Year 8 Term 2 Homework

Student Name: ____________	Grade: ____________
Date: ____________	Score: ____________

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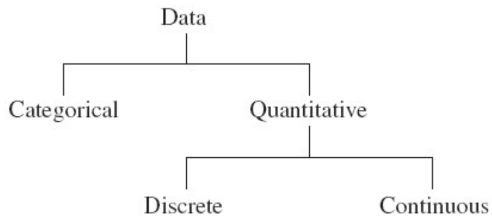
1 Year 8 Term 2 Week 1 Homework

1.1 Classifying Data (Review)

The diagram below shows how variables may be classified as either categorical or quantitative. Quantitative variables can then be further classified as either discrete or continuous.



- A categorical variable is a variable that describes a category of group of things. It can not be counted or measured. For example, nationality occupation and sport.
- A quantitative variable is a variable that has a numerical value. For example, length, area and age.
- A discrete variable is a quantitative variable that has an exact value and usually arises after counting has occurred. For example, hat size and number of people.
- A continuous variable is a quantitative variable that can assume any value between certain limits. For example, height, weight and speed.

Exercise 1.1.1 Classify the following data as either categorical (C), discrete quantitative (DQ) or continuous quantitative (CQ).

1. *the number of classrooms in a school* ______
2. *eye colour* ______
3. *the height of a tree* ______
4. *the average speed of a family car* ______
5. *a person's IQ* ______
6. *ice-cream flavours* ______
7. *capacity of a swimming pool* ______
8. *age of an ancient clock* ______
9. *the frequency of a signal* ______
10. *number of hairs on a human head* ______

1.2 Reading and Interpreting Graphs

There are many different graphs than can be drawn to represent data. Some of the more common graphs are the column graph, line graph, sector graph, bar graph, divided bar graph and picture graph. In a divided bar graph:

- A rectangle or bar is divided into small rectangle or sections.
- The length of each section is in proportion to the value of the data that is represented.
- The value of the data in each section is found by measuring the length of the section then comparing it to the length of the whole rectangle.
- A scale may sometimes be given.

Exercise 1.2.1 This graph shows the sale of 80 animals at Peta's Pets.

1. *Express the pet sales as percentages.*

2. *How many cats were sold?*

3. *How many more dogs were sold than mice?*

4. *What is the scale for this graph? (answer in the form _____ mm represents 1 pet.)*

1.3 Reading Tables

There are several reasons why raw unordered data is best organised into the form of a table:

- A great deal of information can be presented in a compact space.
- Specific information is made easier to find.
- Trends or relationships between variables can be seen by looking along the rows or down the columns.
- Graphs are easier to draw using tabulated data than unordered data.

Exercise 1.3.1 The table below shows the distance between some of the major suburbs in NSW.

	Wollongong	Tamworth	Sydney	Newcastle	Goulburn	Dubbo	Canberra	Broken Hill	Bathurst	Albury
Albury	505	865	560	695	365	530	345	865	445	•
Bathurst	235	430	200	325	185	205	275	960	•	
Broken Hill	1195	1025	1160	1130	1100	750	1080	•		
Canberra	225	705	285	415	90	380	•			
Dubbo	445	335	405	375	350	•				
Goulburn	140	570	195	325	•					
Newcastle	235	275	150	•						
Sydney	80	395	•							
Tamworth	475	•								
Wollongong	•									

1. *What is the distance between Goulburn and Broken Hill?* ________________

2. *Which town is 445 km from Albury?* ________________

3. *Which towns are 335 km apart?* ________________

4. *At what average speed would a motorist have to travel to drive from Sydney to Canberra in 3 hours?*

Exercise 1.3.2 The table details the attendance at meetings of the directors of a company.

Director	Board meetings		Special meetings		Committees							
					Audit		Safety		Remuneration		Finance	
	A	T	A	T	A	T	A	T	A	T	A	T
A. Brown (c)	12	12	6	7	4	5	6	6	5	6	5	6
C. Davies	11	12	7	7	—	—	6	6	6	6	—	—
E. Frank	12	12	7	7	4	5	—	—	6	6	5	6
G. Handel	11	12	6	7	5	5	5	6	—	—	—	—
I. Jones	7	12	4	7	—	—	—	—	3	6	3	6
K. Lamb	12	12	7	7	—	—	6	6	—	—	—	—
M. Nabob	10	12	6	7	5	5	—	—	—	—	6	6

A = number of meetings attended.
T = total number of meetings.
(c) = chairman of the board.
— = not required to attend meeting.

1. *How many meetings did the chairman of the board attend?*

2. *One director had a serious illness during the year. Who do you think this was?*

3. *Which director had a perfect attendance record?*

4. *At what percentage of meetings had full attendance?*

5. *At what percentage of meetings was G.Handel present? Consider only the meetings that he was required to attend.*

1.4 Further Applications

Exercise 1.4.1 Problem solving

1. *A rare book is sold for $180, which is 250% of the original price of the book. Find the original price of the book.*

2. *The retail price of a pearl necklace was discounted by 15% and sold for $68. Find the original price of the necklace.*

3. *The price of an antique watch was marked up by 15% and sold for $713. Find the cost of the watch before the marked-up was applied.*

4. *An item in a store priced $120 was marked-up by 12% and later was discounted by 12%. What is the actual selling price of the item?*

5. *The cost of a car was marked-up from $34,000 to $38,080. Find the percentage mark-up.*

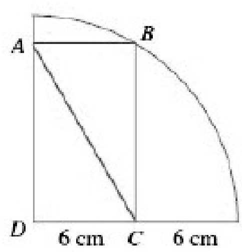
6. *Classify the following data:*

   (a) *temperature at the North Pole.* __________

   (b) *score of your last Maths test.* __________

Exercise 1.4.2

1. *In this quarter circle of radius 12 cm, what is the length of diagonal AC of the rectangle ABCD?*



2. *A 42" Plasma TV is reduced by 35% and sold for \$990. Find the marked price of the Plasma TV before the discount. (correct your answer to nearest dollars)*

3. *Simplify:* $(x^5)^9 \div (\frac{x^6}{2x^2})^4$

4. *Expand and simplify:* $6x(2x-5)+3x(4-2x)-x(6x+8)$

5. *Factorise the following:*

   (a) $3m^2 - 18mn + 15m$

   (b) $ab^2 + a^2b + ab$

   (c) $-14c - 18c^2$

Exercise 1.4.3 The following table appeared in a newspaper. It shows the current average price of houses in 4 suburbs and by what percent they increased in value over the last year.

