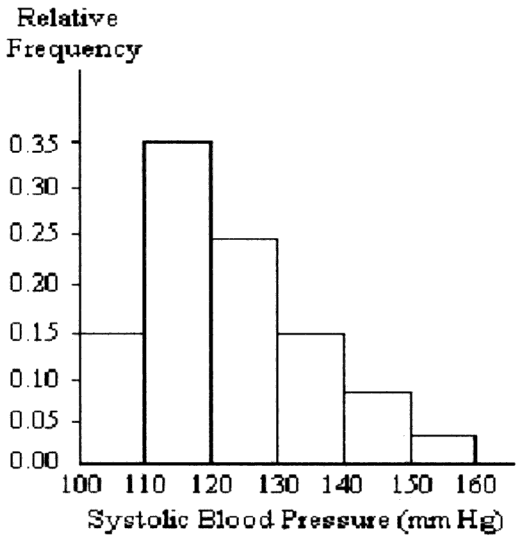
PRACTICE EXAM 1

Note: *This is not intended to be a preview of the actual exam. Rather, it is meant to give you an idea of the types of questions that will be asked. There are concepts in these review problems that will not appear on the actual exam, just as there will be concepts on the actual exam that are not covered in these review problems.*

1. Identify whether the variable is **categorical** or **quantitative**.
   a) The colors of automobiles on a used car lot. categorical
   b) The number of complaint letters received by a company. quantitative
   c) The temperature in a movie theater. quantitative

2. You are interested in the weights of backpacks BHCC students carry to class and decide to conduct a study using the backpacks carried by 30 BHCC students.
   a) Identify the **Individuals** in the study. a) backpacks
   b) Identify the **variable** being collected. b) weight
   c) Is the variable **quantitative** or **categorical**? c) quantitative
   d) What is the **sample size**? d) 30
   e) What is the implied **population** of this study? e) all BHCC backpacks

3. A nurse measured the blood pressure of each person who visited her clinic. Following is a **relative-frequency histogram** for the systolic blood pressure readings for those people aged 25 to 40. Use the histogram to answer the question.



   a) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading of at least 110 but less than 120?

   0.35

   b) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading less than 120?

   0.50

   c) Given that 200 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130?

   $(0.75)(200) = 150$ people

4. The repair costs for five cars which were crashed by a safety testing organization were as follows: \$130, \$140, \$190, \$230, and \$140. Find the **mean** cost of repair.

$$\frac{130+140+190+230+140}{5} = \$166$$

5. Attendance records at a school show the number of days each student was absent during the year. The days absent for 15 students were as follows.

0, 2, 3, 4, 2, 3, 4, 6, 7, 2, 3, 4, 6, 9, 8

a) Find the median.

0 2 2 2 3 3 3 4 4 4 6 6 7 8 9

Q_1 = 2 Q_3 = 6

4

b) Construct the **dotplot** for the given data.

$Q_1 = 2$

$Q_3 = 6$

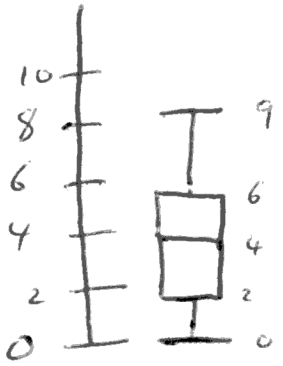
$IQR = 4$

outliers check

$2 - 1.5 \times 4 = -4$

$6 + 1.5 \times 4 = 12$

no outliers!



c) Find the mean.

