TI-84: CALCULATING SUMMARY STATISTICS

Use the STAT, CALC, 1-Var Stats command to find summary statistics such as mean, standard deviation, and quartiles.

1. Enter the data as described previously.
2. Press STAT.
3. Right arrow to CALC.
4. Choose 1:1-Var Stats.
5. Enter L1 (i.e. 2ND 1) for List. If the data is in a list other than L1, type the name of that list.
6. Leave FreqList blank.
7. Choose Calculate and hit ENTER.

TI-83: Do steps 1-4, then type L1 (i.e. 2nd 1) or the list's name and hit ENTER.

Calculating the summary statistics will return the following information. It will be necessary to hit the down arrow to see all of the summary statistics.

$\bar{x}$	Mean	n	Sample size or # of data points
Σx	Sum of all the data values	minX	Minimum
Σx^2	Sum of all the squared data values	Q_1	First quartile
Sx	Sample standard deviation	Med	Median
σx	Population standard deviation	maxX	Maximum

TI-83/84: DRAWING A BOX PLOT

1. Enter the data to be graphed as described previously.
2. Hit 2ND Y= (i.e. STAT PLOT).
3. Hit ENTER (to choose the first plot).
4. Hit ENTER to choose ON.
5. Down arrow and then right arrow three times to select box plot with outliers.
6. Down arrow again and make Xlist: L1 and Freq: 1.
7. Choose ZOOM and then 9:ZoomStat to get a good viewing window.

3.3.3 Calculator: binomial probabilities

TI-83/84: COMPUTING THE BINOMIAL COEFFICIENT $\binom{n}{x}$

Use MATH, PRB, nCr to evaluate n choose r. Here r and x are different letters for the same quantity.

1. Type the value of n.
2. Select MATH.
3. Right arrow to PRB.
4. Choose 3:nCr.
5. Type the value of x.
6. Hit ENTER.

Example: 5 nCr 3 means 5 choose 3.

CASIO FX-9750GII: COMPUTING THE BINOMIAL COEFFICIENT $\binom{n}{x}$

1. Navigate to the RUN-MAT section (hit MENU, then hit 1).
2. Enter a value for n.
3. Go to CATALOG (hit buttons SHIFT and then 7).
4. Type C (hit the ln button), then navigate down to the bolded C and hit EXE.
5. Enter the value of x. Example of what it should look like: 7C3.
6. Hit EXE.

TI-84: COMPUTING THE BINOMIAL FORMULA, $P(X = x) = \binom{n}{x} p^x (1-p)^{n-x}$

Use 2ND VARS, binompdf to evaluate the probability of *exactly* x occurrences out of n independent trials of an event with probability p.

1. Select 2ND VARS (i.e. DISTR)
2. Choose A:binompdf (use the down arrow to scroll down).
3. Let trials be n.
4. Let p be p
5. Let x value be x.
6. Select Paste and hit ENTER.

TI-83: Do step 1, choose 0:binompdf, then enter n, p, and x separated by commas: binompdf(n, p, x). Then hit ENTER.

TI-84: COMPUTING $P(X \leq x) = \binom{n}{0}p^0(1-p)^{n-0} + ... + \binom{n}{x}p^x(1-p)^{n-x}$

Use 2ND VARS, binomcdf to evaluate the cumulative probability of *at most* x occurrences out of n independent trials of an event with probability p.

1. Select 2ND VARS (i.e. DISTR)
2. Choose B:binomcdf (use the down arrow).
3. Let trials be n.
4. Let p be p
5. Let x value be x.
6. Select Paste and hit ENTER.

TI-83: Do steps 1-2, then enter the values for n, p, and x separated by commas as follows: binomcdf(n, p, x). Then hit ENTER.

CASIO FX-9750GII: BINOMIAL CALCULATIONS

1. Navigate to STAT (MENU, then hit 2).
2. Select DIST (F5), and then BINM (F5).
3. Choose whether to calculate the binomial distribution for a specific number of successes, $P(X = k)$, or for a range $P(X \leq k)$ of values (0 successes, 1 success, ..., x successes).
   - For a specific number of successes, choose Bpd (F1).
   - To consider the range 0, 1, ..., x successes, choose Bcd(F1).
4. If needed, set Data to Variable (Var option, which is F2).
5. Enter the value for x (x), Numtrial (n), and p (probability of a success).
6. Hit EXE.

GUIDED PRACTICE 3.71

Find the number of ways of arranging 3 blue marbles and 2 red marbles.[55]

GUIDED PRACTICE 3.72

There are 13 marbles in a bag. 4 are blue and 9 are red. Randomly draw 5 marbles *with replacement*. Find the probability you get exactly 3 blue marbles.[56]

GUIDED PRACTICE 3.73

There are 13 marbles in a bag. 4 are blue and 9 are red. Randomly draw 5 marbles *with replacement*. Find the probability you get *at most* 3 blue marbles (i.e. less than or equal to 3 blue marbles).[57]

[55] Here $n = 5$ and $x = 3$. Doing 5 nCr 3 gives the number of combinations as 10.
[56] Here, $n = 5$, $p = 4/13$, and $x = 3$, so set trials $= 5$, p $= 4/13$ and x value $= 3$. The probability is 0.1396.
[57] Similarly, set trials $= 5$, p $= 4/13$ and x value $= 3$. The cumulative probability is 0.9662.

