Year 8 Term 2 Homework

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

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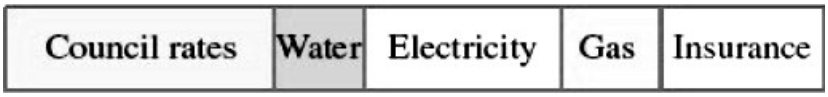
This edition was printed on June 20, 2014 with worked solutions.
Camera ready copy was prepared with the **LaTeX2e** typesetting system.

2 Year 8 Term 2 Week 2 Homework

2.1 Topic 1 — Divided Bar Graph

Exercise 2.1.1 This divided bar graph shows some of the household costs for one year.



1. *Which was the lowest expense?*

2. *Which was the greatest expense?*

3. *The total expenditure for all 5 services was exactly $4000. How much was spent on:*

   (a) *electricity?*

   (b) *gas?*

   (c) *insurance?*

4. *What percentage of the total expenditure was spent in insurance?*

2.2 Topic 2 — Reading Tables

Exercise 2.2.1 This table shows seven subjects' marks for six students

Name	English	Maths	Science	History	Computing	Music	Art	PE
Alia	81	60	51	91	70	71	85	73
Barry	57	66	72	71	65	75	63	85
Christine	71	75	70	82	75	59	68	74
Darag	75	69	68	77	80	66	59	72
Effie	83	87	85	79	81	74	72	78
Fieros	66	57	61	71	79	60	80	81

1. *What was Alia's Music mark?* _____
2. *Who scored highest in PE?*

   _____
3. *Who scored highest in Science?*

   _____
4. *What was Darag's best subject?*

   _____
5. *What was Fieros' best subject?*

   _____
6. *Which subject had the lowest mark?*

   _____
7. *Which subject had the highest mark?*

   _____
8. *Who would you judge to be the strongest student overall?*

   _____

Parcel charges

Weight	Air	Economy	Sea
■ Zone NZ			
Up to 250 g	$4.50	$4.00	—
Over 250 g up to 500 g	$7.50	$6.50	—
Over 500 g up to 750 g	$10.00	$8.50	—
Over 750 g up to 1 kg	$12.50	$10.50	—
Over 1 kg up to 1.25 kg	$15.00	$12.50	—
Over 1.25 kg up to 1.5 kg	$17.50	$14.50	—
Over 1.5 kg up to 1.75 kg	$20.00	$16.50	—
Over 1.75 kg up to 2 kg	$22.50	$18.50	—
Extra 500 g or part thereof	$2.50	$2.00	—
■ Zone 1, 2 and 3			
Up to 250 g	$5.50	$5.00	—
Over 250 g up to 500 g	$9.50	$8.00	—
Over 500 g up to 750 g	$13.00	$11.00	—
Over 750 g up to 1 kg	$16.50	$14.00	—
Over 1 kg up to 1.25 kg	$20.00	$17.00	—
Over 1.25 kg up to 1.5 kg	$23.50	$20.00	—
Over 1.5 kg up to 1.75 kg	$27.00	$23.00	—
Over 1.75 kg up to 2 kg	$30.50	$26.00	—
Extra 500 g or part thereof	$4.00	$3.00	—
■ Zone 4			
Up to 250 g	$6.50	$5.50	$5.00
Over 250 g up to 500 g	$11.50	$9.00	$8.00
Over 500 g up to 750 g	$16.00	$12.50	$11.00
Over 750 g up to 1 kg	$20.50	$16.00	$14.00
Over 1 kg up to 1.25 kg	$25.00	$19.50	$17.00
Over 1.25 kg up to 1.5 kg	$29.50	$23.00	$20.00
Over 1.5 kg up to 1.75 kg	$34.00	$26.50	$23.00
Over 1.75 kg up to 2 kg	$38.50	$30.00	$26.00
Extra 500 g or part thereof	$6.00	$4.00	$3.00
■ Zone 5			
Up to 250 g	$7.50	$6.00	$5.00
Over 250 g up to 500 g	$13.00	$10.00	$8.00
Over 500 g up to 750 g	$18.50	$14.00	$11.00
Over 750 g up to 1 kg	$24.00	$18.00	$14.00
Over 1 kg up to 1.25 kg	$29.50	$22.00	$17.00
Over 1.25 kg up to 1.5 kg	$35.00	$26.00	$20.00
Over 1.5 kg up to 1.75 kg	$40.50	$30.00	$23.00
Over 1.75 kg up to 2 kg	$46.00	$34.00	$26.00
Extra 500 g or part thereof	$7.50	$5.00	$3.00

