

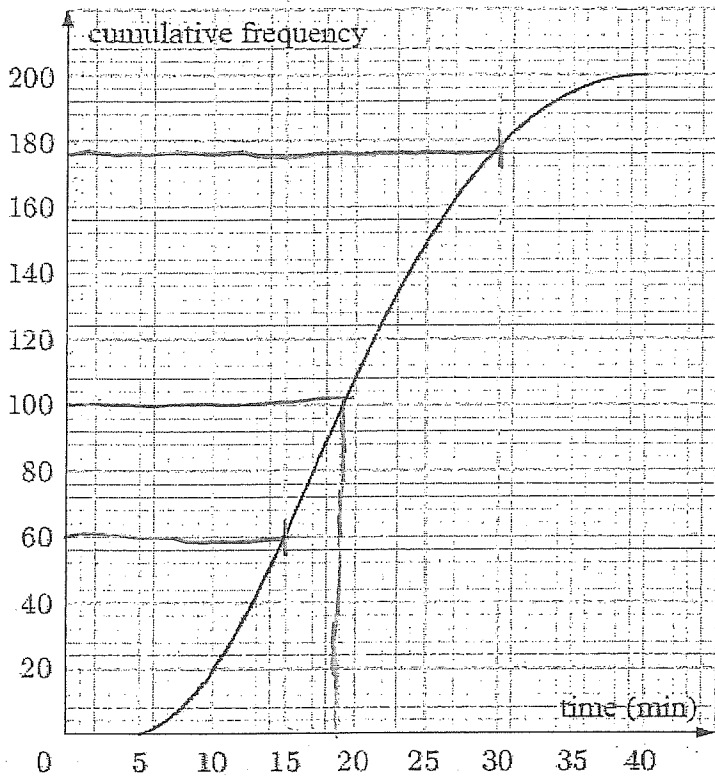
1. Estimate the mean weight of a domestic cat.

Cat Weight (lbs)	Frequency	
$0 \leq m < 4$	3	6
$4 \leq m < 8$	17	102
$8 \leq m < 12$	15	150
$12 \leq m < 16$	11	132
$16 \leq m < 20$	4	72
$20 \leq m < 24$	2	44
	52	528

$$\frac{528}{52} = 10.1516$$

average

Commute time to school



2. Use the cumulative graph to estimate a - d.
- How many students were surveyed?
200
 - How many students have a commute time less than 15 minutes?
59
 - How many students have a commute time greater than 30 minutes?
24
 - Estimate the median.
≈ 19

3. Two rooms have groups of people with different ages in years.

- Room A has a range of 18 years and an IQR of 14 years.
- Room B has a range of 18 years and an IQR of 1 years.

What conclusion could be made about the ages in the two rooms?

Room A has a more spread data set with many different ages, whereas Room B has a more condensed group of ages around the same age, with 1+ outliers. good!

Student-to-Teacher Ratios for Public Elementary and Secondary Schools (2000-2001 School Year) EAST STATES

State (East)	VT	ME	VA	NJ	WV	CT	NY	NH	MA	RI	SC	DE	GA	NC	PA	MD	FL	MN
Ratio	12.1	12.5	12.5	13.1	13.7	13.7	13.9	14.5	14.5	14.8	14.9	15.3	15.4	15.5	15.5	16.3	18.4	?

4. The mean student-to-teacher ratio is about 14.59. Determine the ratio for MN. Show work algebraically.

Sum of all ratios without MN = 246.6

$$18 \cdot 14.59 = 262.62 \text{ (sum)}$$

$$262.62 - 246.6 = 16.02$$

MN ratio = 16.02

5. a) Find the 5 Number Summary and the IQR of the state ratios above. Please include MN.

Min 12.1 Q_1 13.7 Median 14.5 Q_3 15.5 Max 18.4 IQR 1.8

b) Show your work in identifying any outliers for the data set.