4.1.5 Calculator: finding normal probabilities

TI-84: FINDING AREA UNDER THE NORMAL CURVE

Use 2ND VARS, normalcdf to find an area/proportion/probability between two Z-scores or to the left or right of a Z-score.

1. Choose 2ND VARS (i.e. DISTR).
2. Choose 2:normalcdf.
3. Enter the lower (left) Z-score and the upper (right) Z-score.
   - If finding just a lower tail area, set lower to -5.
   - If finding just an upper tail area, set upper to 5.
4. Leave μ as 0 and σ as 1.
5. Down arrow, choose Paste, and hit ENTER.

TI-83: Do steps 1-2, then enter the lower bound and upper bound separated by a comma, e.g. normalcdf(2, 5), and hit ENTER.

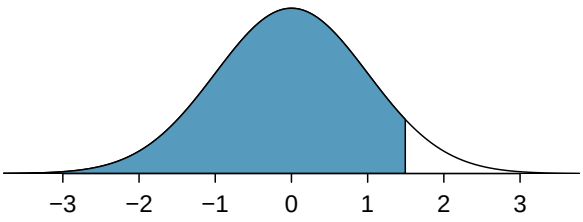
CASIO FX-9750GII: FINDING AREA UNDER THE NORMAL CURVE

1. Navigate to STAT (MENU, then hit 2).
2. Select DIST (F5), then NORM (F1), and then Ncd (F2).
3. If needed, set Data to Variable (Var option, which is F2).
4. Enter the Lower Z-score and the Upper Z-score. Set σ to 1 and μ to 0.
   - If finding just a lower tail area, set Lower to -5.
   - For an upper tail area, set Upper to 5.
5. Hit EXE, which will return the area probability (p) along with the Z-scores for the lower and upper bounds.

EXAMPLE 4.11

Use a calculator to determine what percentile corresponds to a Z-score of 1.5.

Always first sketch a graph:[7]



To find an area under the normal curve using a calculator, first identify a lower bound and an upper bound. Theoretically, we want all of the area to the left of 1.5, so the left endpoint should be -∞. However, the area under the curve is nearly negligible when Z is smaller than -4, so we will use -5 as the lower bound when not given a lower bound (any other negative number smaller than -5 will also work). Using a lower bound of -5 and an upper bound of 1.5, we get $P(Z < 1.5) = 0.933$.

[7] normalcdf gives the result without drawing the graph. To draw the graph, do 2nd VARS, DRAW, 1:ShadeNorm. However, beware of errors caused by other plots that might interfere with this plot.

GUIDED PRACTICE 4.12

Find the area under the normal curve to right of $Z = 2$. [8]

GUIDED PRACTICE 4.13

Find the area under the normal curve between -1.5 and 1.5. [9]

TI-84: FIND A Z-SCORE THAT CORRESPONDS TO A PERCENTILE

Use 2ND VARS, invNorm to find the Z-score that corresponds to a given percentile.

1. Choose 2ND VARS (i.e. DISTR).
2. Choose 3:invNorm.
3. Let Area be the percentile as a decimal (the area to the left of desired Z-score).
4. Leave μ as 0 and σ as 1.
5. Down arrow, choose Paste, and hit ENTER.

TI-83: Do steps 1-2, then enter the percentile as a decimal, e.g. invNorm(.40), then hit ENTER.

CASIO FX-9750GII: FIND A Z-SCORE THAT CORRESPONDS TO A PERCENTILE

1. Navigate to STAT (MENU, then hit 2).
2. Select DIST (F5), then NORM (F1), and then InvN (F3).
3. If needed, set Data to Variable (Var option, which is F2).
4. Decide which tail area to use (Tail), the tail area (Area), and then enter the σ and μ values.
5. Hit EXE.

EXAMPLE 4.14

Use a calculator to find the Z-score that corresponds to the 40th percentile.

Letting Area be 0.40, a calculator gives -0.253. This means that $Z = -0.253$ corresponds to the 40th percentile, that is, $P(Z < -0.253) = 0.40$.

GUIDED PRACTICE 4.15

Find the Z-score such that 20 percent of the area is to the right of that Z-score.[10]

[8] Now we want to shade to the right. Therefore our lower bound will be 2 and the upper bound will be +5 (or a number bigger than 5) to get $P(Z > 2) = 0.023$.

[9] Here we are given both the lower and the upper bound. Lower bound is -1.5 and upper bound is 1.5. The area under the normal curve between -1.5 and 1.5 = $P(-1.5 < Z < 1.5) = 0.866$.

[10] If 20% of the area is the right, then 80% of the area is to the left. Letting area be 0.80, we get $Z = 0.841$.