

P 5

Your Turn

- (a) Each of 30 people in a stats class must categorize themselves as conservative, moderate, or liberal.
Qualitative, Nominal
- (b) The number of donuts made by a baker on Sunday morning.
Quantitative, Discrete, Ratio
- (c) The high temperatures for each day this week in degrees Celsius.
Quantitative, Continuous, Interval (zero is arbitrary and ratios are meaningless)

P 6

2. **Your Turn:** In my class I have 30 students, there are 5 rows of 6 students each. I want to select 12 students for a survey. Classify each sampling method as simple random, random but not simple random, or neither.
- (a) I put all 30 students names in a basket and randomly select 12 students.
Simple random. All students have $12/30$ chance of being selected and no samples of size 12 are favored over others.
 - (b) I randomly select two of the five rows and choose all students in each of these rows.
Random but not simple random. All students have a $2/5$ chance of being selected (random) but not all groups of 12 can be selected (not simple random).
 - (c) I randomly select one odd row and one even row and take all students in the chosen rows.
Neither. Students in an even row have a $1/2$ chance of being selected while those in an odd row have a $1/3$ chance of being selected. Not all students have the same probability of being selected and so this is not even a random sample.

P7

2. **Your Turn:** Suppose you want to gather household income information from a sample of 10 houses on North Street. The house numbers start at 1 and end at 100 without any missing house numbers.

- (a) You randomly select 5 even numbered houses and 5 odd numbered houses.
This is a stratified sample. It is random because all houses have a 1/10 chance of being selected but it is not simple random.
- (b) You take every 10th house starting at number 7.
This is a systematic sample. It is not random. For example, no even numbered houses will be selected
- (c) You group the houses as #'s 1 - 10, 11 - 20, ..., 91 - 100. You then randomly select one of these groups to be in the sample.
This is a cluster sample. It is random because every house has a 1/10 chance of being selected but it is not simple random.
- (d) You randomly select 10 numbers between 1 and 100 and select those 10 houses.
This is none of these. It is random and simple random.
- (e) You include the first 10 houses where someone answers the door.
This is convenience and not random.

P9

• **Your Turn**

- (a) Suppose there are 2200 students at the college and 1243 of them are female.
 - What is the proportion of females in the college? $\frac{1243}{2200} = 0.565$
 - What is the percentage of females in the college? $0.565 = 56.5\%$
- (b) What is 6% of 80? $0.06 \times 80 = 4.8$ What is 250% of 80? $2.5 \times 80 = 200$
- (c) You invest \$100 in a given stock. After one year it decreases by 20% then during the following year there is a 20% increase. After two years are you back to the original \$100?
Year 1: $100 - .20 \times 100 = 80$, Year 2: $80 + .20 \times 80 = 96$
You do not have your \$100 back.
- (d) US Air has a flight to New Orleans for \$372 and Continental has a flight to New Orleans for \$496. Fill in the blanks. **Round your answer to the nearest whole percentage point.**
 - With respect to the price of the US Air flight, the difference in price is %.
 - With respect to the price of the Continental flight, the difference in price is %.
 - The Continental flight costs % more than US Air.
 - The US Air flight costs % less than Continental.

The difference is $496 - 372 = 124$. With respect to US Air this is $\frac{124}{372} = .333 \rightarrow 33\%$. With respect to Continental this is $\frac{124}{496} = 0.25 \rightarrow 25\%$.

p 10

- **Your Turn:** At a given bank, the interest you **earn** in a savings account is 1.5% and the interest you **pay** on a loan is 4.5%. Categorize the following statements as True or False.
 - (a) The interest you pay is 3 times what you earn. **True.** $4.5 = 3(1.5)$
 - (b) The interest you pay is 200% more than you earn. **True.** The difference is $3 = 200\%$ of 1.5.
 - (c) The interest you pay is 300% more than you earn. **False.** It is 200% more.
 - (d) You pay 3 percentage points more than you earn. **True.**
 - (e) The interest you earn is 33.3% of what you pay. **True.** $1.5 = 1/3$ (33.3%) of 4.5
 - (f) The interest you earn is 66.7% less than what you pay. **True.** The difference is $3 = 2/3$ of 4.5.

