

$$\text{Formulas: } Z = \frac{x - \mu}{\sigma} \quad \sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$$

Section 5.5

1. Complete each of the following statements:

- A) A positive z-score indicates that a data value lies ABOVE the mean.  
 B) A negative z-score indicates that a data value lies BELOW the mean.  
 C) When a z-score is 0.5000, the data value is the same as the mean.

2. Max sells his house in Edmonton for \$392 000 and purchases a house in Calgary for \$417 000. The mean and standard deviation for houses in each city are shown below:

City	$\mu$ (\$)	$\sigma$ (\$)
Edmonton	375 000	75 000
Calgary	415 000	80 000

Determine the z-scores for the data above and use it to determine which house has the greater relative value.

$$\text{Edmonton } z = \frac{392 - 375}{75}$$

$$z = 0.23$$

$$\therefore \% \Rightarrow$$

$$\text{Calgary } z = \frac{417 - 415}{80}$$

$$= 0.03$$

$$\therefore \% =$$

3. Running shoes lose their shock-absorption after a mean distance of 640 km, with a standard deviation of 160 km. Quinn is a recreational runner. He plans to replace his running shoes when 70% of people would replace their shoes. After how many kilometers should he replace his running shoes?

$$70\% = z \text{ SCORE OF } 0.52$$

$$\therefore \frac{x - 640}{160} = 0.52$$

\* cross multiply

$$x - 640 = 160(0.52)$$

$$x - 640 = 83.2$$

$$x = 83.2 + 640 = 723.2 \quad 723 \text{ km.}$$

So, Replace  
SHOES AFTER

4. The Congo African Greg parrot species has an average life expectancy of 50 years, with a standard deviation of 8 years. What is the likelihood that a bird of this species will live more than 60 years?

$$z = \frac{60 - 50}{8}$$

89% will live LESS THAN  
60 YEARS.

$$z = 1.25$$

So 100% - 89% = 11% will live

$$\therefore \% = 89\%$$

1 more than 60 YEARS.

5. The average playing time of a defense player in the NHL is 17.2 minutes per game with a standard deviation of 2.2 minutes. What is the probability that a defense player will play between 15.6 and 19.2 minutes?

$$\frac{15.6 - 17.2}{2.2} = -0.73 \qquad \frac{19.2 - 17.2}{2.2} = 0.91$$

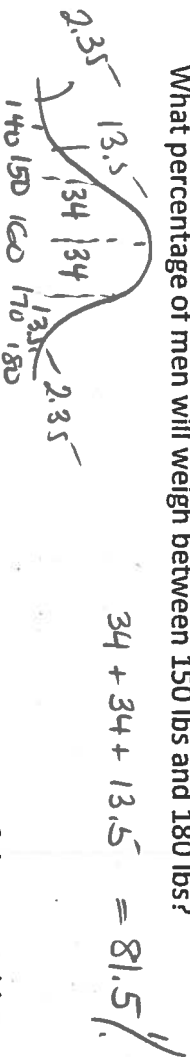
$$\therefore 23\% \qquad \therefore 82\%$$

So between 15.6 to 19.2 is 82% - 23% = 59%

Section 5.4

6. The average weight of men between the ages of 30 and 45 is normally distributed with a mean weight of 160 lbs and a standard deviation of 10 lbs.

- A) What percentage of men will weigh between 150 lbs and 180 lbs?



$$34 + 34 + 13.5 = 81.5\%$$

- B) If 10 000 men were in the 30-45 age category, how many of them would weigh more than 190 lbs?

MORE THAN 190 IS 0.15%

$$SO \quad 10000 \times .0015 = 15$$

7. Judy always waits until her gas tank is nearly empty before refuelling. She keeps track of the distance she drives on each tank of gas. The distance varies depending on the weather and the amount she drives on the highway. The distance has a mean of 824 km and a standard deviation of 28 km.

- A) Sketch a labelled normal curve to show the distribution of the driving distances for a tank of gas.



- B) What percent of the time does Judy drive between 796 km and 852 km on a tank of gas?

$$34 + 34 = 68\%$$

- C) What percent of the time does she drive between 740 km and 796 km on a tank of gas?

$$2.35 + 13.5 = 15.85\%$$

- D) Between what two values will she drive 95% of the time?

$$768 - 880$$

Section 5.3

8. Sports Illustrated is doing a story on the variation of player heights on NBA basketball teams. The heights, in cm, of the players on the starting line ups for two basketball teams are given below.

Lakers	195	195	210	182	205
Celtics	193	208	195	182	180

The team with the most variation in height will be selected for the cover of Sports Illustrated magazine. Which team will appear on the cover? (Hint: Find their standard deviations to compare.)

