



Mission Heights Junior College  
Year 10 Examination 2016  
Subject: Mathematics

Name: \_\_\_\_\_ Class: \_\_\_\_\_

# Water Whanau

Instructions:

Time allowed for this examination is 2 hours.

You should attempt all the required questions in this examination. You are allowed to use a calculator.

Start writing when you are instructed to do so. You have 5 minutes of reading time before you start writing.

Use the space provided after each question to write all your answers. If you need extra writing sheets, please raise your hand and ask a teacher. You are expected to show (record) your working steps in full, to receive the full grade.

Check that this booklet has pages 1-15 in the correct order and a separate planning sheet.

**YOU MUST HAND THIS BOOKLET TO THE TEACHER AT THE END OF THE TEST.**

Working Towards	Achieved	Merit	Excellence

## Water's Year 10 Mathematics Exam: WAME

Section	Working Towards	Achieved	Merit	Excellence
<b><u>Section A:</u></b> <b><u>Problem Solving</u></b> School Camp & Redevelopment Project	You have attempted to apply numeric reasoning in solving problems	You have applied numeric reasoning in solving problems	You have applied numeric reasoning, using relational thinking, in solving problems	You have applied numeric reasoning, using extended abstract thinking, in solving problems
<b><u>Section B:</u></b> <b><u>Statistics</u></b> NCEA	You have attempted to answer questions relating to graphs and perform basic statistical calculations	You have answered questions relating to graphs and performed basic statistical calculations	You have commented on aspects of statistical graphs and drawn graphs	You have interpreted graphs and reports
<b><u>Section C:</u></b> <b><u>Algebra</u></b> It's Our Future	You have attempted to carry out simple algebraic manipulations and solve linear equations	You have carried out simple algebraic manipulations and solved linear equations	You have carried out more complex algebra manipulations and solved equations	You have solved algebra problems involving graphs and manipulation
<b><u>Section D:</u></b> <b><u>Algebra,</u></b> <b><u>Pythagoras &amp;</u></b> <b><u>Trigonometry</u></b> It's Our Future	You have attempted to calculate unknowns in right-angled triangles	You have calculated the unknown sides in right-angled triangles	You have calculated the unknowns in right-angled triangles from words and diagrams	You have modeled 2D (drawn diagrams) situations to find unknowns using Pythagoras or trig ratios
<b>Examination Conditions</b>	You have completed this assessment, however you did not adhere to Examination conditions	You have completed this assessment, however you did not adhere to Examination conditions	You have completed this assessment, adhering to Examination conditions	You have completed this assessment, adhering to Examination conditions

**Section A: Problem Solving ‘School Camp & Redevelopment Project’**



**Section instructions:** *You are required to answer all questions in this section. You should write your working steps and spend 35 minutes completing this section.*

**QUESTION ONE**

a) The two largest campgrounds in Auckland are Camp Adair and Piha Mill Camp. Camp Adair is visited by 133 300 students per year and Piha Mill camp is visited by 79 655 students per year. Altogether, how many students do these two camps cater to? (A)

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b) Camp Adair made a profit of \$554,000 last year. Write this number in standard form. (A)

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c) Two years back Piha Mill Camp earned  $\$4.03 \times 10^5$  and Camp Adair earned  $\$4.925 \times 10^4$ . Calculate the difference in earnings of the two. (M)

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d) The travel time from Mission Heights Junior College to Camp Adair is 45 minutes. The travel time from Mission Heights Junior College to Piha Mill Camp is 150 minutes. Write the time to Camp Adair as a fraction of the time to Piha Mill. (A,M)

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e) A 5 day stay normally costs \$260/-per student. Camp Adair offered a 15% discount for Mission Heights students. Calculate the cost of the stay per student. (M)

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**QUESTION TWO**

a) Camp Adair borrows \$40,000 for 3 years, at the rate of 4.5%. What is the total amount Camp Adair needs to pay including the principal amount to the bank after 3 years?

$I = PRT$

(A)

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b) The ratio of students coming from other cities to students from Auckland is 3:5. Yesterday, 49 224 students passed through Piha Mill Camp. How many of these students have visited from other cities? (M)

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c) Piha Mill Camp borrowed \$ 300,000 at the rate 4.5% for 9 years on a compounding interest terms. How much will be the total amount to be paid at the end of 9 years? (E)

$A = P(1+r)^n$

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d) Camp Adair decided to borrow \$ 150,000 for making improvements at the rate of 3.5% for 5 years which was compounded quarterly. How much is the total amount paid at the end of 5 years? (E)

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## **Section B: Statistics 'NCEA'**

**Context:** During Term 2 we developed our understanding about scatter plots. You went rock climbing as part of your P.E project of risk analysis and Looked at healthy ways of living by inspecting Camelia leaves for tea.