Destination	Zone
Argentina	5
Canada	4
China	3
France	5
Indonesia	2
Italy	4
Japan	3
Malaysia	2
Netherlands	5
New Caledonia	1
New Zealand	NZ
Papua New Guinea	1
Saudi Arabia	4
South Africa	5
United Kingdom	5

1. Find the cost of sending a parcel weighing 600 g to New Zealand by air.

2. How much would it cost to send a 1.5 kg parcel by sea to South Africa?

3. How many of the countries listed could receive parcel by sea?

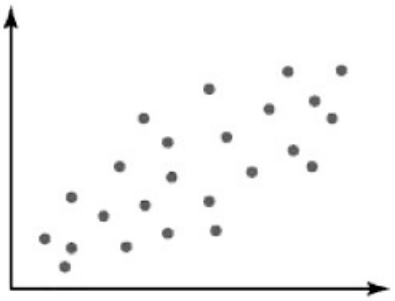
4. Susan sent a parcel by economy freight to Indonesia and paid $23. What was the maximum weight of her parcel?

2.3 Topic 3 — Scatter Diagrams

A scatter diagram is a graph made up of separate points plotted on a number plane. Each point gives the value of two different variables, such as the height of a tree and its age. One value is measured against the horizontal axis and the other value is measured against the vertical axis.

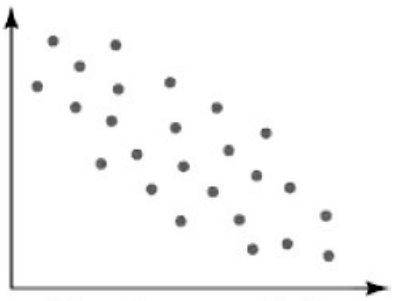
2.3.1 Correlation

- **Correlation:** The study of how strongly two variables are related to each other is called correlations.
- **Positive correlation:** If a scatter diagram consists of points that trend upwards from left to right, then as one variable increases the other variable also increase, we say that the variable has a **positive correlation**.



Positive correlation

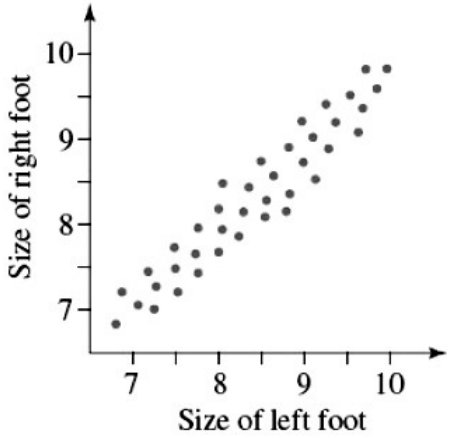
- **Negative correlation:** If a scatter diagram consists of points that trend downwards from left to right, then as one variable increases the other variable decreases, we say that the variable has a **negative correlation**.



Negative correlation

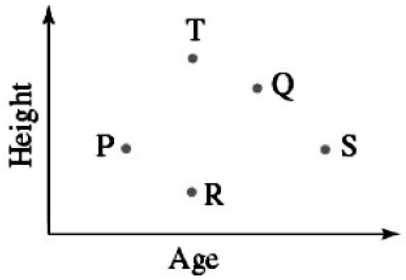
Example 2.3.1 The following scatter diagram shows the relationship between the size of the left and right feet of a number of individuals.

Solution: *Clearly there is a strong correlation between these two variables; however, the size of a person's left foot is not caused by the size of their right foot. Can you think of another situation in which there may be a strong correlation between two variables, yet one variables has no direct effect on the other?*



Note: Although the data in a scatter diagram may suggest a strong relationship between two variables, it does not automatically follow that one variable is some way affects or causes the other.

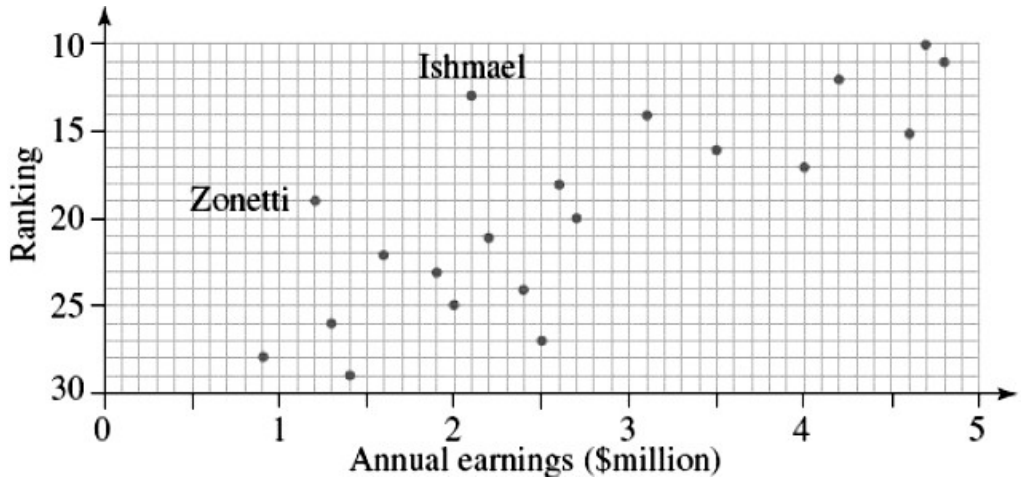
Exercise 2.3.1 The scatter diagram shows the ages and heights of 5 people.



