

Year 8 Term 2 Homework

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

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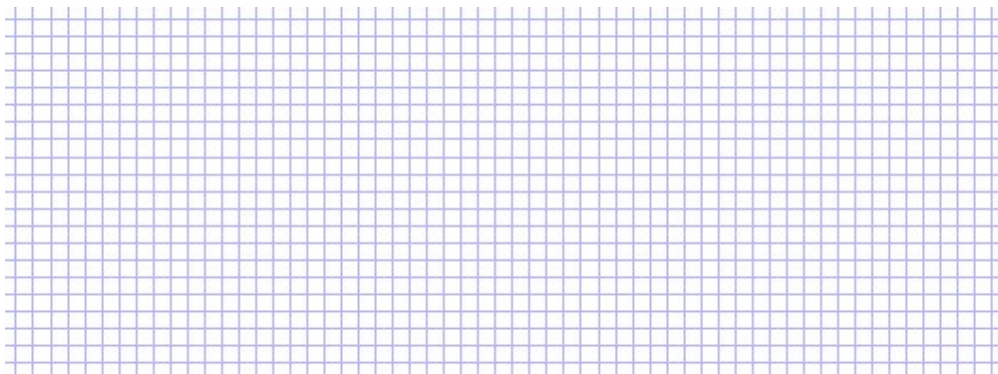
3 Year 8 Term 2 Week 3 Homework

3.1 Reading Tables

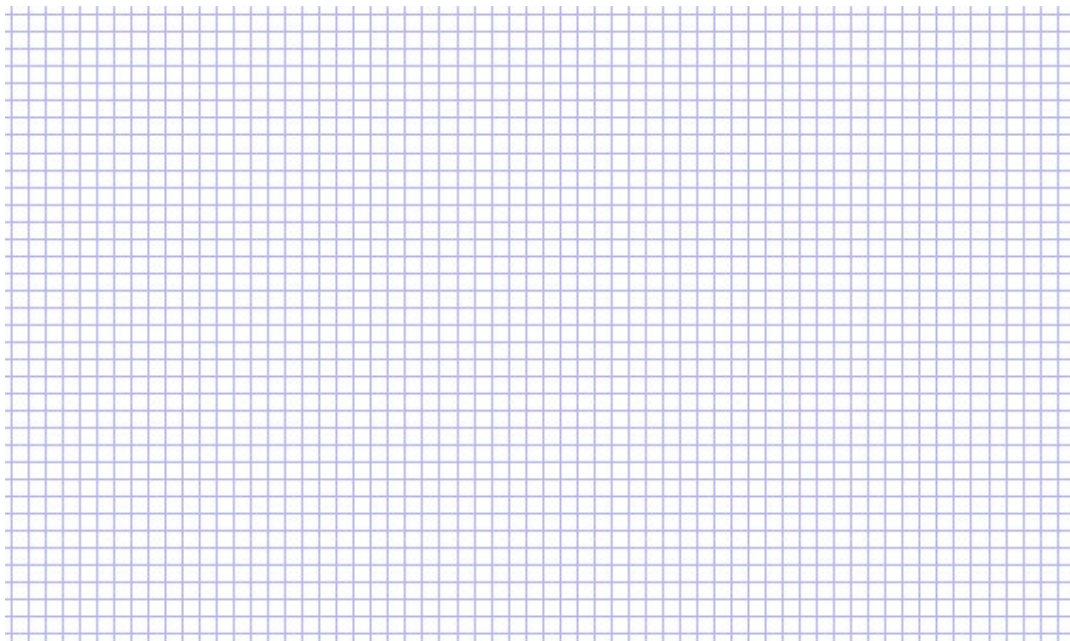
Exercise 3.1.1 The advanced and Intermediate Maths students in Year 8 were given a common test to assess their numeracy skills. Their results are shown in the table below:

Mark range (%)	1 – 20	21 – 40	41 – 60	61 – 80	81 – 100
Advanced	1	4	8	13	7
Intermediate	4	12	22	9	3

1. Show this data in the form of a side-by-side column graph with the Intermediate students in the left-hand column.



2. Show the data in the form of a stacked column graph with the Intermediate students in the bottom section of each column.



3.2 Organising Data

It is difficult to make sense of a large amount of data that has been collected. In order to make judgements about the data it must first be organised in some meaningful way. By arranging the data into a graph or table, we can instantly make out detail such as the highest and the lowest scores and the score that occurs the most.

3.2.1 The frequency distribution table

The frequency distribution table is often the first step in organising a set of data. In a frequency distribution table:

- The score column shows the possible scores.
- The tally column is used to enter the scores into the table one at a time.
- The frequency indicates the number of times each score occurs.
- The total of the frequencies is sometimes written at the base of the frequency column.

Example 3.2.1 A die was rolled 20 times and the numbers were recorded below:

1 1 2 2 2 2 3 3 3 3 4 4 4 4 4 4 5 5 5 6

Organise this data into:

1. a frequency distribution table.
2. a frequency histogram
3. a frequency polygon.