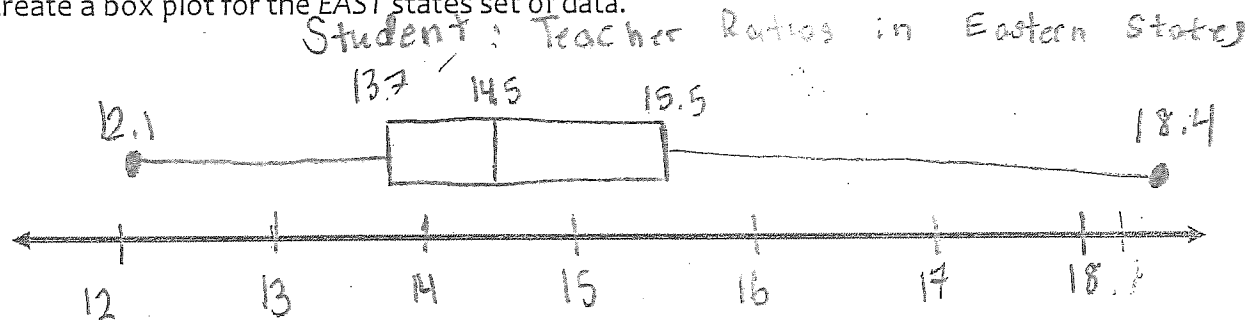
$$13.7 - 1.5(1.8) = 11.0$$

$$15.5 + 1.5(1.8) = 18.2$$

$$18.4 > 18.2$$

Florida is the sole outlier

6. Create a box plot for the EAST states set of data.



7. a) The standard deviation of the East states (including MN) is about 1.56464. Interpret its meaning:

Most states have a student to teacher ratio within 1.56464 from the average of 14.59.

b) The Department of Education is determining which states have teacher shortages. Teacher shortages occur if the state's student-to-teacher ratio is 2 or more standard deviations above the mean: $\bar{x} + 2\sigma$.

Determine which states in the data set have teacher shortages.

$$\bar{x} + 2\sigma$$

$$14.59 + 2(1.56464) = 17.719$$

18.4 > 17.719

Florida has teacher shortages

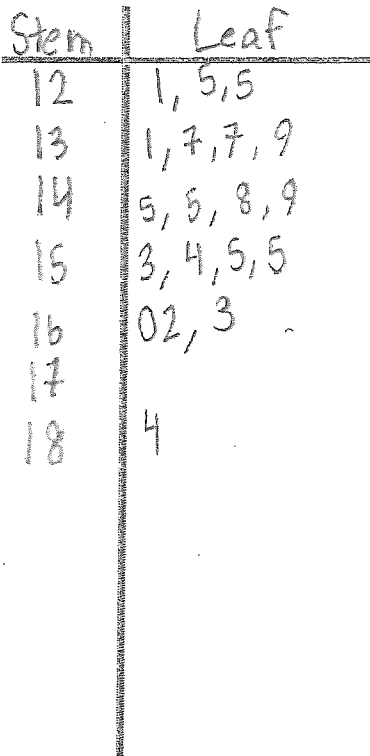
Student-to-Teacher Ratios for Public Elementary and Secondary Schools (2000-2001 School Year) EAST STATES

State (East)	VT	ME	VA	NJ	WV	CT	NY	NH	MA	RI	SC	DE	GA	NC	PA	MD	FL	MN
Ratio	12.1	12.5	12.5	13.1	13.7	13.7	13.9	14.5	14.5	14.8	14.9	15.3	15.4	15.5	15.5	16.3	18.4	?

8. a) Organize the East state data into a frequency table.

