For students **<u>entering</u>** Statistics Fall 2024

Statistics Summer Review

Topics For Review

- Topic 1: Rounding

- Topic 2: Percent, Fraction, Decimal Interpretation

- Topic 3: Percent, Fraction, Decimal Conversion

- Topic 4: Mean, Median, Mode

- Topic 5: Basic Calculator Keystrokes

- Topic 6: Complicated Calculator Entries

- Topic 7: Statistics Calculator Keystrokes

Topic 1: Rounding

Rounding is a crucial part of statistical calculations and interpretations. **Round as directed.** Please pay attention to the inclusion of or lack of the suffix -th for decimal rounding.

1. Round 32.169857883 to the nearest thousandth

2. Round 90.2844097979 to 3 decimal places

3. Round 57.5958961796 to the nearest hundreth

4. Round 1.56796721395 to the nearest millionth

5. Round 18759.404962 to the nearest thousand

6. Round 3193.55767741 to the nearest thousandth

7. Round 7996.33774627 to the nearest ten

8. Round 80417.0858163 to the nearest tenth

9. Round 217.7266837 to 2 decimal places

10. Round 425.97962703 to the nearest thousandth

11. Round 565.948063818 to the nearest whole number

12. Round 387.86911589 to 3 decimal places

Beware of some calculator answers that are given in scientific notation. It is important when interpreting these calculator answers to know whether they are *essentially* zero or if they represent a large number. **Write each in scientific notation and decide if the answer is *essentially* zero or a large number.**

13. Calculator answer: 1.85195297 E -11

14. Calculator answer: 1.08249129 E 33

15. Calculator answer: 1.1665308 E -20

16. Calculator answer: 1.51888247 E -7

17. Calculator answer: 2.6984169527 E 9

Topic 2: Percent, Fraction, Decimal Interpretation

Set up and solve each word problem below.

1. A middle school took all its 6th grade students on a field trip to see a symphony. The students filled 924 seats, which was 55% of the total number of seats in the theater. How many total seats are in the theater?

2. Nathaniel has a toy car collection with 480 toy cars. He keeps 216 of them on his wall. What percentage of Nathaniel's toy car collection is NOT on his wall?

3. Eva has a collection of 180 coins. Minted state quarters make up 20% of her collection. How many minted state quarters does Eva own?

4. There are 125 students in the 9th grade at a local high school, and 25% of them are in Environmental Club. How many 9th grade students are in the Environmental Club?

5. A gift shop sold 650 cards for Mother's Day. One of the salesmen, Anna, sold 10% of the cards sold for Mother's Day. How many cards did Anna sell?

6. There were 2900 people at a football game. Of the people attending, 1595 were for the home team and 1305 were for the visiting team. What percentage of people were for the visiting team?

7. Isabella earned a grade of 73% on her math multiple choice final exam. She got 146 multiple choice problems correct. How many total multiple choice problems were on the final exam that Isabella took?

Topic 3: Percent, Fraction, Decimal Conversion

Convert each decimal to a percent.

1.   0.0652

2.   0.0079

3.   0.013

4.   0.314

5.   0.815

6.   0.9222

Convert each percent to a decimal.

7.   16%

8.   9.1%

9.   0.03%

10.   0.5%

11.   35%

12.   80.7%

There are ways on your calculator to quickly convert between fractions and decimals. This can prove useful in statistics calculations. Let's practice a bit here!

DECIMAL to FRACTION conversion… once you get a decimal answer (or once you type a decimal in) press **MATH**, then press **1** for 1:▶Frac, then press **ENTER** once on the home screen. Your answer is in simplified fraction form.

FRACTION to DECIMAL conversion… once you get a fraction answer (or once you type a fraction in) press **MATH**, then press **2** for 2: ▶Dec, then press **ENTER** once on the home screen. Your answer is in simplified decimal form.

To type a fraction in to the calculator, press **ALPHA** (green button) then **Y=** (top left grey button).

Convert each fraction to a decimal (round 3 places) or each decimal to a fraction using your calculator.

13.   0.406

14.   0.575

15.   0.0608

16. $\dfrac{7}{15}$

17. $\dfrac{24}{30}$

18. $\dfrac{31}{40}$

Topic 4: Mean, Median, Mode

Having a basic understanding of these middle school topics is helpful going into statistics. Mean, median, mode are usually the first introduction students have to statistics before the actual course. You may use your calculator to find these answers. Any decimal should be rounded to the nearest hundreth.

Reminders…
- Mean is the "average" for a set of data. Add all the data values together, then divide by the total number of data values.
- Median is the "middle" for a set of data. Order the values from least to greatest, then identify the middle data value. If there is not a definite middle value, add the two middle values together and divide by 2.
- Mode is the "most" for a set of data. Which number appears the most? There may be one answer, no answer, or more than one answer.

