3.3 Exercise **MATH 241** **THOMPSON**

1. The following data represent the number of people aged 25 to 64 years covered by health insurance (private or government) in 2018. Approximate the mean and standard deviation for age.

Age	25-34	35-44	45-54	55-64
Number	29.7	31.7	39.5	28.2

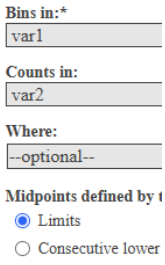
Open a new window statcrunch.com

use same login as mathxl

take out the decimal

STAT-SUMMARY STATS-GROUPED/BINNED
Bins n:var1 Counts in: var2
Calculate mean and Unadj St Dev

var1	var2
25-34	297
35-44	317
45-54	395
55-64	282



$'\bar{x} = mean$

Midpoint $\frac{35+25}{2}$

Class	Frequency(f_i)	Midpoint (x_i)	$x_i f_i$
25-34	29.7	$\frac{25+35}{2} = 30$	30·29.7 = 891
35-44	31.7	$\frac{35+45}{2} = 40$	40·31.7 = 1268
45-54	39.5	$\frac{45+55}{2} = 50$	50·39.5 = 1975
55-65	28.2	$\frac{55+65}{2} = 60$	60·28.2 = 1728
	129.1 - sum		**5862 = sum**

$$\bar{x} = \frac{x_i f_i}{f_i} = \frac{5862}{129.1} = 45.41$$

Class	Frequency	Midpoint (x)	$x - \bar{x}$	$(x-\bar{x})^2 f_i$
25-34	29.7	30	30-45.41=15.41	$(15.41)^2 \cdot 29.7 = 7052.80$
35-44	31.7	40	40-45.41=5.41	$(5.41)^2 \cdot 31.7 = 927.80$
45-54	39.5	50	50-45.41=4.59	$(4.59)^2 \cdot 39.5 = 832.19$
55-65	28.2	60	60-45.41=14.59	$(14.59)^2 \cdot 28.2 = 6002.88$
	129.1 - sum		*(drop negatives)*	**14815.67 = sum**

$$s = \sqrt{\frac{14815.67}{129.1}} = 10.71$$

2. Recently, a random sample of 13–18 year olds was asked, "How much do you currently have in savings?" The data in the table represent the responses to the survey. Approximate the mean and standard deviation amount of savings. Do this problem using your calculator.

Click the icon to view the frequency distribution for the amount of savir

The sample mean amount of savings is $ 230 .
(Round to the nearest dollar as needed.)

The sample standard deviation is $ 224 .
(Round to the nearest dollar as needed.)

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STAT-SUMMARY STATS – GROUPED/BINNED

Bins in: Savings
Counts in: Frequency

- **Consecutive lower limits (since it is a range)**

Mean then Std. dev.

3. The accompanying frequency distribution represents the square footage of a random sample of 500 houses that are owner occupied year round. Approximate the mean and standard deviation square footage.

Click the icon to view the data table.

The mean square footage is $\bar{x}$ = 2436.
(Round to the nearest integer as needed.)

The standard deviation square footage is s = 928.
(Round to one decimal place as needed.)

STATCRUNCH

STAT-SUMMARY STATS – GROUPED/BINNED

Bins in: square footage
Counts in: Frequency

• Consecutive lower Limits (since it is a range)

Mean then Std. dev

4. Often, frequency distributions are reported using unequal class widths because the frequencies of some groups would otherwise be small or very large. Consider the following data, which represent the daytime household temperature the thermostat is set to when someone is home for a random sample of 734 households. Determine the class midpoint, if necessary, for each class and approximate the mean and standard deviation temperature.

Click the icon to view the frequency distribution for the daytime household temperature.

Determine the class midpoint of each class by adding consecutive lower limits and dividing by 2.

$\frac{61+65}{2} = 63$

$\frac{65+68}{2} = 66.5$..... last use 80-1 = 79

Class	Class Midpoint
61–64	63
65–67	66.5
68–69	69
70	70.5
71–72	72
73–76	75
77–80	79

The sample mean is 70.7 °F.
(Round to one decimal place as needed.)

The sample standard deviation is 3.4 °F.
(Round to one decimal place as needed.)

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STAT-SUMMARY STATS – GROUPED/BINNED

Bins in: temperature
Counts in: Frequency

• Consecutive lower Limits (since it is a range)

Mean then Std. dev

5. The following data represent the high-temperature distribution for a summer month in a city for some of the last 130 years. Treat the data as a population. Complete parts (a) through (c).

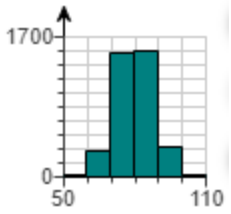
Temperature	50-59	60-69	70-79	80-89	90-99	100-109
Days	1	304	1484	1508	348	13

(a) Approximate the mean and standard deviation for temperature.

μ = 80.3
(Round to one decimal place as needed.)

σ = 7.9

(b) Use the frequency histogram of the data to verify that the distribution is bell shaped.