$\bar{x} = 4.2$

d) Calculate the ADM

x	0	2	2	2	3	3	3	4	4	4	6	6	7	8	9
Distance from Mean	4.2	2.2	2.2	2.2	1.2	1.2	1.2	0.2	0.2	0.2	1.8	1.8	2.8	3.8	4.8

add these

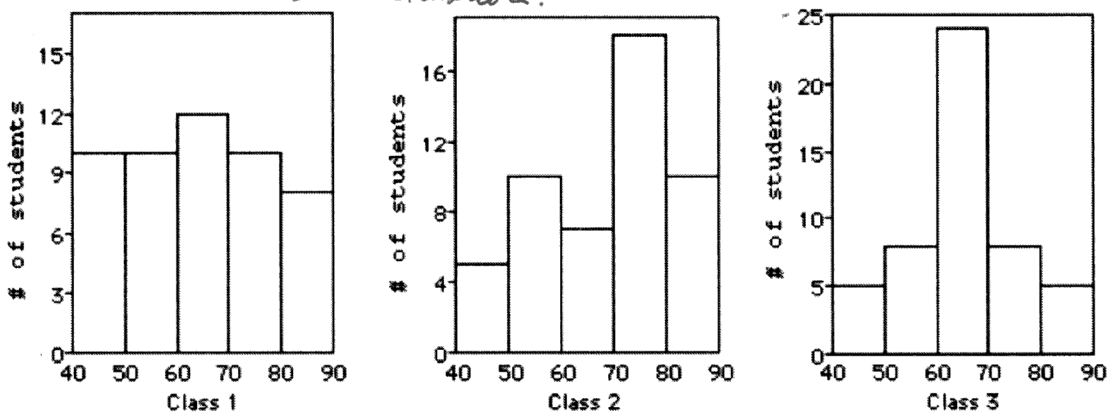
30

$\frac{30}{15} = 2$

ADM = 2

6. Three statistics classes (each of 50 students) took the same test. Shown below are histograms of the scores for the classes. Which class had the smallest standard deviation? ~~Which class had the largest standard deviation~~? How do you know?

Bad Question!



Class 3 has smallest because many students scored similarly (60-70)

~~Class 1 has largest because~~ Bad question!

7. The test scores of 32 students are listed below. Construct a **boxplot** for the data.

32 37 41 44 46 48 53 55
57 57 59 63 65 66 68 69
70 71 74 74 75 77 78 79
81 82 83 86 89 92 95 99

$Q_1 = 56$

$Med = 69.5$

$Q_3 = 80$

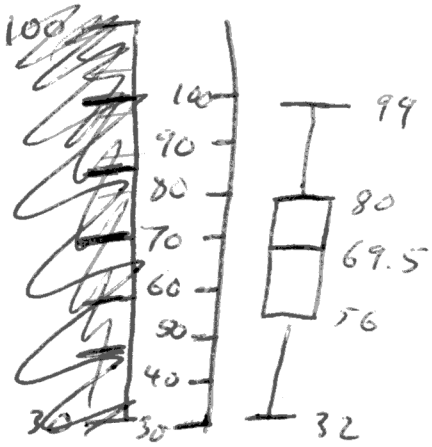
$IQR = 24$

check for outliers

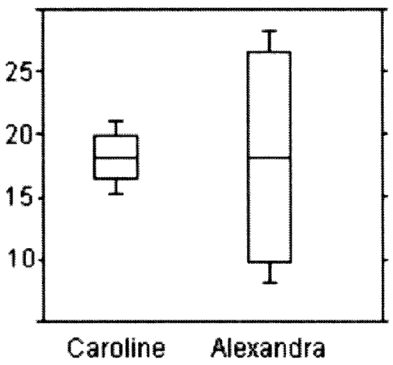
$Q_1 - 1.5 \cdot IQR = 20$

$Q_3 + 1.5 \cdot IQR = 116$

no outliers



8. Here are boxplots of the points scored during the first 10 games of the basketball season for both Caroline and Alexandra. Summarize the similarities and differences in their performance so far. Use shape, center, range, typical range and any other data for your summary.