Find the mean, median and mode for each data set given.

1.   47, 15, 6, 49, 45, 30

        Mean =   Median =   Mode =

2.   37, 50, 39, 39, 33, 34, 43, 30, 54

        Mean =   Median =   Mode =

3.   37, 13, 9, 48, 11, 11, 11

        Mean =   Median =   Mode =

4.   21, 50, 21, 34, 34, 18, 48, 37, 23, 21, 36

        Mean =   Median =   Mode =

5.   0, 45, 33, 8, 26, 25, 31

        Mean =   Median =   Mode =

Topic 5: Basic Calculator Keystrokes

There are several calculator buttons and keystrokes you will need to be familiar with for statistics.

Fraction – press **ALPHA** then press **Y=** to bring up a fraction
Square Roots – press **2nd** then press x^2 to bring up a square root
Other Roots – press **MATH** then press **5** for $5: \sqrt[x]{}$
Exponents – press **^** button (located above division button)
Negative Sign – press $(-)$ button (located bottom right corner)
Exiting to Home Screen – press **2nd** then press **MODE** to get back to the home screen from any other window

Type the following in to your calculator to find answers (even if you can do it mental math or by hand).

1. $\dfrac{14}{3} - \dfrac{6}{7} + \dfrac{2}{9} + \dfrac{1}{24}$

2. $\sqrt{225} - \left(\dfrac{1}{2}\right)^{-3}$

3. $\dfrac{-\sqrt{81} - 51}{64}$

4. $5^3 + \sqrt[7]{-2187}$

5. $\sqrt{4096} - \sqrt{631} + (-3.8)^2$

6. $9(-6+2)^5 + 4^{-2}$

There are other useful EDITING keystrokes that would be good to know. We type a lot of things in the calculator throughout the course, and often you might miss a number or might mistype something. Instead of *retyping* the whole thing, there are ways to edit your entries without retyping everything.

Delete – move the cursor box so that it is blinking over the part you want to delete, then press **DEL** (located near blue 2nd button). The part should now be gone.
Insert – move the cursor box so that it is blinking over where you want to insert a missed part. The calculator will insert whatever you type BEFORE/TO THE LEFT of the cursor box. Press **2nd** then press **DEL**. The cursor now appears as a blinking line. Type as much as you want. When you're done inserting things, press the over arrow to continue on without inserting more.
Change – if you want to change a number *without* deleting or inserting, simply move the cursor box so it is blinking over the part you want to change. Then type a different number/symbol. When changing something, it must be equal amount of space (for example, you can't change a 9 to a 10 without over riding a second space)
Copy/Paste – if you want to copy an entry that has already been entered/solved in the calculator, use the up arrow to highlight the entry you want to copy then press **ENTER**. This is useful for editing something you've already typed in without having to type the whole thing again.

Practice using these keystrokes with the following from above…
7. Copy/Paste #4 from above in your calculator. Do <u>not</u> retype it. Then change the 3 exponent to a 2. Solve.

8. Copy/Paste #6 from above in your calculator. Do <u>not</u> retype it. Delete the negative in front of the 2 exponent and insert a 1 behind the 2 in the parenthesis. Solve.

9. Copy/Paste #5 from above in your calculator. Do <u>not</u> retype it. Change 631 to 289, delete the exponent 2 completely, and insert a 0 between the 9 and the 6 in 4096. Solve.

Topic 6: Complicated Calculator Entries

At times, you will be asked to type complicated looking formulas and data values into your calculator. These involve multiple fractions within fractions, multiple items under square roots, and the use of parenthesis correctly. Practice typing in these complicated entries below. If you make a mistake and do not get the correct answer, use your editing keystrokes from the last topic to fix your entry. (Round answers to the thousandth)

1. $\left(\dfrac{3+8\sqrt[3]{12}}{2}\right)^{\frac{4}{5}}+\left(\dfrac{9}{2+3^{-2}}\right)$

2. $\dfrac{51}{7^2}+\sqrt{3698-821}-\left(4+\dfrac{5(20)-\frac{2}{3}}{1631}\right)$

3. $3\left(\dfrac{2}{7}+\left(\dfrac{2}{3}\right)^{\frac{1}{2}}+\dfrac{4+\sqrt[3]{27}}{9}\right)$

4. $\dfrac{\dfrac{11}{35}-\dfrac{10}{18}}{\sqrt{\dfrac{\left(\dfrac{21}{53}\right)\left(\dfrac{32}{53}\right)}{35}+\dfrac{\left(\dfrac{21}{53}\right)\left(\dfrac{32}{53}\right)}{18}}}$

5. $\left(\sqrt{7}+\dfrac{2}{7}\right)^7+\dfrac{3\sqrt[5]{100}}{\sqrt{24}}-\left(-5\sqrt[4]{45}\right)$

6. $\dfrac{\sqrt{\dfrac{84}{153}-0.158}+\left(\dfrac{3}{4}\right)^{-3}}{(5.6)^{3/2}}$

Topic 7: Statistics Calculator Keystrokes

There are four more calculator skills I would like you to be familiar with, particularly for the use of statistics.

