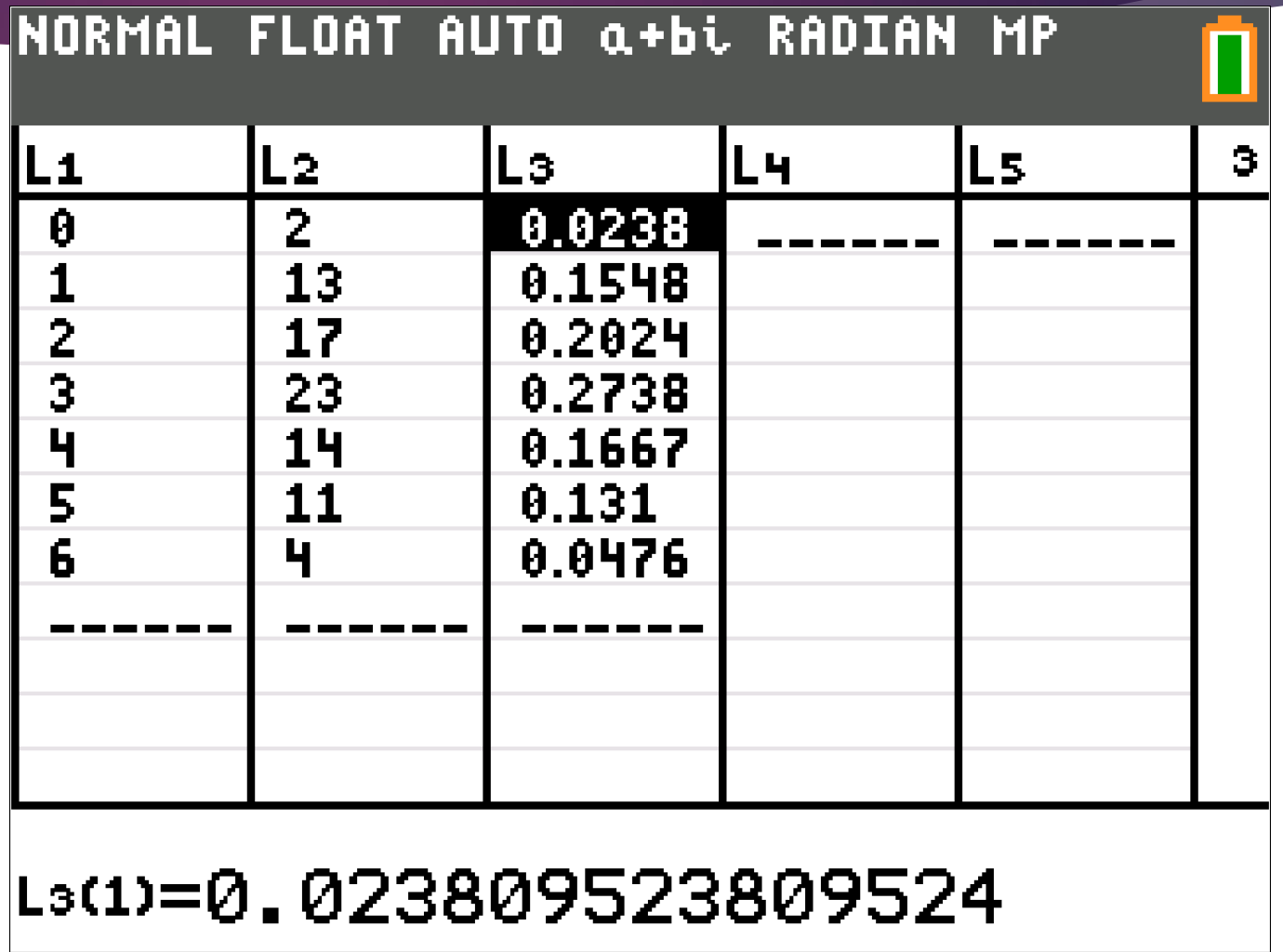
- What's the sum of L_2?
- sum(L_2)