1. *Which two people are the same height?*

2. *Which 2 people are the same age?*

Exercise 2.3.2 This scatter diagram shows the final ranking and total annual earning for a group of professional tennis players.



1. *What prize money was earned by the player ranked 20?*

2. *What was the ranking of the player who earned $2,600,000?*

3. *How many of these players earned more than $3,000,000?*

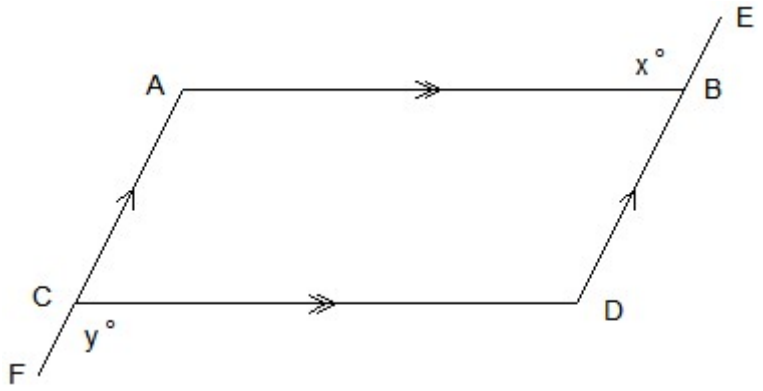
4. *Two high-ranking players Ishmael and Zonetti both earned much less than they would have expected. Can you suggest a reason why this might have occurred?*

5. *The scale on the vertical axis representing the players' ranking is marked in an unusual way, with the larger numbers closer to the bottom of the graph. Why would this be the case?*

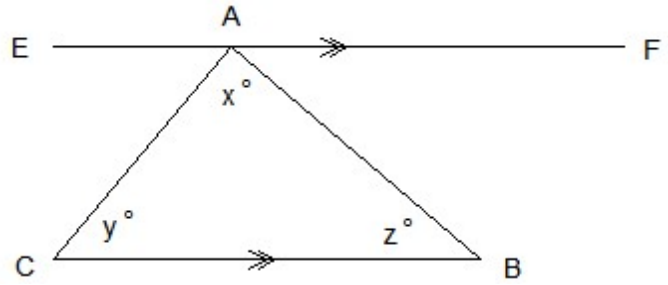
6. *What relationship can you see between the players' final ranking and total prize money earned?*

2.4 Topic 4 — Non-numerical Geometry

Exercise 2.4.1 In the figure, $AB//CD$ **and** $AC//BD$**.** $\angle ABE = x^o$ **and** $\angle DCF = y^o$**. Prove that** $x = y$**.**

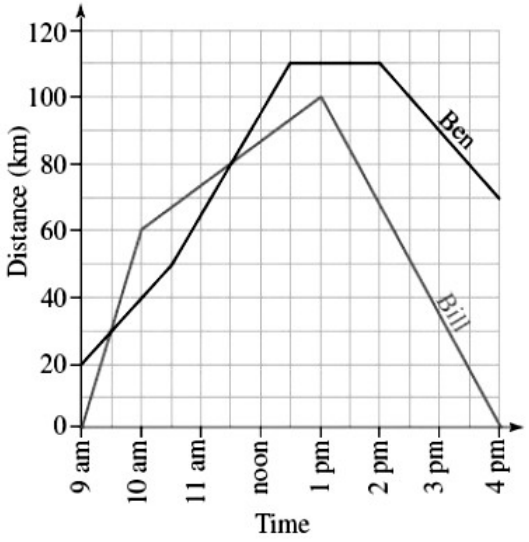


Exercise 2.4.2 In the diagram, $BC//EF$**,** $\angle ABC = z^o$**,** $\angle ACB = y^o$ **and** $\angle CAB = x^o$**.**
Prove that $x^o + y^o + z^o = 180^o$



2.5 Miscellaneous Exercises

Exercise 2.5.1 Bill and Ben are two travelling salesmen. The graph shows the distance of each man from his home at various times during the day.