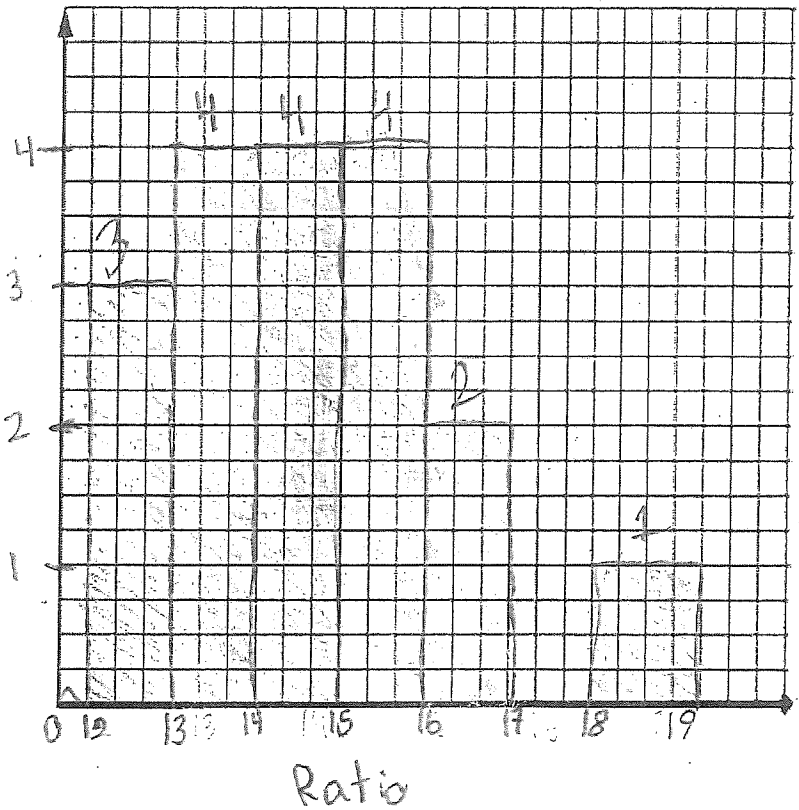
Interval	$12 \leq x < 13$	$13 \leq x < 14$	$14 \leq x < 15$	$15 \leq x < 16$	$16 \leq x < 17$	$17 \leq x < 18$	$18 \leq x < 19$		
Frequency	3	4	4	4	2	0	1		

b) Create a stem & leaf plot of the east state data. c) Use the stem and leaf plot to scale a histogram.



number of frequency

Student: Teacher ratios in eastern states



key 12:1 = 12.1

label

c) What conclusions can you make about the Eastern states' education systems? Support your conclusions with statistical measures and your displays.

Eastern states generally don't have more than 16 kids per teacher based off the data, implying there are an adequate amount of teachers. This hopefully means schools have enough better education overall (small chance it may not).

1. Estimate the mean weight of a domestic cat.

Cat Weight (lbs)	Frequency
$0 \leq m < 4$	2
$4 \leq m < 8$	6
$8 \leq m < 12$	10
$12 \leq m < 16$	14
$16 \leq m < 20$	16
$20 \leq m < 24$	11

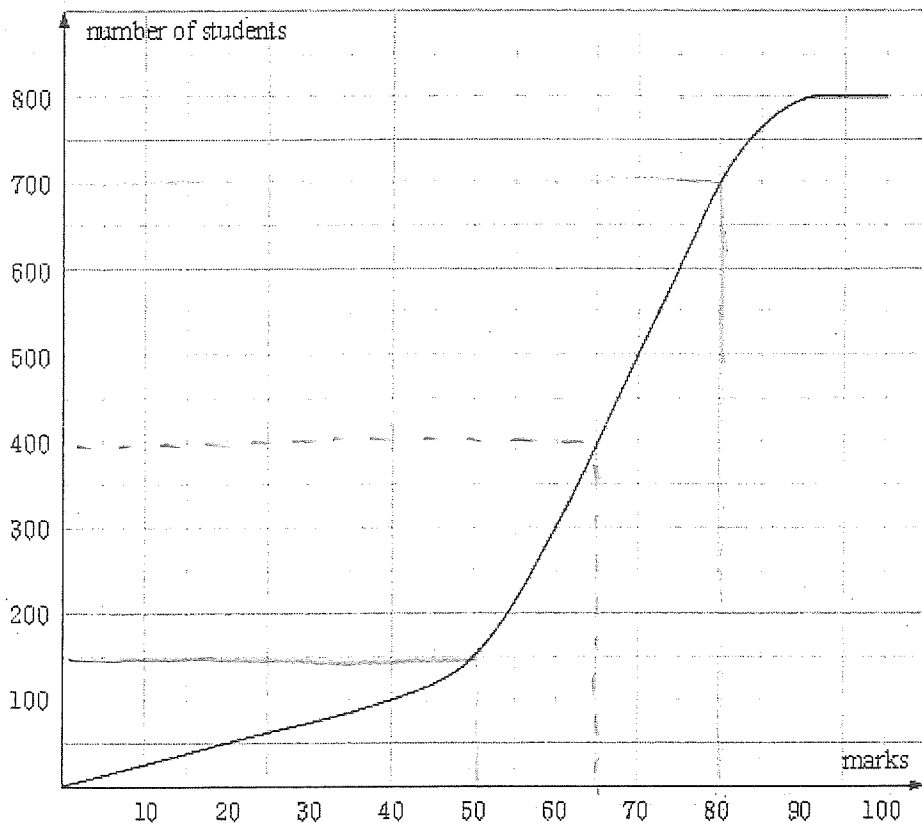
$2 + 4 + 10 + 14 + 16 + 11 = 57$ (total frequency)