Probability Distribution in the List Menu

- $L_3 = L_2 / \text{sum}(L_2)$

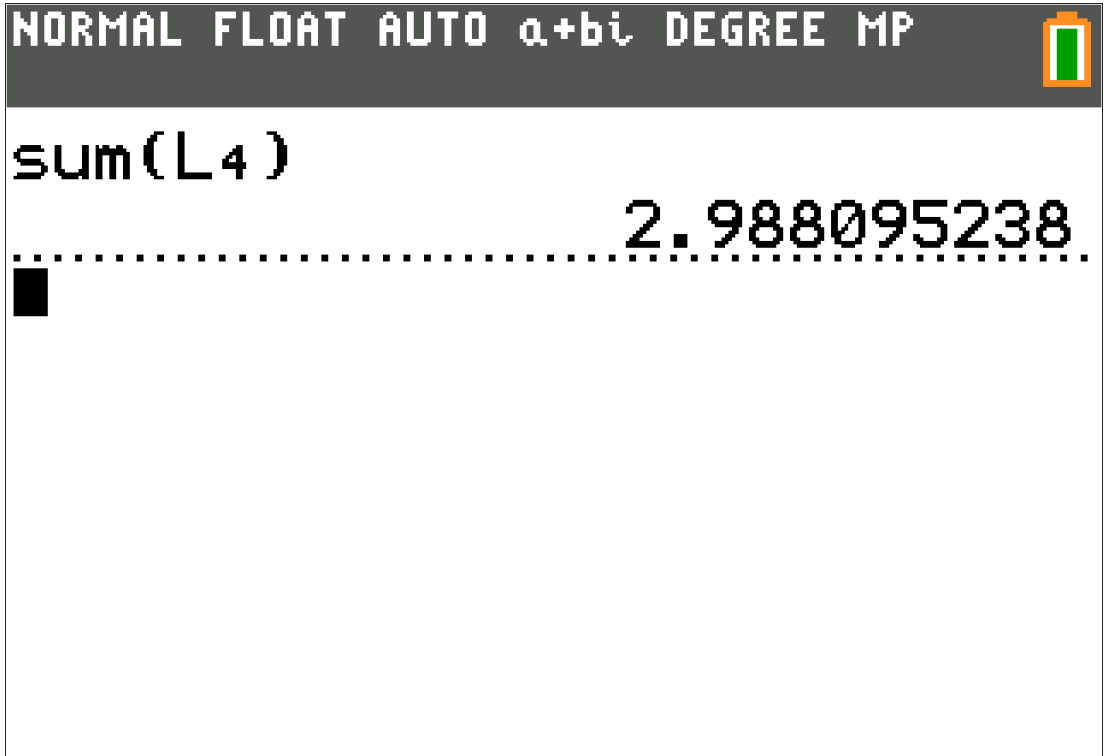
**Quick check!!
$\text{sum}(L_3)$ should equal 1.



Probability: Finding the Variance and Mean

- We have x and P(x). We need μ, $(x - \mu)^2 \cdot P(x)$, σ^2, and σ.
- $\mu = \sum x \cdot P(x)$
- $x \cdot P(x) = L_1 \cdot L_3 = L_4$