1. *How far apart do the two men live?*

2. *At what times during the day did they pass each other?*

3. *How far apart are they at 2:30 pm?*

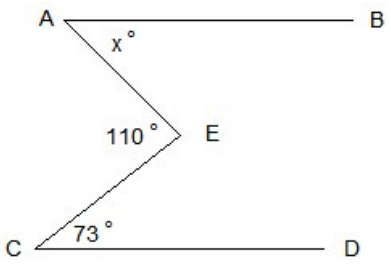
4. *How far is Ben from home when Bill has travelled 60 km?*

5. *How far did each man travel altogether?*

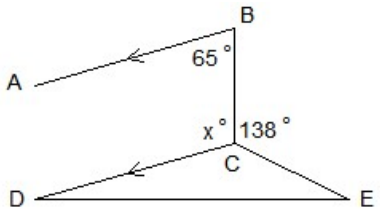
6. *Calculate each man's average speed during the day, correct to 1 decimal place.*

Exercise 2.5.2 In each of the following cases, evaluate the pronumeral, giving a brief reason:

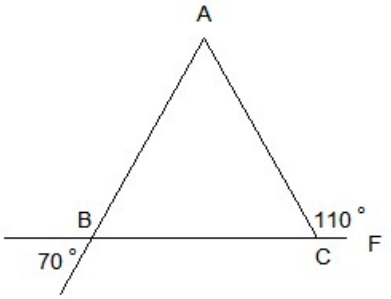
1. $x =$ _____



2. $x =$ _____

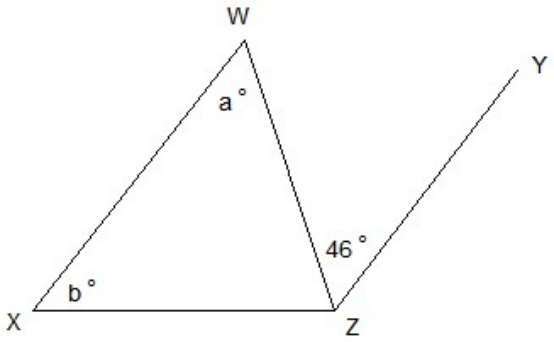


Exercise 2.5.3 In the diagram, Prove that $AB = AC$

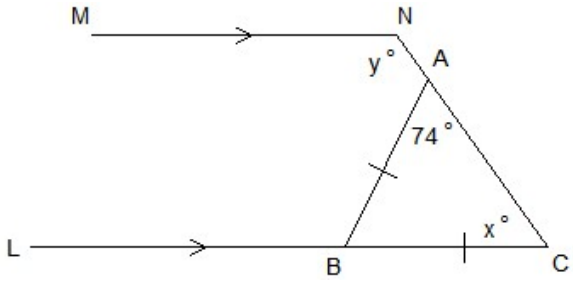


Exercise 2.5.4 Find the value of the pronumeral in each of these, giving reasons.

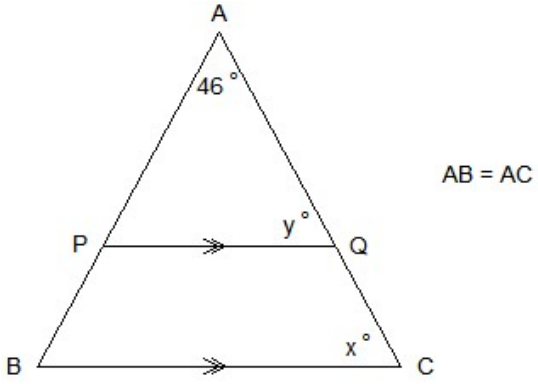
1. *If WX//YZ and XZ = WZ, find a =* _____ *, b =* _____