p 22

- **Your Turn:** Calculate the mean, median, and mode of the given sample data below:

5 8 11 12 13

Mean = 9.8

Median = 11

Mode = none

- Without recalculating these averages, describe what would happen to these if the following changes to the data set were made.
 - (a) Suppose the 13 was changed to 23.
The mean would get bigger but the median (and mode) would stay the same.
 - (b) Suppose the 5 was changed to 3 and the 13 to 15.
None of the averages would change.
 - (c) Suppose the 11 was changed to 8.
The mean and median would drop. There would now be a mode = 8.

p23

- **Your Turn:** Calculate the standard deviation for the number of sales by Valerie and Carl. Before you do, speculate on how these should compare to Bob's standard deviation.

Valerie

x	$x - \bar{x}$	$(x - \bar{x})^2$
18	$18 - 10 = 8$	64
2	$2 - 10 = -8$	64
16	$16 - 10 = 6$	36
4	$4 - 10 = -6$	36
		200

$$s = \sqrt{\frac{200}{3}} \approx 8.2$$

Carl

x	$x - \bar{x}$	$(x - \bar{x})^2$
10	$10 - 10 = 0$	0
10	$10 - 10 = 0$	0
10	$10 - 10 = 0$	0
10	$10 - 10 = 0$	0
		0

$$s = \sqrt{\frac{0}{3}} = 0$$

p27

- (c) **Your Turn:** Calculate P_{75}

The index is $i = \frac{75}{100} \cdot 16 = 12$, and we must average the 12th and 13th values to get $P_{75} = 43.5$.

- (d) **Your Turn:** Calculate P_{90}

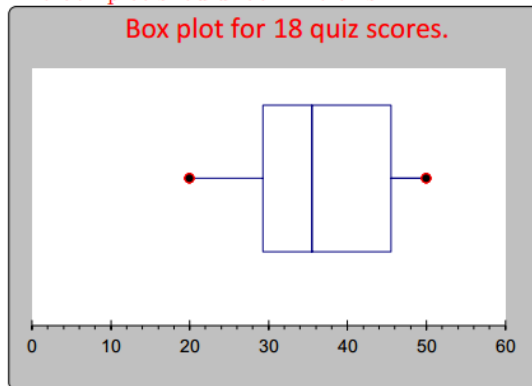
The index is given by $i = \frac{90}{100} \cdot 16 = 14.4$. Since this is not a whole number we **round up** to get $i = 15$ and $P_{90} = 48$.

p28

- **Your Turn:** Use the data below for 18 quiz scores to create the 5-number summary and sketch a box plot of the data. How does it compare to the set of 16 scores from the previous page?

index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
score	20	21	21	27	29	30	30	32	33	38	40	41	44	46	46	48	50	50

The box plot should look like this:



5-number summary

min	20
Q_1	29
Q_2	35.5
Q_3	46
max	50

p 29

Your Turn:

4-credit F & 1-credit A			
	Letter	Numerical	
Credits (w)	Grade	Grade (x)	$w \cdot x$
4	F	0.0	0.0
1	A	4.0	4.0
3	C	2.0	6.0
3	C	2.0	6.0
3	C	2.0	6.0
14			22

$$\text{GPA} = \frac{22}{14} = 1.57$$

p 31

- **Your Turn:** Professor Brown has two sections of Statistics, one in the morning and one in the afternoon. The morning section has 10 students and their average on Test #1 was 85. The afternoon section has 28 students and their average was 73. Calculate the average score on Test #1 for Professor Brown's Statistics Students.

$$\text{Prof. Brown - Weighted Average: } \bar{x} = \frac{\sum(w \cdot x)}{\sum w} = \frac{(85 \cdot 10) + (73 \cdot 28)}{38} \approx 76$$