μ=2.988

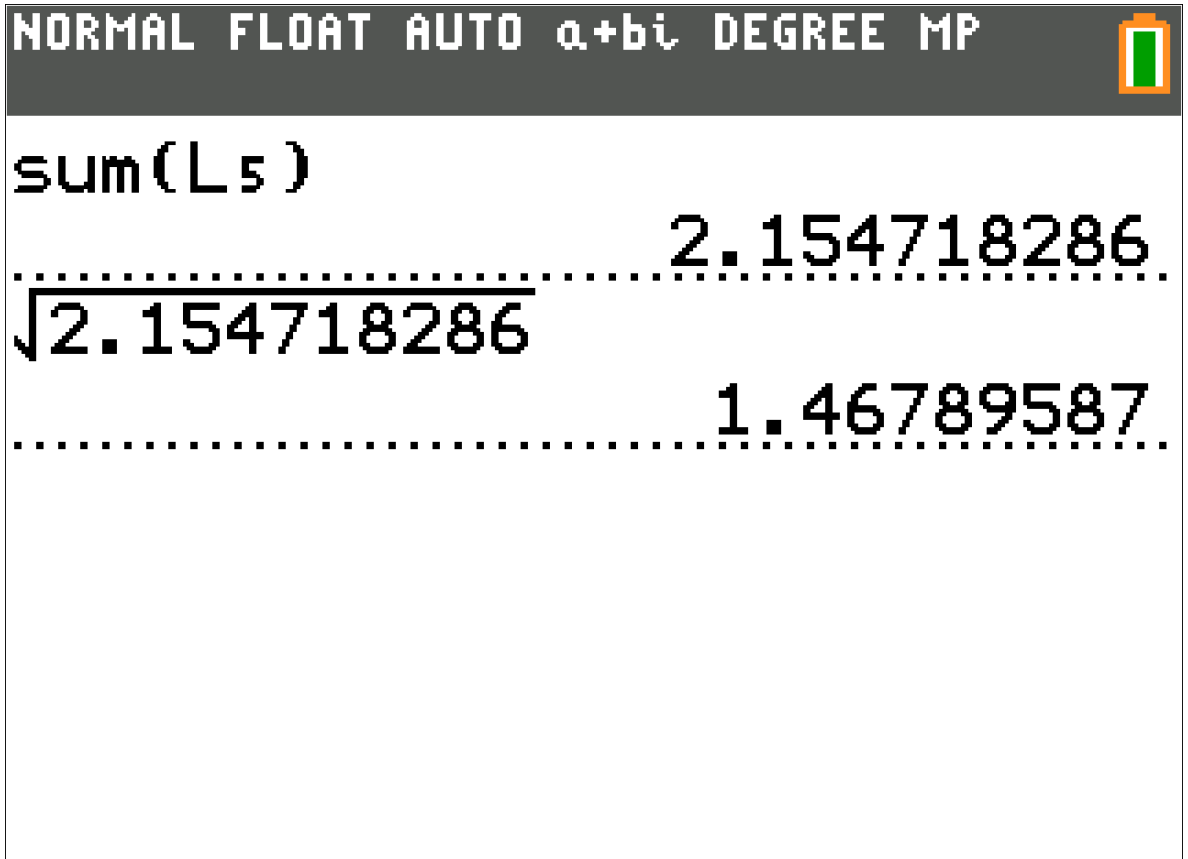


Probability: Finding the Variance and Mean

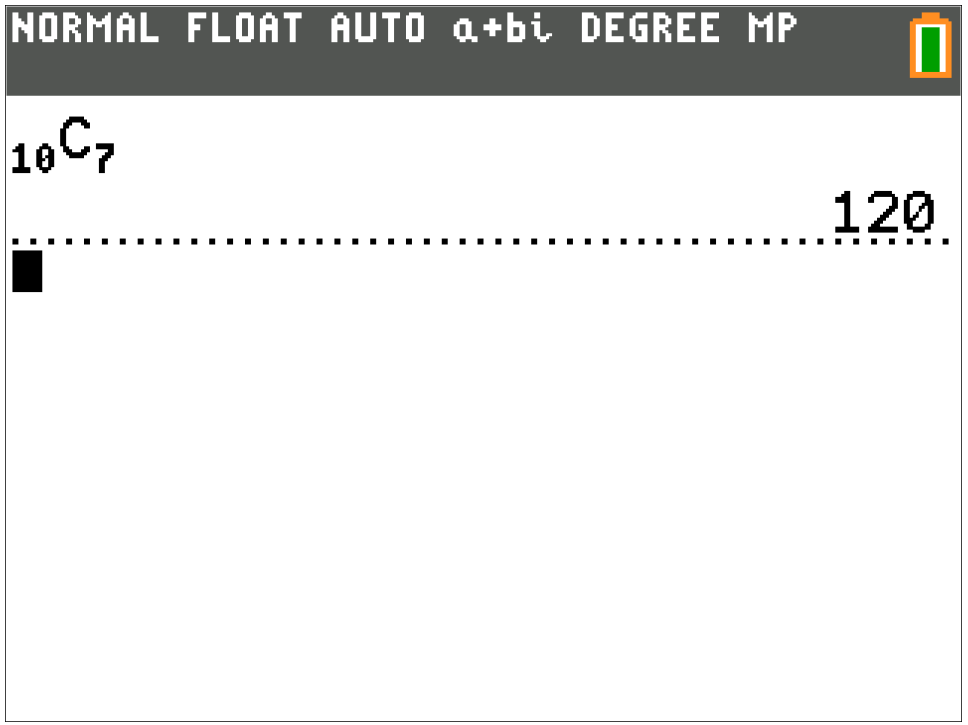
- Now, we have μ. Let's put $(x - \mu)^2 \cdot P(x)$ in L_5.