Score	Tally	Frequency
1		2
2		4
3		4
4		6
5		3
6		1
Total =		20

3.2.2 The frequency histogram

The frequency histogram is a type of column graph. In a frequency histogram:

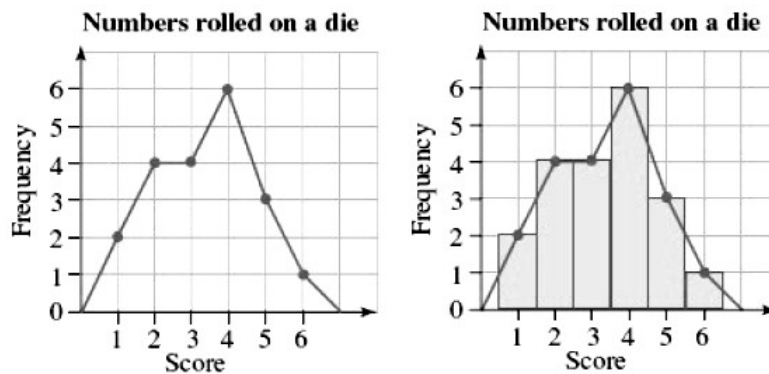
- The scores are placed along the horizontal axis and the frequencies are placed along the vertical axis.
- The columns straddle the scores and are drawn next to each other.
- There is a half-column space on the horizontal axis before the first column.



3.2.3 The frequency polygon

The frequency polygon is a type of line graph. In a frequency polygon:

- The scores are placed along the horizontal axis and the frequencies are placed along the vertical axis.
- The polygon begins and ends on the horizontal axis.
- The first score is marked one full unit away from the vertical axis.



Note: the area under the histogram is equal to the area under polygon.

Exercise 3.2.1 As part of the quality-control process in a match factory, 30 boxes of matches were opened and the contents counted. The number of matches in each box is given below:

48 53 50 51 49 50 51 52 51 49
 51 50 52 49 53 50 49 48 51 50
 49 50 51 49 48 53 52 50 50 51

1. Organise this data into a frequency distribution table.

<i>Matches</i>	<i>Tally</i>	<i>Frequency</i>
	<i>Total =</i>	

2. How many boxes contained exactly 50 matches?

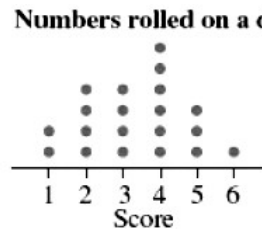
3. What is the greatest number of matches in any box?

4. How many boxes contained less than 50 matches?

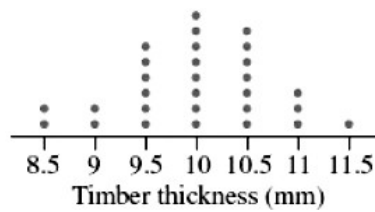
3.2.4 The dot plot

The dot plot is a simpler version of the histogram. It is only useful for small numbers of scores since one dot represents a single score. In a dot plot:

- The scores are placed along the horizontal axis.
- One dot is placed above the score in a vertical line each time that score occurs.



Exercise 3.2.2 This dot plot shows the thickness in millimetres of lengths of pre-cut timber.



1. To what thickness do you think the timber should have been cut?

2. Are there any clusters in the data?

3. Are there any outliers?

4. The timber will be rejected at the quality control stage if its thickness is more 1 mm outside the ideal thick (10 mm). How many pieces of timber will be rejected?

3.2.5 Stem-and-leaf Plots

A stem-and leaf plot is similar to a histogram that has been drawn on its side, except that the columns are made up of digits.

- The first part of each number in the data is called the stem
- The remaining part of the number is called the leaf.

Exercise 3.2.3 The following stem and leaf plot shows the maths' exam scores for a group of Year 8 students.

<i>Stem</i>	<i>Leaf</i>
4	1 2 2 4 8 9
5	0 2 4 5
6	2 2 3 5 6 6
7	0 4 4 6 8
8	0 1 3 5
9	2 3 6

1. What was the highest mark?

2. How many students sat the exam?

3. How many students failed if the pass mark was 50?

4. Find the average exam score, correct to 1 decimal place.

Exercise 3.2.4 The number of points scored per game by a women’s netball team are listed below:

75 77 78 80 82 84 84 85 87 87 88 88 89 90 92 94 95 96 97 98

1. Show this information on a stem-and-leaf with class intervals of 5.

<i>Stem</i>	<i>Leaf</i>

2. In what percentage of games did the team score 90 points or more?

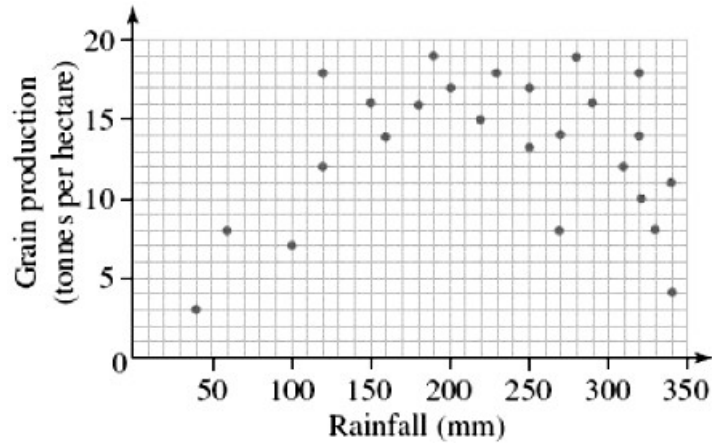
Exercise 3.2.5 Redraw this stem-and-leaf plot with class intervals of 5 and hence find the difference between the highest and lowest scores