- [x] Yes, the frequency histogram of the data is bell shaped.
- [ ] No, the frequency histogram of the data is not bell shaped.

(c) According to the empirical rule, 95% of days in the month will be between what two temperatures?

64.5 and 96.1 95% is 2 standard deviations 80.3-2(7.9)=64.5 80.3+2(7.9) = 96.1

(Round to one decimal place as needed. Use ascending order.)

6. The frequency distribution was obtained using a class width of 0.5 for data on cigarette tax rates. Use the frequency distribution to approximate the population mean and population standard deviation. Compare these results to the actual mean $\mu = \$1.535$ and standard deviation $\sigma = \$1.032$.

Click the icon to view the frequency distribution for the tax rates.

The population mean is $ 1.590 .
(Round to three decimal places as needed.)

The population standard deviation is $ 1.087 .
(Round to three decimal places as needed.)

Population is unadj. std. dev

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STAT-SUMMARY STATS – GROUPED/BINNED

Bins in: Tax Rate
Counts in: Frequency

- Consecutive lower Limits (since it is a range)

Mean then **Unadj. std. dev (population)**

Compare these results to the values found using the actual data.

- [ ] A. The grouped values are both slightly smaller.
- [ ] B. The grouped mean is slightly larger, while the grouped standard deviation is slightly smaller.
- [x] C. The grouped values are both slightly larger.

7. Patty has just completed her second semester in college. She earned a grade of A in her 3-hour discrete math course, a grade of B in her 4-hour psychology course, a grade of A in her 4-hour engineering course, and a grade of B in her 2-hour philosophy course. Assuming that A equals 4 points, B equals 3 points, C equals 2 points, D equals 1 point, and F is worth no points, determine Patty's grade-point average for the semester.

Grade value X hours and compute the total for all classes divided by total number of hours taken. Total hours = 3+4+4+2 = 13

$$\frac{4(3)+3(4)+4(4)+3(2)}{13} = 3.54$$

8. In Marissa's calculus course, attendance counts for 20% of the grade, quizzes count for 10% of the grade, exams count for 45% of the grade, and the final exam counts for 25% of the grade. Marissa had a 100% average for attendance, 93% for quizzes, 82% for exams, and 85% on the final. Determine Marissa's course average.

Total percentage = 100 $\frac{100(20)+93(10)+82(45)+85(25)}{100} = 87.45$

9. Karl and Leonard want to make trail mix. In order to get the right balance of ingredients for their tastes they bought 2 pounds of raisins at $2.94 per pound, 2 pounds of peanuts for $4.81 per pound, and 4 pounds of chocolate chips for $4.75 per pound. Determine the cost per pound of the trail mix.

Total pounds= 8 $\quad \frac{2.94(2)+4.81(2)+4.75(4)}{8} = 4.31$

10. Male and female populations of humpback whales under 80 years old are represented by age in the table below. Complete parts (a) through (d).

Age	Males	Females
0-9	12	9
10-19	16	8
20-29	17	17
30-39	16	19
40-49	24	23
50-59	25	24
60-69	18	18
70-79	15	15

(a) Approximate the population mean and standard deviation of age for males.

SEE BELOW

μ = 42.15
(Round to two decimal places as needed.)

σ = 21.09
(Round to two decimal places as needed.)

(b) Approximate the population mean and standard deviation of age for females.

μ = 44.34
(Round to two decimal places as needed.)

σ = 19.94
(Round to two decimal places as needed.)

(c) Which gender has the higher mean age?

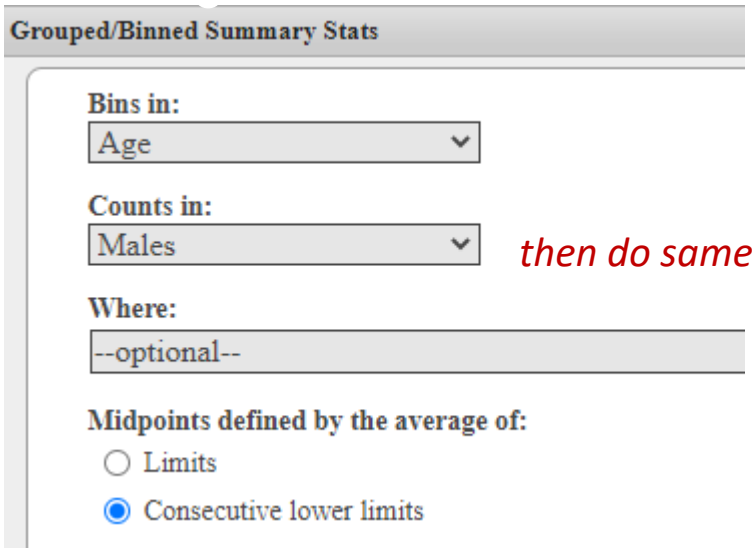
(c) Which gender has the higher mean age?

Females have the higher mean age.

(d) Which gender has the higher dispersion in age?

Males have the greater dispersion.

STATS – SUMMARY STATS – COLUMNS highlight mean and unadj. st. dev



then do same for females