$\sigma^2 = \sum (x - \mu)^2 \cdot P(x)$

$\sigma = \sqrt{\sigma^2}$

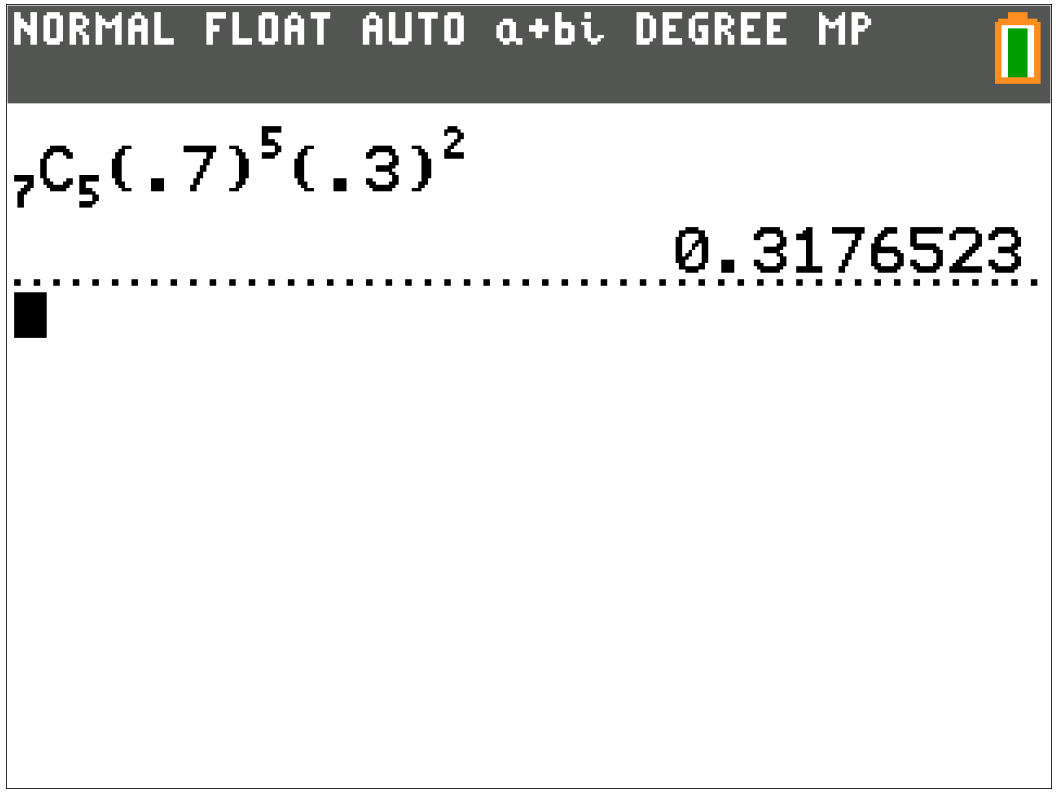


nCx: 



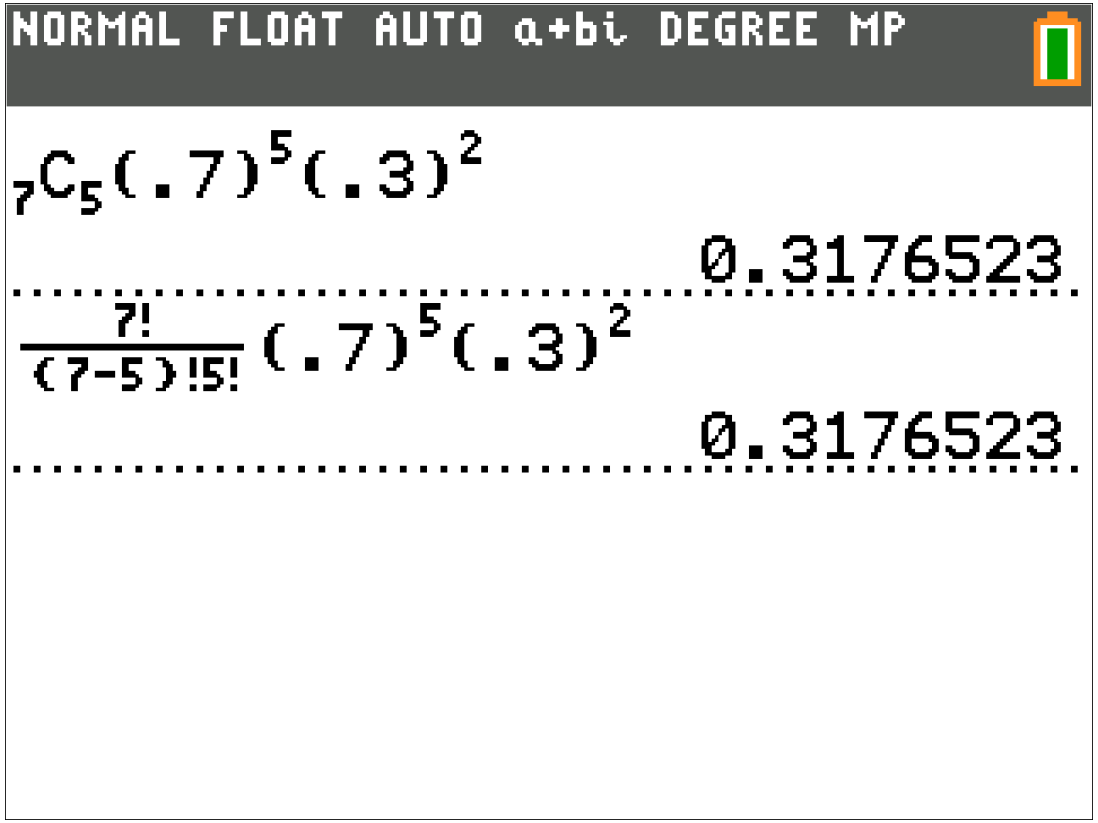
Binomial Probability: ${}_nC_x p^x q^{n-x}$

- With an expected 70% chance of success, what is the probability of getting exactly 5 successes in 7 trials?