<i>Stem</i>	<i>Leaf</i>
1	2 3 3 4 5 6 6 7 7 9
2	0 0 1 1 3 6 7 7 8 9
3	1 2 3 4 6 7 8 8 9 9

<i>Stem</i>	<i>Leaf</i>

3.3 Miscellaneous Exercises

Exercise 3.3.1 The scatter diagram compares a farm’s grain production, in tonnes per hectare, to the amount of rain that fell during the growing season, in millimetres, for the last 25 years.



1. In how many years was the rainfall more than 200 mm?

2. What was the highest grain return in this 25-year period?

3. What was the lowest grain return? What do you think may have caused this low return?

4. What was the second lowest grain return? What do you think may have caused this low return?

5. Describe the relationship that this scatter diagram shows between the level of grain production and rainfall.

Exercise 3.3.2 Solve the following simultaneous equations

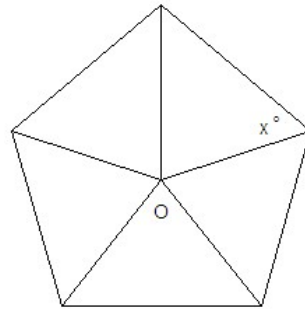
1. $7x + 3y = 8$
 $4x - y = -9$

2. $4x - 3y = -3$
 $5x + 2y = 25$

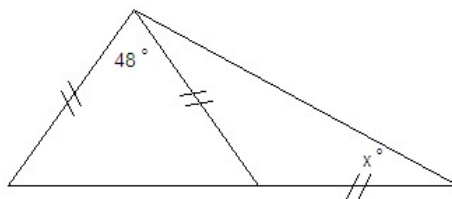
3. $4x - 3y = -1$
 $2x + 3y = 13$

4. *Rectangle ABCD is twice as long and four times as wide as rectangle MNOP. Find the dimensions of each rectangle, if their perimeters are 48 cm and 20 cm respectively.*

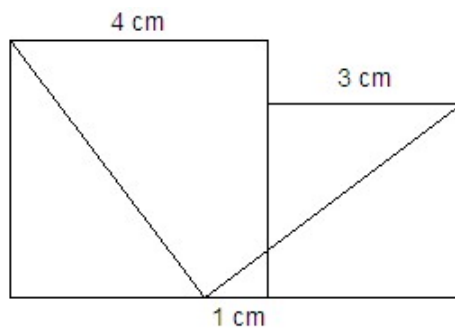
Exercise 3.3.3 The diagram not drawn to scale shows a regular pentagon with its centre at o. Find the size of the angle x.



Exercise 3.3.4 Find the angle x:



Exercise 3.3.5 These two squares have been cut into five pieces. The pieces can be rearranged to make a large square. Find the perimeter of the large square.



Exercise 3.3.6 The following data recorded a group of 18 boys and 18 girls in a math topic test:

Boys	86	45	38	90	68	75	73	79	89	86	91	83	69	78	80	66	53	51
Girls	61	47	32	59	69	79	85	89	94	84	87	78	80	82	89	52	48	74

1. Organise this data into a two-sided stem-and-leaf plot.

<i>Leaf</i>	<i>Stem</i>	<i>Leaf</i>

2. What is the highest mark?

3. What is the lowest mark?

4. How many students passed the exam if the pass mark was 50?

5. Do boys or girls have the higher average score?

6. Find the average exam score, correct to 1 decimal place.

Exercise 3.3.7

1. Tony and Mike have a bicycle race. Tony cycles at a speed of 12 km/h. Mike cycles at a speed of 16 km/h. If Mike lets Tony start 40 min before him, how long will Mike take to catch up with Tony?

2. Peter travelled from Town A to Town B which was 560 km away. for the first 450 km of the journey, he drove at a speed of 90 km/h. He then reduced his speed by 55 km/h and completed the rest of the journey. What was his average speed for the whole journey?

3. Express the following as a single fraction in its simplest form.

$$\frac{3}{2x-3} - \frac{2}{6-4x}$$

4. Given $x = \frac{ay}{a+y}$, express y in terms of x and a

Exercise 3.3.8 Simplify the following expression:

1. $\frac{3x}{2} - \frac{x}{7}$

2. $(2x + x)^3$

3. $12a^3d^2 \div 4ab^2$

4. $(a + 3)^2 - (a - 3)^2$

Exercise 3.3.9 The distance a stone falls in metres is given by the formula $d = \frac{1}{2}gt^2$ where $g = 9.8$ and t is the number of seconds. How far will it fall in 9 seconds, correct to 1 decimal.