**Section instructions:** You are required to answer all questions in this section. You should spend 40 minutes completing this section

### **QUESTION ONE**

The graph shows the median age of New Zealanders from 1880 to 2005



a) What was the median age of New Zealanders in 1980? (A)

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b) From 1945 to 1959 New Zealand experienced a post war Baby Boom, when the number of babies born was very high. How does the graph above show this? Explain your answer. (M)

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c) Describe the trend of the median age of New Zealanders from 1880 to 2005. (E)

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**QUESTION TWO**

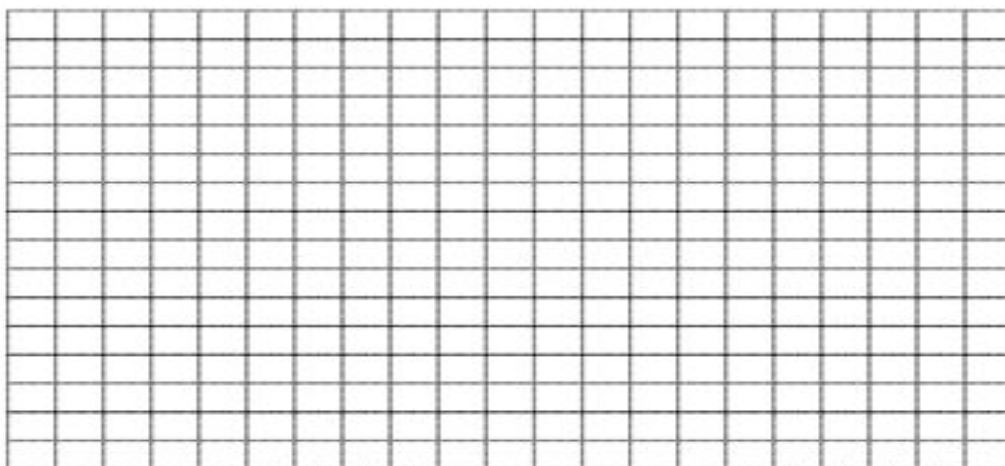
Max is thinking about his future and is deciding whether to attend Otago University in Dunedin or Auckland University, in Auckland.

Max's parents are concerned. They think Dunedin is much colder than Auckland, therefore Max should attend Auckland University. They have found the average monthly temperature in both cities for each month last year. These are in the table below.

Dunedin (°C)	Auckland (°C)
19	20
18	20
17	19
16	17
13	14
9	12
10	11
13	12
15	16
16	15
17	16
15	18

(a) Draw a double dot plot of the temperatures.

(M)



(b) Complete the table for the temperature data

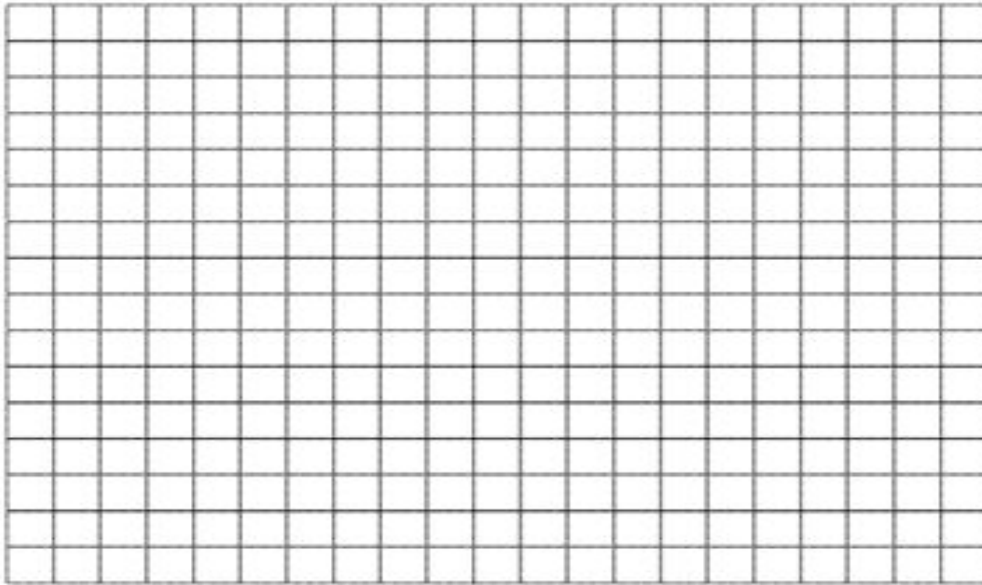
(M)

	Dunedin	Auckland
Lowest Value		
Lower quartile		
Median		
Upper quartile		
Highest value		
Mean		
Range		
Mode		



(c) Draw a double box and whisker plot of the temperatures.

