

Lesson 3: Finding \bar{x} , m_d , m_o in May 2, 2023
Data Tables + Graphs and Solving

Find Mode: **given**: Condensed Data Table w/ Freq. or Rel. Freq. Pg 50

Example 1: As part of an environmental impact survey, a sample of learners at a small adult education centre were asking how they traveled to school each day. Their responses were organized in the below data table: **What is the mode?**

{ car, bus, uber, can } = x

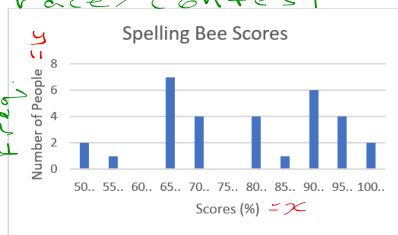
Type of Transport x	Number of Learners (Frequency)
Car	10
Walking	20
Bus	15
Taxi	5

Mode = { walking }
 succeeded (w/ effort)

(or . qualitative
 Bar . quant
 + dis.
 Circle Graphs)

TIPS: label your variables!
 The distribution (x) is the results from the survey.

Example 2: With a lot of practice, Shannon managed to get a 70% during a Spelling Bee competition. According to the distribution of the scores below, **what is the mode of this competition?**



mode = { 65% }

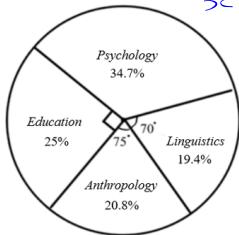
the mode (x) is the most frequent data value.

nota bene:

mode is the only central tendency you can use for a qualitative dist.

Example 3: The circle graph below describes the distribution of the fields of study of 160 social science students at Vanier College.

$x = \{ ed, psych, anth, ed \}$

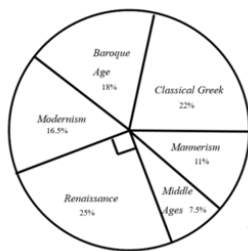


mode =

{ psychology }

You do :

Practice 1: Art history students surveyed the types of paintings found at the Louvre according to their era. What is the mode?



Mode
= Renaissance

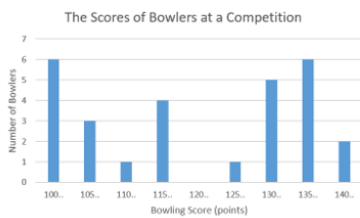
- Think
- Pair
- Share

Practice 2: Determine the mode of the following distribution:

X	Frequency
0	12
1	14
2	21
3	18
4	18
5	18

Mode
{ 3, 4, 5 }

Practice 3: The bar graph below lists the scores that participants got at an international Bowling competition. What is the mode?



↪ bi modal

Mode = { 100 points, 135 points }

Find Modal Class

given table of data grouped into classes
 • cont. quant.

Example 1: Students surveyed the heights of black cherry trees at a local orchard and presented their results in the following table:

$$x = \{ \cancel{61.5}, \cancel{76.4}, \dots \}$$



Height (ft) x	Number of Cherry Trees (Frequency)
[60, 65[	3
[65, 70[	3
[70, 75[	8
[75, 80[	10
[80, 85[	5
[85, 90[	2

m.c.
 Modal class =

[75, 80[ft

TIP.

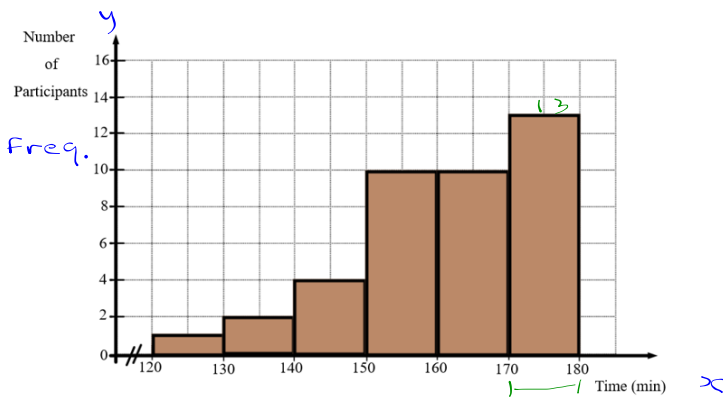
m.c. is the class w the highest frequency

Example 2: A sport analyst collected the times it took participants to complete a marathon in New York City. What is the modal class of this distribution?