Suburb	*Current price*	*% increase*
Eastwood	*$692,000*	*14*
Chatswood	*$798,000*	*9*
Epping	*$672,000*	*10*
Ryde	*$670,000*	*12*

1. *Which suburb had the most expensive houses a year ago?*

2. *If the same percentage increase occurs in the coming year, which suburb will have the most expensive housing?*

Exercise 1.4.4 Four towns P, Q, R and S are connected by roads. The time, in hours, needed to go from one town to another is shown in the table below:

	Town P	*Town Q*	*Town R*	*Town S*
Town P	–	*5 hrs*	*12 hrs*	*11 hrs*
Town Q	*5 hrs*	–	*8 hrs*	*9 hrs*
Town R	*12 hrs*	*8 hrs*	–	*6 hrs*
Town S	*11 hrs*	*9 hrs*	*6 hrs*	–

1. *A man who lives at Town P, must go to town Q, from there to town S and from there to town R in that order, then return to town P. What will be the least time needed for this journey?*

2. *Floods closed the road from Town P and R and the man has to detour in order to complete his journey. What would be the least amount of time that the same journey would now take?*

1.5 Algebra

Exercise 1.5.1 Simplify these expressions:

1. $12x^2 - 10y^2 \times 4x^4y^3 \div xy$

2. $8x^4 \times (-3y^2) \div 6x^3y^3$

3. $3x(2x + 3y) + 5x(x - y)$

Exercise 1.5.2 Factorise:

1. $6xy + 3x^2y - 12x^2y^2$

2. $4abc - 2ab + 16a^2c$

3. $x^2y^2 + x^2y - xy^3$

1.6 Equations

Exercise 1.6.1 Solve the following equations:

1. $-3(9-4x)=9$

2. $8(x+5)-2(x+3)=46$

3. $\frac{2x-5}{5}=\frac{50-x}{7}$

4. $\frac{5-2x}{3}=\frac{9-2x}{5}$

5. $\frac{2x+2}{3}+\frac{3x+4}{2}=7$

6. $\frac{2x-3}{5}+\frac{5-3x}{4}=1$

1.7 Simultaneous Equations

Example 1.7.1 Solve the simultaneous equations by substitution method. $\begin{cases} 2x - y = 4 & (1) \\ x + 3y = 9 & (2) \end{cases}$

Solution: *First make 'y' the subject of equation (1).* $\Rightarrow \ y = 2x - 4$

Now substitute $y = 2x - 4$ *for the letter 'y' in equation (2).*

$\therefore x + 3(2x - 4) = 9$

$x + 6x - 12 = 9$

$7x = 21$

$x = 3$

substitute $x = 3$ *into either equation (1) or (2) to find y.*

Hence y = 2x - 4 = 2(3) - 4 = 2.

Example 1.7.2 Solve the simultaneous equations by elimination method. $\begin{cases} 2x - y = 4 & (1) \\ x + 3y = 9 & (2) \end{cases}$

Solution: *Multiply equation (1) by 3 to obtain the same y coefficient.*

$\therefore 6x - 3y = 12$ *(3)*

$x + 3y = 9$ *(2)*

Now simply add equation (3) to equation (2).

$7x = 21$

$\therefore x = 3$

substitute $x = 3$ *into either equation (1) or (2) to find y.*

Hence y = 2x - 4 = 2(3) - 4 = 2.

Exercise 1.7.1 Solve the following simultaneous equations: $\begin{cases} x - 3y = 7 & (1) \\ x - y = 3 & (2) \end{cases}$

1.8 Pronumerals and Rules

Exercise 1.8.1 Find the missing number in each table of values, hence find the rules for the table of values.

1.

A	*1*	*2*	*3*	*4*	*5*
B	*4*	*7*		*13*	*16*

2.

M	*1*	*3*	*5*	*7*	*9*
N	*6*	*14*	*22*		*38*

3.

x	*1*	*2*	*3*	*4*	*5*
y	*16*	*12*	*8*	*4*	

4.

x	*1*	*2*	*3*	*4*	*5*
y	*12*	*10*		*6*	*4*

5.

x	*1*	*2*	*3*	*8*	*12*
y	*6*	*10*	*14*		

Exercise 1.8.2 Complete the tables. write the rules in different ways.

1.

a	*4*	*150*		*354*		*246*	*362*
b	*354*	*500*	*461*		*1054*		

2.

m	*-5*	*-1*	*0*	*2*		*5*	*8*
n	*7*		*2*		*-1*		

3.

a	*-1*	*2*	*-3*		*4*	*7*	*-4*
b	*-4*	*-6*	*3*	*1*			*11*
c	*-5*	*-4*		*8*	*-3*	*0*	

4.

a	*840*	*360*	*690*	*1224*		*1535*	
b	*20*	*10*		*12*	*7*		*25*
c	*42*		*23*		*107*	*307*	*0*