$2 \times 2 = 4$
 $6 \times 4 = 24$
 $10 \times 10 = 100$
 $14 \times 14 = 196$
 $16 \times 16 = 288$
 $22 \times 11 = 242$

total: 894

$894 \div 57 = 15.68 \text{ lb}$

Recent marks of 10th and 11th graders on a recent exam:



2. Use the cumulative graph to estimate a - d.

a. How many students were surveyed?

800 students

b. How many students scored above 80 marks?

$800 - 700 = 100$

100 students

c. How many students had marks below 50?

150 students

d. Estimate the median.

65 students

3. Two rooms have groups of people with different ages in years.

- Room A has a range of 16 years and an IQR of 1 year.
- Room B has a range of 16 years and an IQR of 15 years.

What conclusion could be made about the ages in the two rooms?

Room A has data that is more compressed, with a few outliers

Room B is much more spread out so there would be a lower chance of having outliers

Student-to-Teacher Ratios for Public Elementary and Secondary Schools (2000-2001 School Year) WEST STATES

State	WY	ND	NE	SD	IA	TX	MT	NM	AK	HI	CO	ID	NV	OR	WA	CA	UT	MN
Ratio	13.3	13.4	13.6	13.7	14.3	14.8	14.9	15.2	16.9	16.9	17.3	17.9	18.6	19.4	19.7	20.6	21.9	21.9

4. The mean student-to-teacher ratio is about 16.58. Determine the ratio for MN. Show work algebraically.

$$13.3 + 13.4 + 13.6 + 13.7 + 14.3 + 14.8 + 14.9 + 15.2 + 16.9 + 17.3 + 17.9 + 18.6 + 19.4 + 19.7 + 20.6 + 21.9 = 282.4 + x$$

$$18 \left(\frac{282.4 + x}{18} \right) = (16.58) 18$$

$$282.4 + x = 298.44$$

$$x = 16.04$$

$x = 16.04$ students per 1 teacher.

5. a) Find the 5 Number Summary and the IQR of the state ratios above. Please include MN.

Min 13.3 Q_1 14.3 Median 16.47 Q_3 18.6 Max 21.9 IQR 4.3

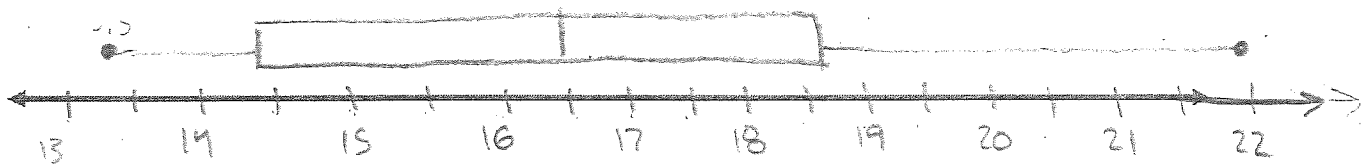
b) Show your work in identifying any outliers for the West states data set.

Outlier $< Q_1 - 1.5 IQR$
 Outlier $< 14.3 - 1.5(4.3)$
 Outlier $< 14.3 - 6.45$
 Outlier < 7.85

Outlier $> Q_3 + 1.5 IQR$
 Outlier $> 18.6 + 1.5(4.3)$
 Outlier $> 18.6 + 6.45$
 Outlier > 25.05

There are no outliers

6. Create a box plots for the WEST set of data.



Ratio of students to teachers

7. a) The standard deviation of the West states (including MN) is about 2.5838. Interpret its meaning:

On average each of the student to teacher ratios in the Western states are approximately 2.5838 students per every one teacher away from the mean student per teacher ratio of 16.58

b) The Department of Education is determining which states have teacher shortages. Teacher shortages occur if the state's student-to-teacher ratio is 2 or more standard deviations above the mean: $\bar{x} + 2\sigma$.