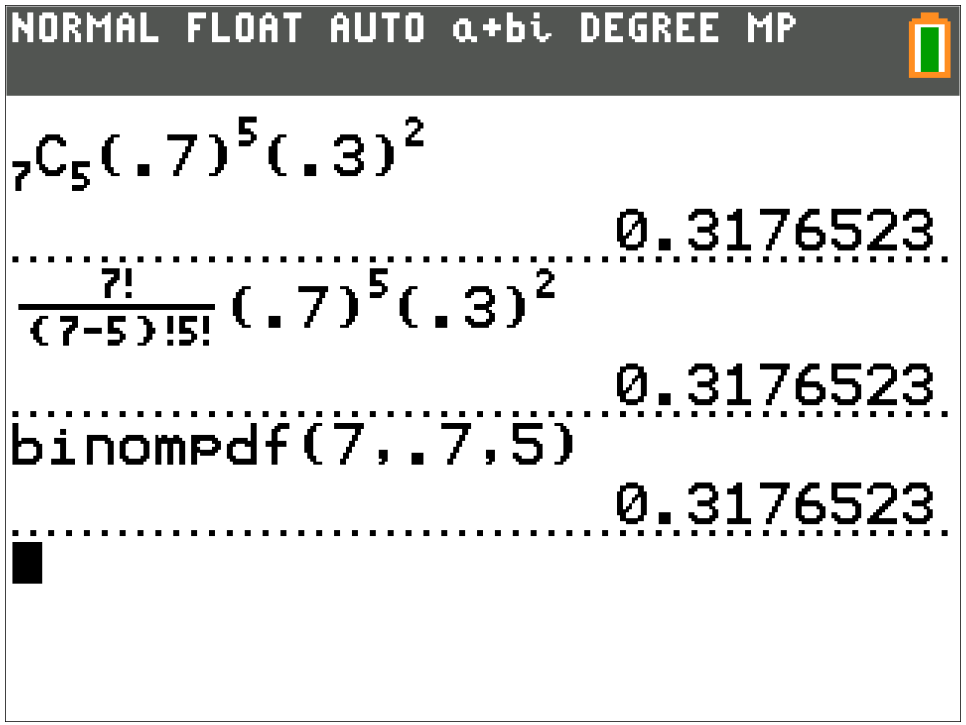


BinomProb Formula: factorials, entering information correctly

- $_nC_x p^x q^{n-x} = \frac{n!}{(n-x)!x!} p^x q^{n-x}$



BinomPDF

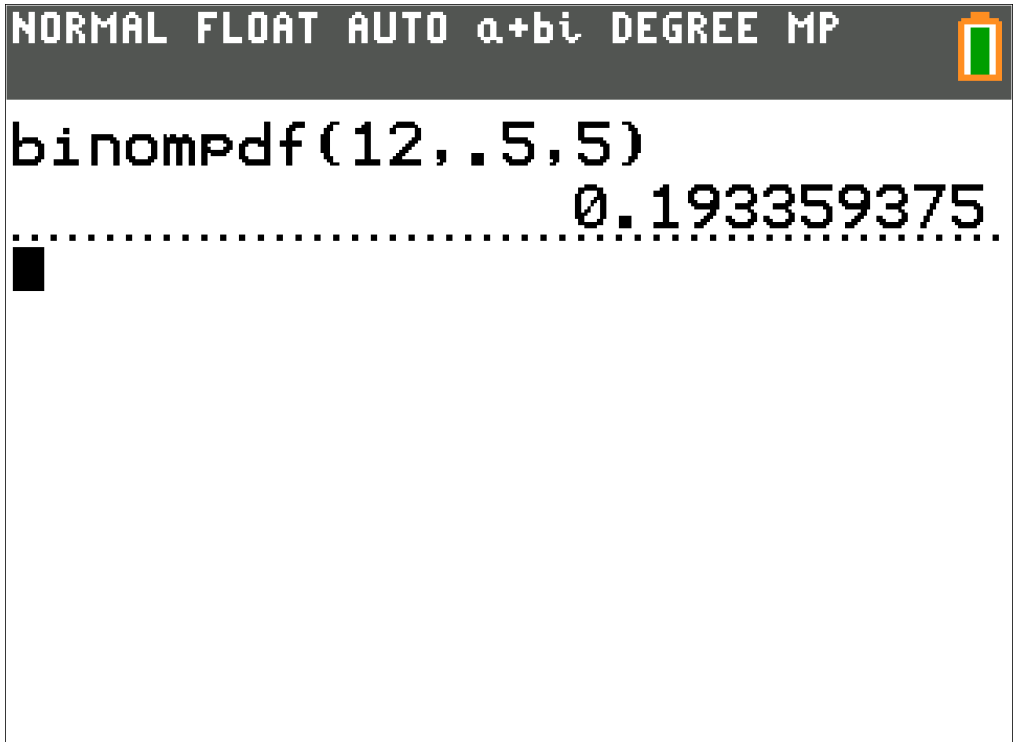

NORMAL FLOAT AUTO a+bi DEGREE MP
${}_7C_5(.7)^5(.3)^2$
0.3176523
$\frac{7!}{(7-5)!5!}(.7)^5(.3)^2$
0.3176523
binompdf(7,.7,5)
0.3176523

BinomPDF

What's the likelihood that the number of Avengers listed in purple blipped?

What is n?
What is p?
What is x?

