

Year 10 Term 2 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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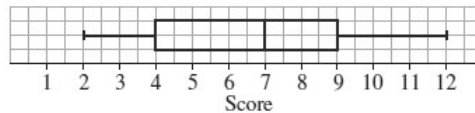
7 Year 10 Term 2 Week 7 Homework

7.1 Data analysis and evaluation

7.1.1 The interquartile range

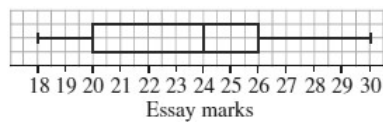
Exercise 7.1.1

1. For the box-and-whisker plot shown below, write down:



- (a) the lowest and highest scores _____
- (b) the range _____
- (c) the median _____
- (d) the lower and upper quartiles _____
- (e) the interquartile range _____

2. This box-and-whisker plot shows the essay marks obtained by a large group of Year 10 students.



- (a) Find the percentage of marks that lie between:
 - i. 18 and 20 _____
 - ii. 20 and 26 _____
 - iii. 20 and 30 _____

(b) If there are 28 students in the class, find the number of students who scored a mark between 26 and 30.

3. Consider the scores 5, 6, 7, 7, 8, 10, 13, 15, 20 Find the median and the interquartile range.

7.1.2 The standard deviation**Exercise 7.1.2**

1. The maximum daily temperatures ($^{\circ}$) recorded in a city over a period of time is given below:
25, 24, 27, 28, 26, 30, 28, 25, 29, 30, 31, 34, 32, 30, 26, 23, 24, 26, 30, 27.

(a) Find the range of the temperatures. _____

(b) Find the interquartile range of the temperatures.

(c) Find the standard deviation, correct to a decimal place. _____

(d) What would be the most appropriate measures of spread for these temperatures?

2. Consider the scores 5, 7, 7, 10, 12, 15, 15, 17, 19.

(a) Find the standard deviation of the following scores, correct to 1 decimal place.

(b) If an outlier of 40 was included, what effect do you think this would have on the standard deviation?

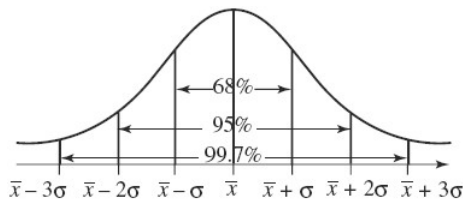
3. Consider the score 1, 2, 3, 4, 5, 6, 7.

(a) Find the mean and standard deviation of the scores.

(b) If each score was increased by 2, what effect would this have on the mean and standard deviation?

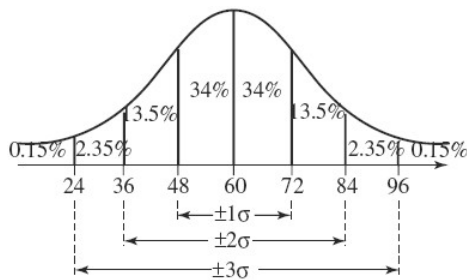
(c) If each score was multiplied by 2, what effect would this have on the mean and standard deviation?

7.1.3 The normal distribution



- approximately 68% of the scores lie within 1 standard deviation either side of the mean.
- approximately 95% of the scores lie within 2 standard deviations either side of mean.
- approximately 99.7% of the scores lie within 3 standard deviations either side of the mean.

Example 7.1.1 For a set of marks (out of 100), the mean is 60 and the standard deviation is 12. If the distribution of the marks is normal, find the percentage of students that should have scored a mark between:



1. 48 and 72 equal to 68%
2. 36 and 84 equal to 95%
3. 24 and 96 equal to 99.7%
4. 60 and 72 equal to 34%
5. 36 and 48 equal to 13.5%
6. 84 and 100 equal to 2.5%

Exercise 7.1.3 The mean (\bar{x}) of a set of scores is 68 and the standard deviation (σ_n) is 12. Find:

1. $\bar{x} - 2\sigma$ _____
2. $\bar{x} + \frac{2}{3}\sigma$ _____
3. $\bar{x} - \frac{1}{4}\sigma$ _____
4. $\bar{x} + \frac{5}{6}\sigma$ _____

Exercise 7.1.4 Further applications

1. Anna scored 61 on her music practical. Her mark was two standard deviations below the class mean 78. What is the standard deviation?

2. A teacher decides that the pass mark in his course will be two standard deviations below the mean. Anna's final mark after two assignments and an exam is 45. If the mean is 65 and the standard deviation is 10.5, determine whether Anna will pass the course.

3. The mean of a set of scores is 60 and the standard deviation is 12. Would the mean and standard deviation increase or stay the same if the following scores were taken out of the set?

(a) 40 _____

(b) 60 _____

(c) 90 _____

4. The mean of a set of scores is 60 and the standard deviation is 12. Would the mean and standard deviation increase or stay the same if the following scores were added of the set?

(a) 40 _____

(b) 60 _____

(c) 90 _____

5. Tom scored 58 on a math test, which was 1 standard deviation below the mean. On the same test, George scored 76, which was two standard deviations above the mean.

(a) What was the standard deviation?

(b) What is the mean score?

(c) Cathy's mark was $1\frac{1}{2}$ standard deviation above the mean. What is her mark?

(d) John's mark was 2 standard deviations below the mean. What was his mark?

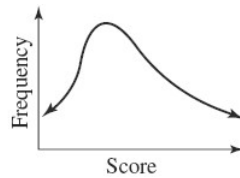
6. Linda scored 50 on a test in which the average was 65, the standard deviation was 7.5 and the marks were normally distributed.

(a) What percentage of students in the year had a lower mark than Linda?

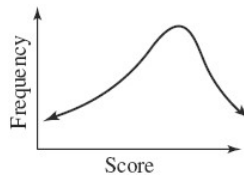
(b) Is it likely that any student scored a mark of 95 or more on this test? Why?

7.1.4 The shape of a distribution

- A distribution is symmetrical if the scores are spread evenly about the mean.
- If a distribution is not symmetrical then it is said to be **skewed**.
- If most of the scores in a distribution are relatively low, then the distribution is positively skewed.



- If most of the scores in a distribution are relatively high, then the distribution is negatively skewed.



Exercise 7.1.5

1. State whether each distribution is symmetrical, positively skewed or negatively skewed.

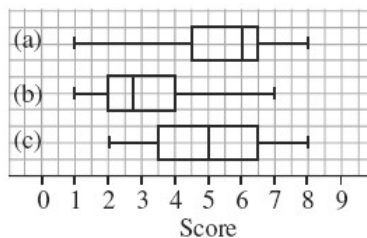
a

Stem	Leaf
1	2 5
2	0 1 4
3	3 4 7
4	1 3 6 7 8 9
5	0 2 4 5 6 6 7 8
6	4 5 5 6 9 9

b

Stem	Leaf
10	4 5
11	1 2 4 6
12	0 5 6 6 7 9
13	3 3 8 9
14	2 6 7

2. Describe the shape of the distribution represented by each of these box-and-whisker plots.



(a) _____

(b) _____

(c) _____