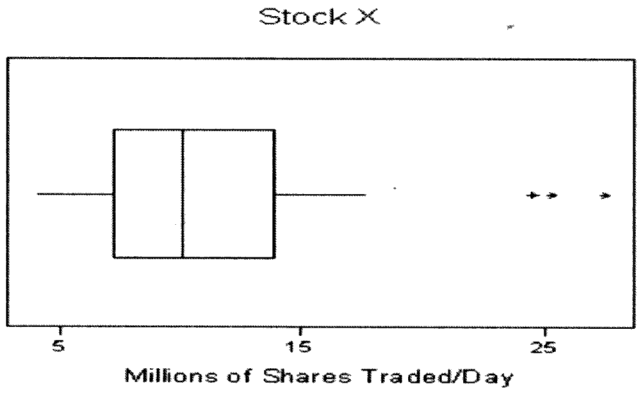


Both symmetric

Same median (center)

Alexandria has larger range (spread)

9. The box plot below represents the volume of stock X traded for a random sample of 35 trading days. The volume of a stock is the number of shares traded on a given day.



a) Approximately, what is the median for this dataset?

10 million shares per day

b) Are there any potential outliers in this dataset? If so, how many?

Yes, 3.

c) Describe the shape of the distribution. Would the standard deviation or the interquartile range be a better measure of spread for this dataset? Explain.

Skew right. IQR is better for skewed distributions; it is more robust to outliers.

10. Christine is currently taking college astronomy. The instructor often gives quizzes. On the past seven quizzes, Christine got the following scores.

51, 17, 59, 27, 13, 42, 72

Use a calculator to find the **mean** and **standard deviation** for the given data. Round your final answer to one more decimal place than that used for the observations. Then find the **typical range** using the formula **mean** ± **SD**.

$$\bar{x} = \frac{51+17+59+27+13+42+72}{7} = 40.14 \approx 40.1$$

use calculator...

$$s_x = 22.12 \approx 22.1$$

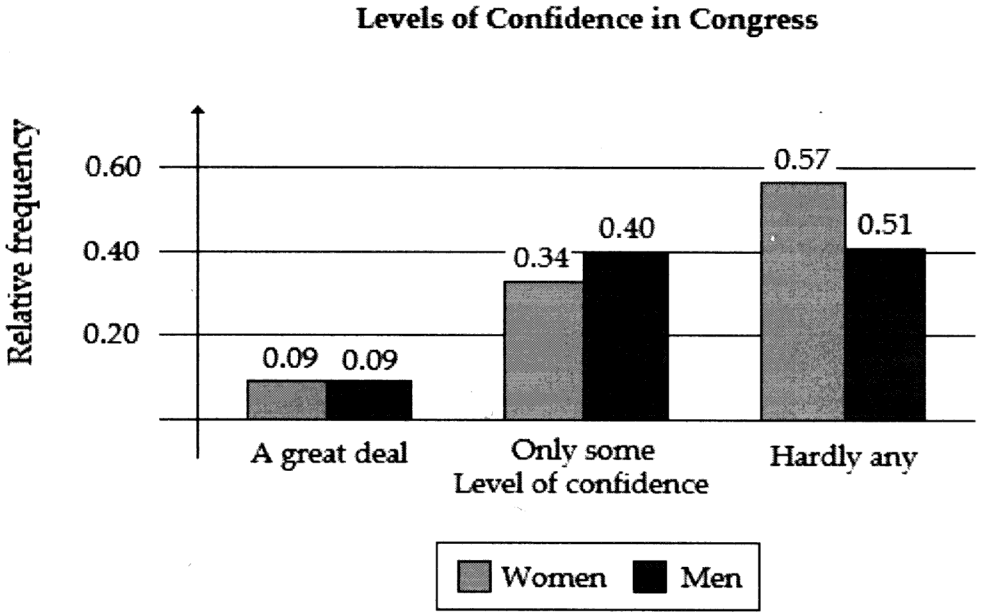
$$\text{typical range} = [18.02, 62.27] \approx [18.0, 62.2]$$

 Name Key

Practice Exam 2: Module 5 & 6

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

631 women and 725 men were asked how much confidence they had in Congress. The results of the survey are described by the multiple bar graph.



1) What proportion of women surveyed did NOT have a great deal of confidence in Congress? 1) B
A) 0.43 B) 0.91 C) 0.57 D) 0.34

2) How many men had only some confidence in Congress? $(0.4)(725) = 290$ 2) C
A) 215 B) 247 C) 290 D) 370

Express the indicated degree of likelihood as a probability value.