(E)



(d) What do the graphs show about the average monthly temperature of Dunedin compared to the average monthly temperature of Auckland? Are Max's parents correct about Dunedin being colder than Auckland? Justify your answer. (E)

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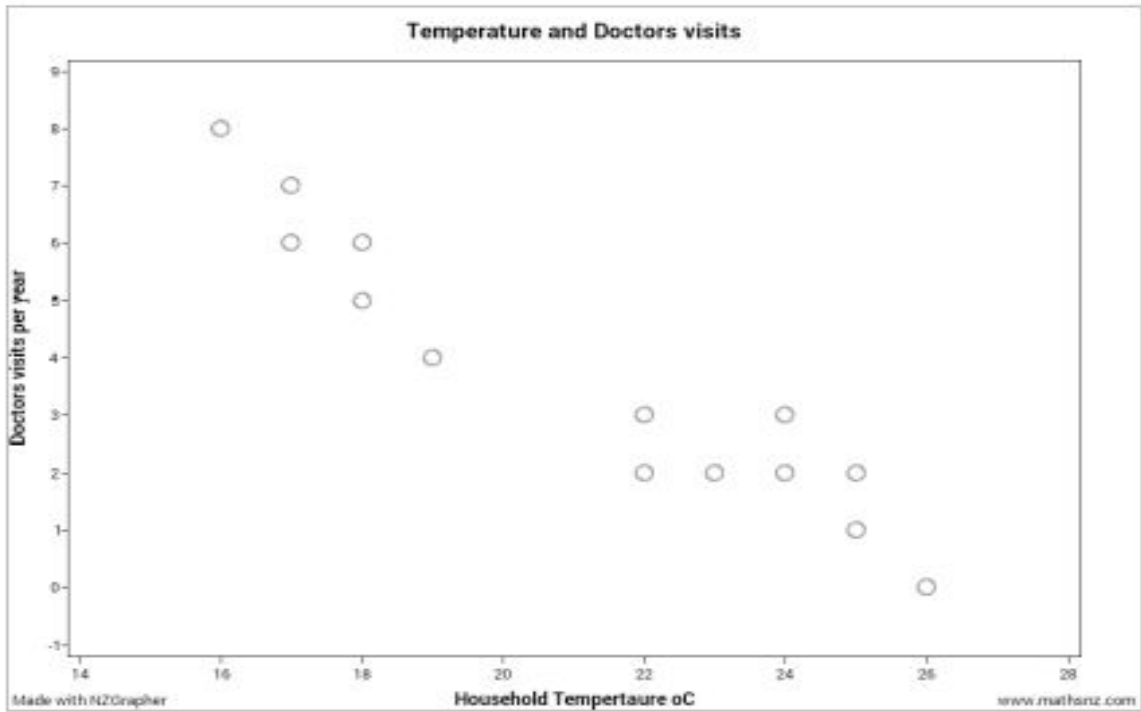
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### QUESTION THREE

(a) The World Health Organisation recommends a minimum indoor temperature of  $18^{\circ}\text{C}$ , and ideally  $21^{\circ}\text{C}$  if babies or elderly people live in the house. The average daily indoor temperature in the winter for most New Zealand houses is just  $16^{\circ}\text{C}$  (source: Science media centre)

15 four bedroom student flats in Auckland had their inside midday temperature measured every day last winter. The average temperature was then calculated for each flat. The number of visits to the doctor by the occupants was also recorded.

The results are presented in the graph on the following page.



Describe the relationship between the number of doctors visits and the average midday temperature in Auckland. (E)

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## Section C: Algebra ‘It’s Our Future’

During Term 3 we focused on Algebra, Pythagoras and Trigonometry

Section instructions: You are required to answer all questions in this section. You should spend 25 minutes completing this section

### QUESTION ONE

Simplify the following expressions:

1.  $5p + 6y + 7p + 3y =$  \_\_\_\_\_ (A)

2.  $13ab - 8b - 3ab + 9b =$  \_\_\_\_\_ (A)

3.  $h \times h \times h \times h \times h =$  \_\_\_\_\_ (A)

4.  $(y^4)^5 =$  \_\_\_\_\_ (M)

### Solve Equations

1.  $y + 8 = 17$

$y =$  \_\_\_\_\_ (A)

2.  $3k - 5 = 26$

\_\_\_\_\_   
 \_\_\_\_\_  $k =$  \_\_\_\_\_ (M)

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

\_\_\_\_\_   
 \_\_\_\_\_   
 \_\_\_\_\_   
 \_\_\_\_\_ (E)

Expand

a)  $4(a+4)$  (A)

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b)  $6(x+y) - 4(x-y)$  (M)

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c)  $(x - 8)(x + 4)$  (E)

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Factorise

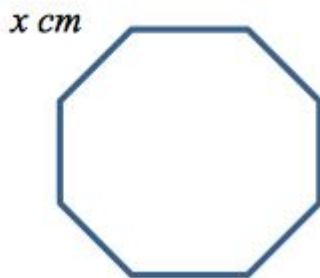
1.  $5w + 25 =$  \_\_\_\_\_ (A)

2.  $x^2+x-56=$  \_\_\_\_\_ (M)

3.  $x^2 - 3x - 10 =$  \_\_\_\_\_ (M)

### QUESTION TWO

The perimeter of the regular octagon below is 96cm.