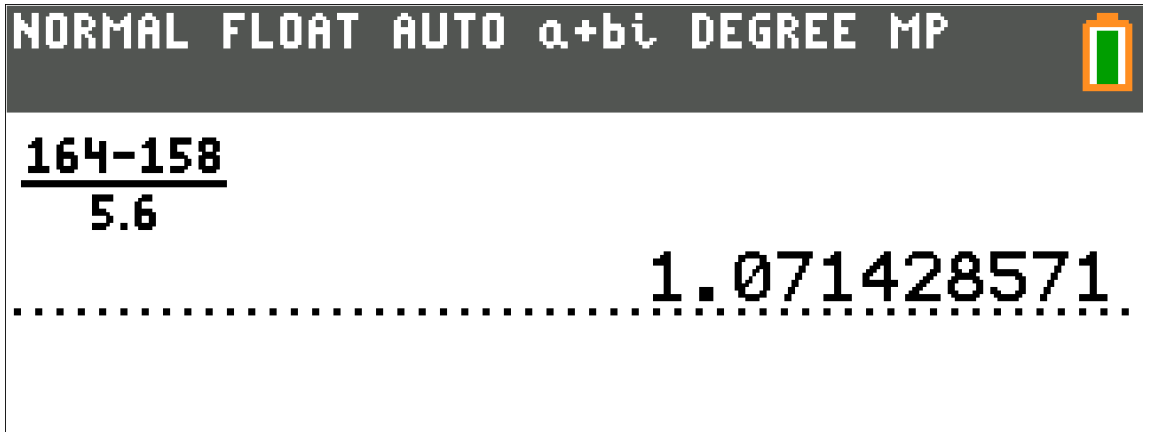
- Captain America
- IronMan
- Thor
- Hulk
- **Black Panther**
- Captain Marvel
- **Spider Man**
- **Dr Strange**
- Black Widow
- **Scarlet Witch**
- **Star Lord**
- Hawkeye



calculating z-scores

- An average Japanese female is 158 cm tall with a standard deviation of 5.6 cm. Chisa is 164 cm tall. What is the z-score of Chisa's height?

$$z = \frac{x - \mu}{\sigma}$$

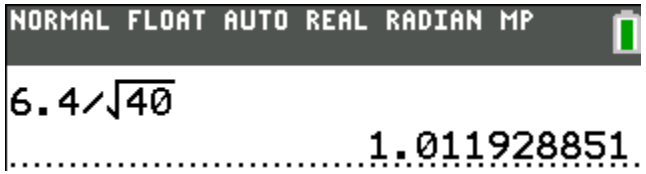


Central Limit Theorem

- "What is the standard error?"