LAKERS

$$195 \quad 197.4 \quad 195 - 197.4 = (-2.4)^2 =$$

$$195 \quad 197.4 \quad 195 - 197.4 =$$

$$210 \quad 197.4 \quad 210 - 197.4 =$$

$$182 \quad 197.4 \quad 182 - 197.4 =$$

$$205 \quad 197.4 \quad 205 - 197.4 =$$

2

8. (Continued)



Section 5.2

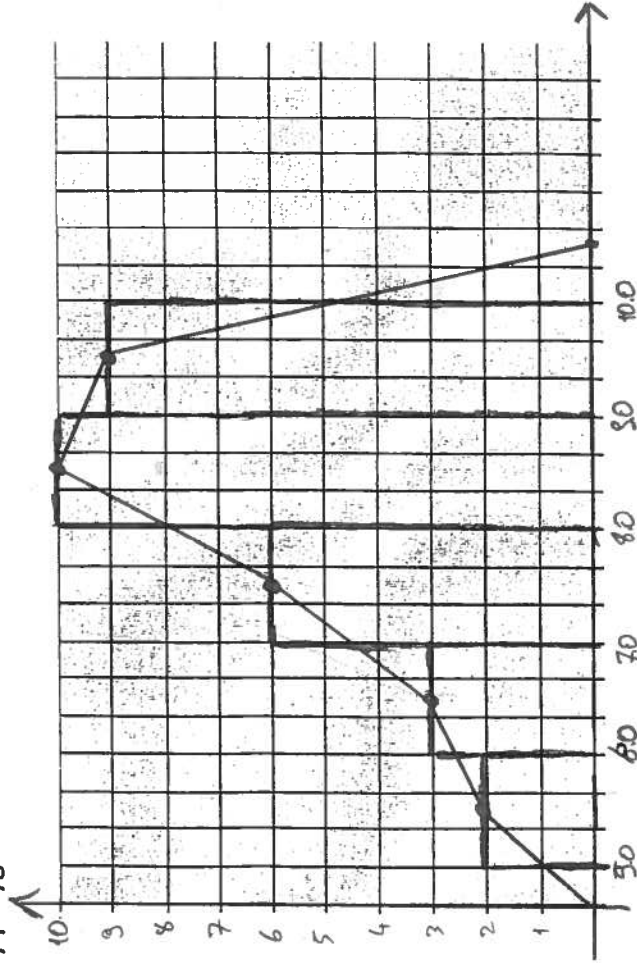
9. The Canadian figure skating team wanted to examine the results from 30 of their recent performances. The judges' results are recorded below:

- ~~8.7~~ ~~5.6~~ ~~7.2~~ ~~9.1~~ ~~8.5~~ ~~7.9~~
- ~~8.0~~ ~~9.4~~ ~~7.1~~ ~~6.3~~ ~~8.0~~ ~~7.7~~
- ~~8.5~~ ~~9.2~~ ~~9.8~~ ~~8.2~~ ~~9.1~~ ~~6.6~~
- ~~9.4~~ ~~8.4~~ ~~7.9~~ ~~8.5~~ ~~9.4~~ ~~6.8~~
- ~~9.7~~ ~~8.3~~ ~~7.9~~ ~~5.8~~ ~~9.6~~ ~~8.2~~

A) Choose a suitable interval width and construct a frequency table for the data.

<u>INTERVAL</u>	<u>FREQUENCY</u>
5.0 — 6.0	→ 2
6.0 — 7.0	→ 3
7.0 — 8.0	→ 6
8.0 — 9.0	→ 10
9.0 — 10.0	→ 9

B) Draw a histogram and frequency polygon.



- C) Describe the distribution of the data (ie. Clustered, spread out, ...)

Section 5.1

10. The following data represents the height of 9 trees. Which one of the following statements is TRUE?

~~3.3~~ m, ~~2.6~~ m, ~~8.5~~ m, ~~6.8~~ m, ~~5.3~~ m, ~~9.4~~ m, ~~6.3~~ m, ~~5.9~~ m, ~~6.8~~ m

- A) The mode of the data is 6.3 m

2.6 3.3 5.3 5.9 6.3 6.4 6.8 8.5 9.4

- B) The median of the data is 5.3 m

- C) The range of data is 3.5 m

$$\text{Mean} = \frac{54.9}{9} = \underline{\underline{6.1}}$$

- D) The mean of the data is 6.1 m

11. Calculate the range for each set of data. Why is this value alone misleading for this situation?

Group A: 8, 13, 13, 14, 14, 14, 15, 15, 20      Range = 20 - 8 = 12

Group B: 7, 7, 8, 9, 11, 13, 15, 15, 17, 18      Range = 18 - 7 = 11

12. Which measure of central tendency is most affected by outliers?

Mean