Time, in minutes, it Took Each Top Participant to Run ~40 km New York City Marathon

Modal class

[170, 180[



You do pg 4
 → keep answers w partner.

Practice 1: Determine the modal class of the following distribution:

Grades	Number of Students (Frequency)
[60, 65[	17
[65, 70[	38
[70, 75[	38
[75, 80[	54
[80, 85[	54
[85, 90[	10

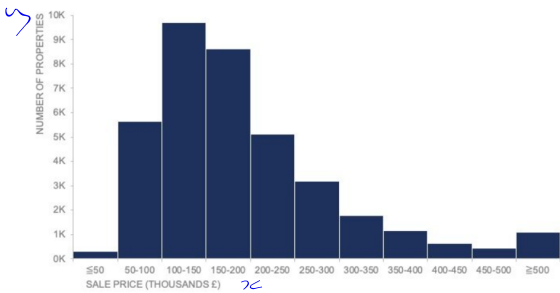
Modal Class

[75, 80[

[80, 85[

Practice 2: Economists collected data on the selling price of residential properties in the UK. What is the modal class? (source: <https://www.storytellingwithdata.com/blog/2021/1/28/histograms-and-bar-charts>)

Distribution of property sales: January 2013 to September 2019

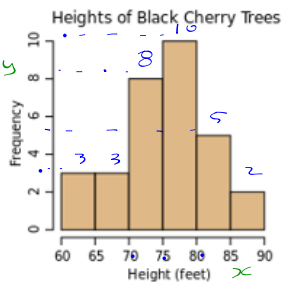


[100 - 150[(thousand of £)

Find Median Class

given: table of data grouped into classes or Histogram.
(cont. quant.)

Example 1: Students surveyed the heights of black cherry trees at a local orchard and presented their results in the below histogram. Determine the median class of this distribution of results.



x - height (ft)	y - freq	cumul freq
[60, 65[	3	3
[65, 70[	3	6 (3+3)
[70, 75[	8	14 (6+8)
[75, 80[	10	24 (14+10)
[80, 85[	5	29 (24+5)
[85, 90[	2	31 (29+2)
total :	31	

step i: make table. (same x + y variable)

step ii: create position int column + cumul freq column

PI	CF
11	### ###

(since 16th is less than 24th and move that 14th)

step iii: To find position median class

$$P = \frac{n+1}{2} \rightarrow \frac{31}{2}$$

n total freq.

$$P = \frac{31+1}{2}$$

$$P = 16^{\text{th}} \text{ position}$$

∴ med. class [75, 80[ft

You do Practice 1 - 5 mins (moving on @ 11:20pm)

Find Mean

given data table \bar{x} freq (dis. quant)

4.5 The Mean in a Condensed Data Table (Simple Frequency)

Consider the following data:

Fill out

You do 4.6

$x = \{ 1, 1, 1, 2, 2, 3, 3, 4, 4, 4, 5, 5, 5, 5, 6, 6, 6, 7, 7, 7, 7 \}$

X	Frequencies	values x freq
1	3	3
2	2	4
3	2	6
4	3	12
5	4	20
6	3	18
7	5	35
total:	22	98

Handwritten calculations for mean: $\bar{x} = \frac{3 \times 1 + 2 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + 3 \times 6 + 5 \times 7}{22} = \frac{98}{22} = 4.45$

$$\bar{x} = \frac{\text{sum of } x \cdot \text{fr.}}{\text{sum of fr}}$$

$$\bar{x} = \frac{98}{22}$$

$$\bar{x} = 4.45$$

(check that \bar{x} is data value)