Write an equation for the perimeter of the octagon. Then solve your equation to find the length of each side of the octagon.

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**Section D: Algebra, Pythagoras & Trigonometry 'It's Our Future'**

*During Term 3 we focused on Algebra, Pythagoras and Trigonometry*

**Section instructions:** *You are required to answer all questions in this section. You should spend 20 minutes completing this section*

**QUESTION ONE**

*Calculate the values of x rounded to 1 decimal place.*

a)  $6^2 + 8^2 = x^2$

\_\_\_\_\_ (A)

b)  $x^2 + 7^2 = 20^2$

\_\_\_\_\_ (M)

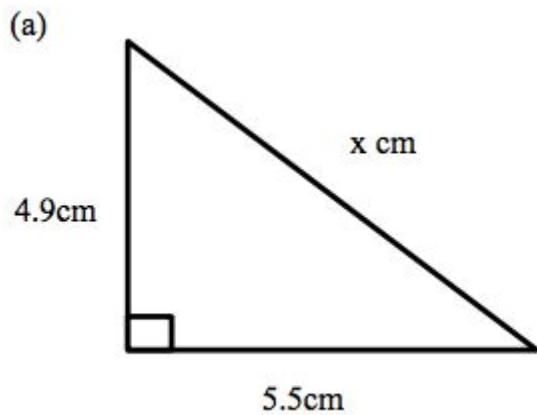
\_\_\_\_\_

c)  $10 \cos 60 = x$

\_\_\_\_\_ (A)

**QUESTION TWO**

*Calculate the size of side X*



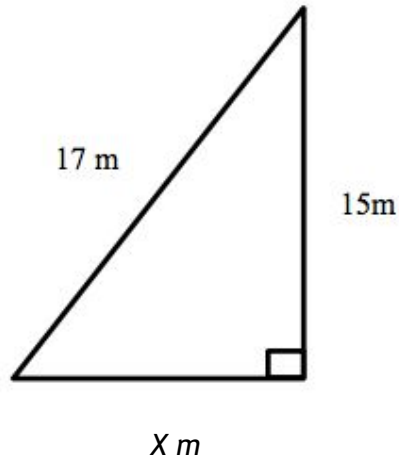
\_\_\_\_\_ (M)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(b)



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(E)

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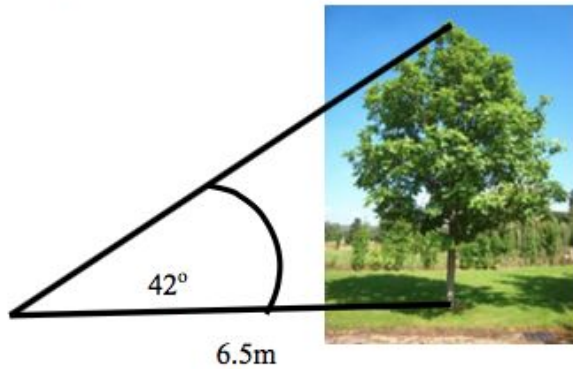
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**QUESTION THREE**

Justin is chopping down a camellia tree in his backyard. To chop the tree down in one piece, it must be less than  $6\text{m}$  high.

He measures the distance from a fixed marker on the ground to the tree and uses an angle metre app on his phone to find the angle of elevation.

The distance to the base of the tree was  $6.5\text{m}$  and the angle of elevation is  $42^\circ$ .



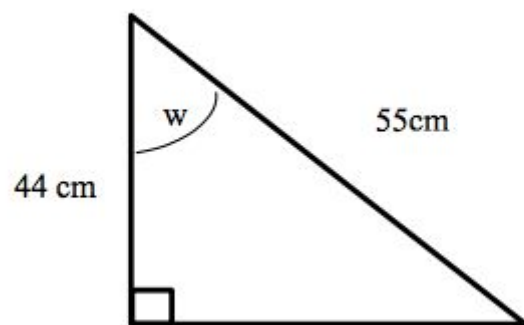
Will Justin be able to chop down his tree in one piece? (E)

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Calculate the size of angle  $w$



\_\_\_\_\_ (E)

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\_\_\_\_\_