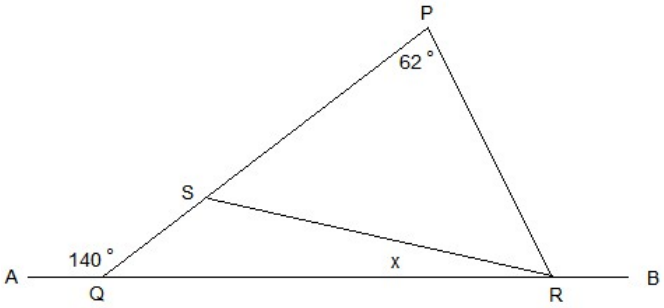
2. *x =* _____ *, y =* _____ *,*



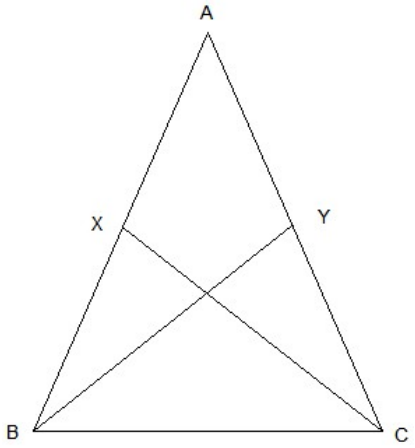
3. *x =* _____ *, y =* _____ *,*



Exercise 2.5.5 In this diagram, $\angle PQA = 140^o$**,** $\angle QPR = 62^o$ **and** $SP = RP$**. Find x.**



Exercise 2.5.6 $\triangle$ **ABC is an isosceles triangle and** $AB = AC$**. X is the midpoint of AB and Y is the midpoint AC. Prove** $\angle XCB = \angle YBC$**.**



Exercise 2.5.7

1. *Find the LCM of 2205 and 1400.*

2. *Joe, Daniel and George register the following average times when running around the school oval: Joe 1 minute, 30 seconds, Daniel 1 minute, 40 seconds and George 1 minute 45 seconds. If they all start at the same time from the same place, how long will it be in minutes and seconds before they part the starting point together?*

3. *A printer can print 15 pages in the first minute and 20 pages every minute thereafter. Find a formula for the number of pages the printer can printer in M minutes and hence find the number of minutes it will take for the printer to print 500 pages.*

4. *A large rectangle is divided into four non-overlapping smaller rectangles by two perpendicular lines. The area of three of the smaller rectangles are* $18cm^2$, $24\,cm^2$ *and* $30\,cm^2$. *Find the integer solution for the area of the fourth small rectangle.*

5. *Simplify* $\frac{x+y}{4} - \frac{5x-2y}{3}$

2.6 Recurring Decimals

Terminating decimal: terminating decimal is an rational number that can be written as a fraction with a power of 10 as the denominator.
Recurring decimal: recurring decimal can be written as a fraction.
Method: If the cycle length is n, multiply by 10^n and subtract.

Example 2.6.1 Write each recurring decimal as a fraction in lowest terms:

1. $0.\dot{1}\dot{8}$

Solution: *Let* $x = 0.\dot{1}\dot{8}$, *then* $x = 0.18181818...$
Multiply both sides by 100: $100x = 18.181818...$
Subtract $100x$ *by* x, $\Rightarrow$ $99x = 18$
$\therefore x = \frac{18}{99} = \frac{2}{11}$

2. $0.2\dot{1}$

Solution: *Let* $x = 0.2\dot{1}$, *then* $x = 0.211111...$
$10x = 2.1111..$ *and* $100x = 21.1111..$
$100x - 10x = 19$, $\Rightarrow$ $90x = 19$
$\therefore x = \frac{19}{90}$

3. $2.3\dot{4}8\dot{6}$

Solution: *Let* $x = 2.3\dot{4}8\dot{6}$, *then*$x = 2.3486486...$
$10x = 23.486486...,$ *and* $10000x = 23486.486486...$
$10000x - 10x = 23486 - 23$, $\Rightarrow 9990x = 23463$
$\therefore x = \frac{23463}{9990} = 2\frac{129}{370}$

Exercise 2.6.1

1. $0.\dot{7}\dot{5}$

2. $6.5\dot{3}$

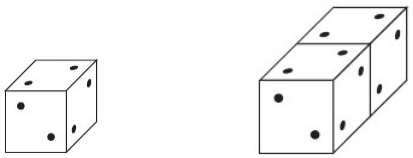
3. $2.3\dot{4}\dot{5}$

4. $1.13\dot{8}$

5. $1.\dot{0}3\dot{5}$

2.7 Maths challenge

Exercise 2.7.1 If we place two dots on each face of a cube, there will be 12 dots on the outer surface. If two cubes are joined as shown, the number of dots on the outer surface will be 20.



1. *Five cubes are joined in a single line. How many dots will there be on the outer surface?*

2. *How many dots will there be on the outer surface of n cubes joined in the same way?*

3. *How many cubes, joined in the same way, are needed if there are to be 148 dots on the outer surface?*

Exercise 2.7.2 Factorise the following expressions:

1. $4x^2 - 4x + 1$

2. $3x^3 - x^2 + 3x - 1$

3. $8x^2 - 2xy - 6y^2$