Storing Values – after an answer is solved for or a number is typed in, you can store this value as a variable on your calculator. Press **STO>** then press **ALPHA** then press your variable (these are written in green above each calculator button) then press **ENTER**.

Using Store Values – to bring up a variable with a stored value, press **ALPHA** then press the variable. The calculator will insert your stored value here when solving.

List Entries – to enter data in a list, press **STAT** then press **1** for 1:Edit… . Choose the list you want to type data under (probably L1). Type the first data entry, then press **ENTER** to go to the next line.

Recalling List – to bring up a specific list to use, press **2nd** then press **STAT** and then select the list number you want to use and press that number

List entry specifics:
- if you want to change an entry, go to that number so that it is highlighted and retype in the correct number. No insert or other buttons needed
- if you want to delete an entry completely, go to that number so that it is highlighted and press **DEL**. This will delete the entry and move the list up one row
- if you want to clear a list, go to the list name at the top (L1, L2, etc.) so it is highlighted and press **CLEAR** then press **ENTER**. The entire list should be cleared now.
    - DO NOT press **DEL** when attempting to clear a list. This will DELETE the list.

Practice using these keystrokes by following the instructions below.

Store these numbers as these variables: 7.38 as C , -9.39 as G , $\sqrt[3]{3581}$ as K , $\dfrac{581}{6147}$ as Q , 63.15 as Y.

Type in the expressions below with the stored variables for answers. (Round answers to thousandth)

1. $\dfrac{K^2 - 6G + Y}{(C-2)^4}$

2. $\dfrac{5}{8}CQ + \dfrac{7-Y}{K}$

3. $\dfrac{\sqrt{2C - 3G + 4K}}{Q + Y}$

Enter these in List 1: 84, 21, -39, 95, 46, 77 .   Enter these in List 2: 30, 97, 80, -24, 10, 66 .
Perform the following calculations on the home screen and write out the answers given.

4. L1 – L2

5. 6L2 – 3L1

6. L1 ^{2}

7. – L2

ANSWER KEY

Topic 1

1. 32.170
2. 90.284
3. 57.60
4. 1.567967
5. 19000
6. 3193.558
7. 8000
8. 80417.1
9. 217.73

10. 425.980
11. 566
12. 387.869
13. 1.85×10^{-11}
    essentially zero
14. 1.08×10^{33}
    large number

15. 1.17×10^{-20}
    essentially zero
16. 1.52×10^{-7}
    essentially zero
17. 2.70×10^{9}
    large number

Topic 2

1. 1680 total seats
2. 55% not on his wall
3. 36 minted state quarters
4. 38 9th grade students

5. 65 cards
6. 45% for visiting team
7. 200 total problems

Topic 3

1. 6.52%
2. 0.79%
3. 1.3%
4. 31.4%
5. 81.5%
6. 92.22%
7. 0.16

8. 0.091
9. 0.0003
10. 0.005
11. 0.35
12. 0.807
13. $\dfrac{203}{500}$

14. $\dfrac{23}{40}$
15. $\dfrac{38}{625}$
16. 0.467
17. 0.8
18. 0.775

Topic 4

1. Mean = 32, Median = 37.5, Mode = none
2. Mean = 39.89, Median = 39, Mode = 39
3. Mean = 20, Median = 11, Mode = 11
4. Mean = 31.18, Median = 34, Mode = 21
5. Mean = 24, Median = 26, Mode = none

Topic 5

1. $\dfrac{2053}{504}$
2. 7

3. $-\dfrac{15}{16}$
4. 122
5. 53.32

6. -9215.94
7. 22
8. 6834391
9. 181.45

Topic 6

1. 10.903
2. 50.618
3. 5.640
4. −1.701
5. 1874.834
6. 0.226

Topic 7

1. 0.422
2. −3.234
3. 0.161
4. $\{54, -76, -119, 119, 36, 11\}$
5. $\{-72, 519, 597, -429, -78, 165\}$
6. $\{7056, 441, 1521, 9025, 2116, 5929\}$
7. $\{-30, -97, -80, 24, -10, -66\}$