What is the mean? How would we calculate the mean if the data was in a simple frequency table?

$$\bar{x} = \frac{3 \times 1 + 2 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + 3 \times 6 + 5 \times 7}{22}$$

$$\bar{x} = \frac{f_1 \times x_1 + f_2 \times x_2 + \dots + f_n \times x_n}{n} \quad n = \text{total freq}$$

$$\bar{x} = \frac{\text{sum of freq} \times x}{\text{sum of freq}}$$

$$\bar{x} = \frac{\sum_{i=1}^n f_i \times x_i}{\sum_{i=1}^n f_i} \quad f_i \text{ individual freq.}$$

$$\bar{x} = \frac{\text{sum of } x}{n}$$

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

Use table to help.

Find approximate Mean

given table of data grouped into classes or Histogram

Students surveyed the heights of black cherry trees at a local orchard and presented their results in the following table:

	Height (ft) x	Number of Cherry Trees (Frequency) y	Midpoint $(\frac{avg}{centre})$ $\frac{60+65}{2}$	mid point \times freq $\textcircled{4}$
1	60, 65	3	62.5	187.5
2	65, 70	3	67.5	202.5
3	70, 75	8	72.5	580
4	75, 80	10	77.5	775
5	80, 85	5	82.5	412.5
6	85, 90	2	87.5	175
TOTAL		31		2332.5

step i. make a table. Label x and y

step ii. Find each class' midpoint / centre. create new column.

step iii. make mid \times freq column.

step iv. find approx mean

$$\bar{x} \approx \frac{\text{sum of freq} \times \text{mid}}{\text{sum of freq}}$$

What is the estimate for the mean of this distribution?

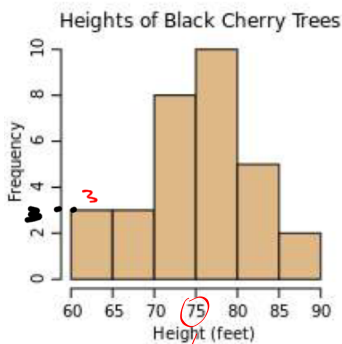
$$\bar{x} \approx \frac{2332.5}{31}$$

$$\bar{x} \approx 75.2 \text{ ft}$$

$$\bar{x} \approx$$

$$\sum_{i=1}^n (f_i \times m_i) / \sum_{i=1}^n f_i$$

m_i ind. mid points



https://commons.wikimedia.org/wiki/File:Black_cherry_tree_histogram.svg Ref.

You. Do 4.7.1

Solving For Unknowns

in a weighted average question.

WANT: unknown
TOO: 1 equation
+ solve/isolate
the unknown

	Weight	Your Results
Assignments	20% = 0.2	x
Quiz	35% = 0.35	88%
Exam	45% = 0.45	90%

Find assign.
grade

final mark 75% = weighted mean/average

(% exp. as decimal.)

$$WM = \% \times x_1 + \% \times x_2 + \% \times x_3$$

$$75 = 0.2 \cdot x + 0.35 \times 88 + 0.45 \times 90$$

$$75 = 0.2x + 30.8 + 40.5$$

$$75 = 0.2x + 71.3$$

$$\frac{3.7}{0.2} = \frac{0.2x}{0.2}$$

$$18.5\% = x$$

Pg 65
#2.10 b)

HWK:
Pg 64 #2.6 / #2.7 a)
Pg 77 #2.11 / #2.12
Pg 78-81 (not #2.16)

Per cent
100
Read
Summary
Pg 74-76
+
Pg 77

sub in value, and always simplify.
Simplify
A M S

solve/isolate x by do o.o. (opposite operations) both sides of equation

x = 18.5%