3) "It will definitely turn dark tonight." 3) C
A) 0.67 B) 0.30 C) 1 D) 0.5

Find the indicated probability.

4) A class consists of 50 women and 21 men. If a student is randomly selected, what is the probability that the student is a woman? 4) B

A) $\frac{1}{71}$ B) $\frac{50}{71}$ C) $\frac{50}{21}$ D) $\frac{21}{71}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

For a) – d) identify each probability as Marginal, Conditional, or Joint. Then find the probability as a decimal rounded to the nearest tenth place.

5) The managers of a corporation were surveyed to determine the background that leads to a successful manager. Each manager was rated as being either a good, fair, or poor manager by his/her boss. The manager's educational background was also noted. The data appear below. 5) Key

Educational Background

Manager Rating	H. S. Degree	Some College	College Degree	Master's or Ph.D.	Totals
Good	5	6	24	4	39
Fair	8	18	44	17	87
Poor	3	2	1	28	34
Totals	16	26	69	49	160

a) What is the probability that a manager has a College Degree?

marginal $\frac{69}{160}$ or $\frac{118}{160}$ depending on your interpretation

0.4 0.7

b) Given that a manager is only a fair manager, what is the probability that this manager has no college background?

$\frac{8}{87}$ conditional 0.1

c) What is the probability that a someone is a poor manager, given the he or she has a college degree?

either $\frac{1}{69}$ or $\frac{29}{160}$ conditional

0.0 0.2

d) What is the probability that a manager has a poor rating and has a college degree?

Joint $\frac{1}{160}$ or $\frac{29}{160}$

0.0 or 0.2

6) **For a) – f) identify each probability as Marginal, Conditional, or Joint. Then find the probability as a decimal rounded to the nearest tenth place.** 6) _____

The table lists the drinking habits of a group of college students.

Sex	Non-drinker	Regular Drinker	Heavy Drinker	Total
Man	135	49	5	189
Woman	187	21	6	214
Total	322	70	11	403

a) Find the probability of getting someone who is a non-drinker. Round your answer to three decimal places.

Marginal, $\frac{322}{403} = 0.799$

b) Find the probability of getting someone who is a regular or heavy drinker. Round your answer to three decimal places.

Marginal/disjoint $\frac{81}{403} = 0.201$

c) Given that someone is a non-drinker, what is the probability that person is a woman?

Conditional $\frac{187}{322} = 0.581$

d) Given that someone is a woman, what is the probability that she is a heavy drinker?

Conditional $\frac{6}{214} = 0.028$

e) Given that someone is a man, what is the probability that he is a heavy drinker?

Conditional $\frac{5}{189} = 0.026$

f) Based on the calculations, are men or women more likely to be heavy drinkers in college?

I guess women, but those proportions are close, and I bet the difference could be due to chance.

7) The number of golf balls ordered by customers of a pro shop has the following probability distribution. 7) _____

x	P(x)	x·P(x)
3	0.14	0.42
6	0.29	1.74
9	0.36	3.24
12	0.11	1.32
15	0.10	1.5

a) What is the probability that a customer will order 6 golf balls?

0.29

b) What is the probability that a customer will order 9 or more golf balls?

$0.36 + 0.11 + 0.1 = 0.57$

c) Find the mean of the given probability distribution. Use the formula $\mu = \Sigma x \cdot P(x)$

$\Sigma x \cdot P(x) = 0.42 + 1.74 + 3.24 + 1.32 + 1.5 = 8.22$

8) Find the mean. 8) _____

x	P(x)	x·P(x)
0	0.26	0
1	0.11	0.11
2	0.16	0.32
3	0.05	0.15
4	0.42	1.68

$\Sigma x \cdot P(x) = 2.26$

9) There are 8 members on a board of directors. If they must form a subcommittee of 6 members, how many different subcommittees are possible? 9) _____

10) There are 6 members on a board of directors. If they must elect a chairperson, secretary, and a treasurer, how many different slates of candidates are possible? 10) _____