Determine which states in the data set have teacher shortages.

$$16.58 + 2(2.5838)$$

$$16.58 + 5.1676$$

$$21.7476$$

According to this rule, only Utah, which has a student to teacher ratio of 21.9, has a shortage of teachers.

Student-to-Teacher Ratios for Public Elementary and Secondary Schools (2000-2001 School Year) WEST STATES

State	WY	ND	NE	SD	IA	TX	MT	NM	AK	HI	CO	ID	NV	OR	WA	CA	UT	MN
Ratio	13.3	13.4	13.6	13.7	14.3	14.8	14.9	15.2	16.9	16.9	17.3	17.9	18.6	19.4	19.7	20.6	21.9	16.0

8. a) Organize the West states data into a frequency table.

Interval	$13 \leq s < 14$	$14 \leq s < 15$	$15 \leq s < 16$	$16 \leq s < 17$	$17 \leq s < 18$	$18 \leq s < 19$	$19 \leq s < 20$	$20 \leq s < 21$	$21 \leq s < 22$
Frequency	4	3	1	3	2	1	2	1	1

b) Create a stem & leaf plot of the West states data.

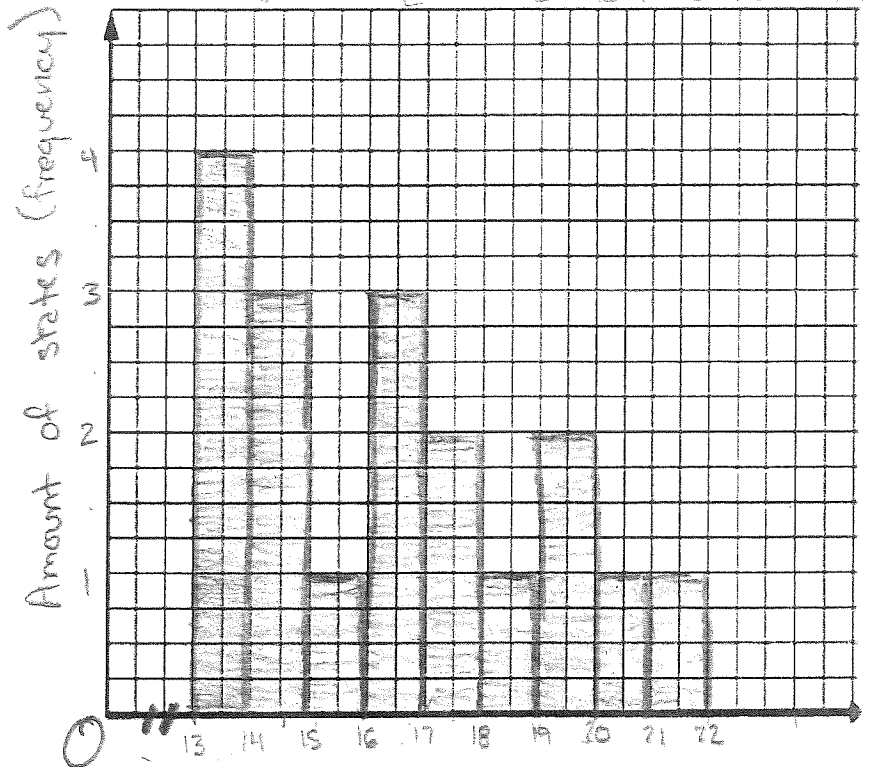
key: _____

c) Use the stem plot or frequency table to scale a histogram.

$13 \overline{) 3} = 13.3$ students per teacher
 I rounded the MN ratio (16.0) to 16

stem	leaf
13	3 4 6 7
14	3 8 9
15	2
16	0 9 9
17	3 9
18	6
19	4 7
20	6
21	9

STUDENT-TO-TEACHER RATIOS OF THE WESTERN STATES



Student to Teacher Ratios for Public Elementary and Secondary Schools in the Western States

c) What conclusions can you make about the Western states' education systems? Support your conclusions with statistical measures and your displays:

As can be seen in the histogram above, the majority of public elementary and secondary schools in the Western United States have lower amounts of students per every one teacher. We can also see this on the box plot, which shows the interquartile range being skewed towards the side of the chart maintaining low students per teacher.