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

- Standard deviation of 6.4 and a sample size of 40



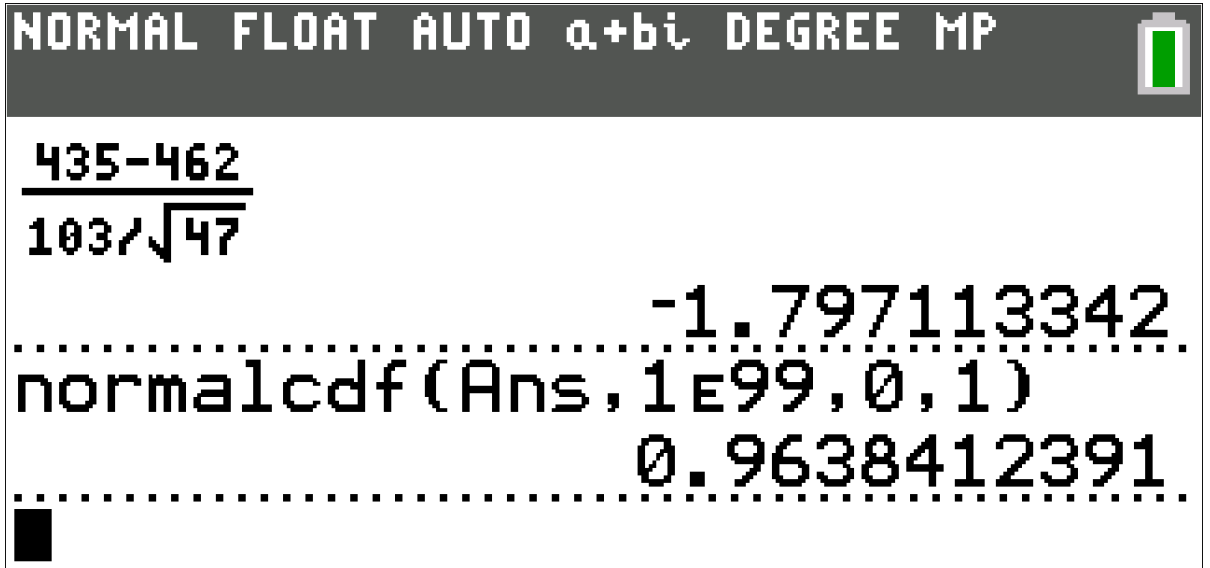
When to use the z with $\sqrt{n}$ (when to use CLT)

Z score (& normalCDF) of an **individual**	Z score (& normalCDF) of a **sample**
$z = \frac{x - \mu}{\sigma}$	$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$

What two changes do you notice?

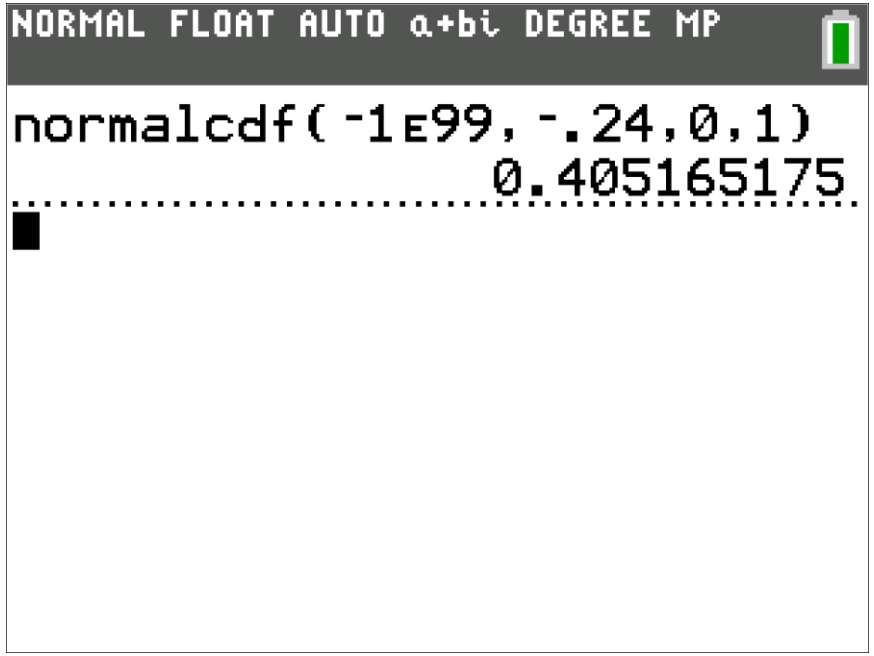
CLT/StDev of sample means

- You surveyed 47 college students who paid an average of $435 for books this semester with a standard deviation of $103. What is the probability that the true mean is greater than $462?



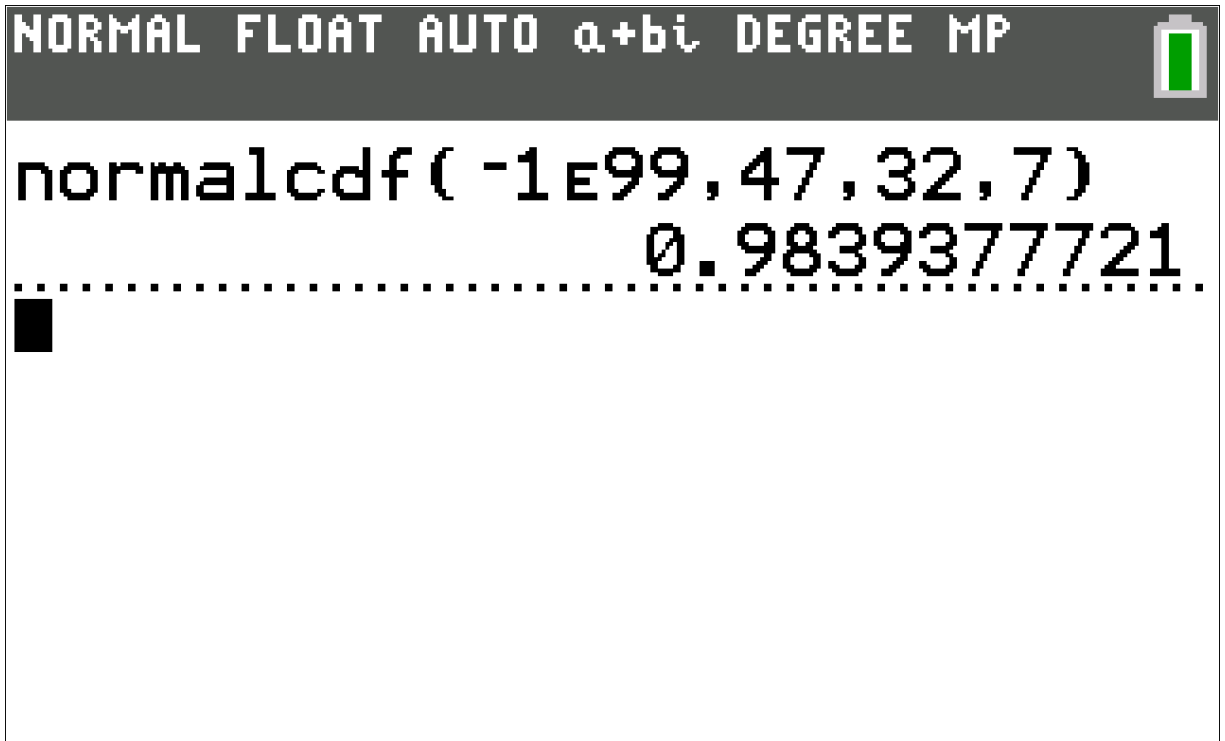
normalCDF with z

- Given a z < -.24, what is the probability?



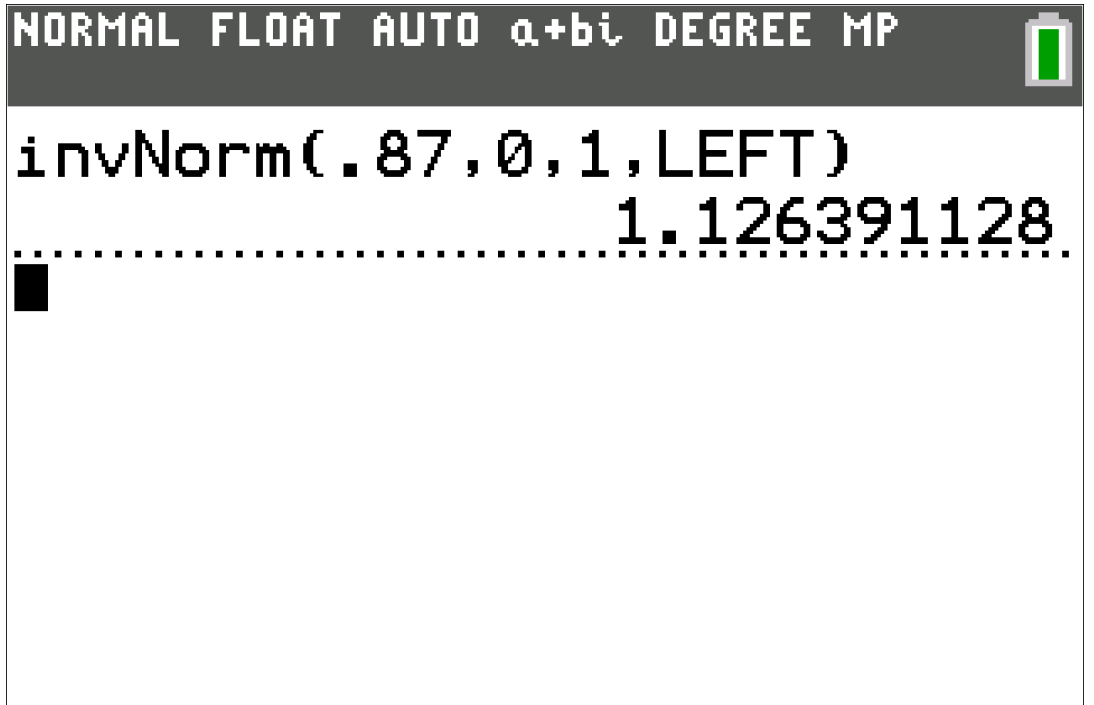
normalCDF with x

- Given that x < 47, the mean is 32, and the standard deviation is 7, what is the probability?



invNorm

- What z score is associated with 87% probability?



Have/Need

Have	Need	Do
Z	Area	normalCDF
Area	Z	invNorm