

# PICTON HIGH SCHOOL

Creating Opportunities Achieving Success



## YEAR 10 (2020) Stage 5.2/5.1 Mathematics Pathway

<b>Due Date:</b> 10MA C and 10MA T – 19/8/2020 10MA O and 10MA P – 20/8/2020	<b>Assessment Name:</b> Assignment
<b>Mark:</b> /56	<b>Weighting:</b> 30 %
<b>SYLLABUS OUTCOMES TO BE ASSESSED:</b>	
MA5.1-8NA	<b>Solves</b> linear and simple quadratic equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques
MA5.2-16SP	<b>Investigates</b> relationships between two statistical variables, including their relationship over time
MA5.2-13MG	<b>Applies</b> trigonometry to <b>solve</b> problems, including problems involving bearings
MA5.2-10MG	<b>Applies</b> trigonometry, given diagrams, to <b>solve</b> problems, including problems involving angles of elevation and depression
MA5.2-1WM	<b>Selects</b> appropriate notations and conventions to <b>communicate</b> mathematical ideas and solutions
MA5.2-2WM	<b>Interpret</b> mathematical or real-life situations systematically <b>applying</b> appropriate strategies to solve problems
MA5.2-3WM	<b>Construct</b> argument to <b>prove</b> and <b>justify</b> results
<b>DIRECTIVES TO BE ASSESSED:</b>	
<b>Select</b>	Carefully chooses as the best.
<b>Communicate</b>	To convey information about.
<b>Interprets</b>	Draws meaning from the mathematical results.
<b>Solve</b>	To manipulate something for a particular purpose to mathematical problems.
<b>Apply</b>	To use relevant information and skills for a given situation.
<b>Construct</b>	To build an argument based on mathematical calculations.
<b>Prove</b>	To provide logical evidence to support mathematical statement to support mathematical claim.
<b>Investigate</b>	To examine situations using various techniques and in the process of their exploration develop skills that can be applied to other problems.
<b>Justify</b>	To find a mathematical solution for a question, and carry out the process
<p>This assignment requires you to complete questions on Data, Trigonometry and Equations.</p> <p>You are required to:</p> <ul style="list-style-type: none"> <li>➤ Analyse and compare two sets of data.</li> <li>➤ Use trigonometry to find length and angles in triangles.</li> <li>➤ Use equations to solve problems.</li> <li>➤ <b>You will complete this assignment at home. Your class teacher may give you class time to complete this assignment.</b></li> <li>➤ <b>The topics assessed are:</b> <ul style="list-style-type: none"> <li>Data</li> <li>Trigonometry</li> <li>Equations</li> </ul> </li> </ul>	
<b>STUDENT CHECKLIST:</b>	
<p>You will be assessed on your ability to demonstrate your knowledge of content covered in topics Data, Trigonometry and Equations.</p> <p>Have you:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Completed all questions?</li> <li><input type="checkbox"/> Attended the MATHS Staffroom and asked for help?</li> </ul>	

**Complete all questions in the space provided.**

**Part A: Data**

Mr Lee and Mr Velthuis asked their IBL class to research the overall performance of the countries that participated in the 2000 Sydney and 2004 Athens Olympics. They gave their class the medal tables for 2000 Sydney Olympics and 2004 Athens Olympics. The students were asked to compare the overall performance in only one type. Complete the questions below to find out how consistent the countries were.

1. Choose twelve countries that participated in both the 2000 Sydney and 2004 Athens Olympics to complete the table below: See appendix A and B on pages 12 and 13.  
**(2 marks)**

**Note: No two students should choose the same countries.**

Type of medal		
Country	2000 Sydney Olympics Number of medals	2004 Athens Olympics Number of medals
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		

2. Arrange the medals won in 2000 and 2004 in ascending order in the space below:

**(2 marks)**

**2000:**

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**2004:**

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3. Use your answer(s) in question 2 to find the five-point summary for 2000 and 2004 medals and complete the table below. Do all calculations on page 4.

**Show all working out.**

**(10 marks)**

	2000	2004
Minimum value		
First quartile ( $Q_1$ )		
Median ( $Q_2$ )		
Third quartile ( $Q_3$ )		
Maximum value		

2000 five-point summary:

2004 five-point summary:

4. From your table in question 3, draw a parallel box plot for both 2000 and 2004 using the axis below: **(4 marks)**



5. Comment on the shape of the two box plots. **(2 marks)**

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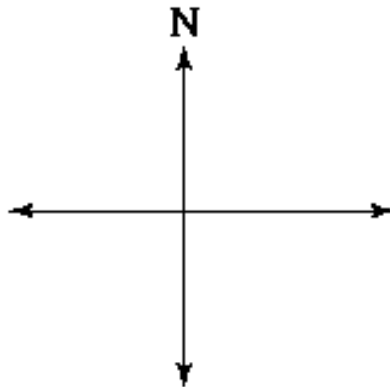
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## Part B: Trigonometry

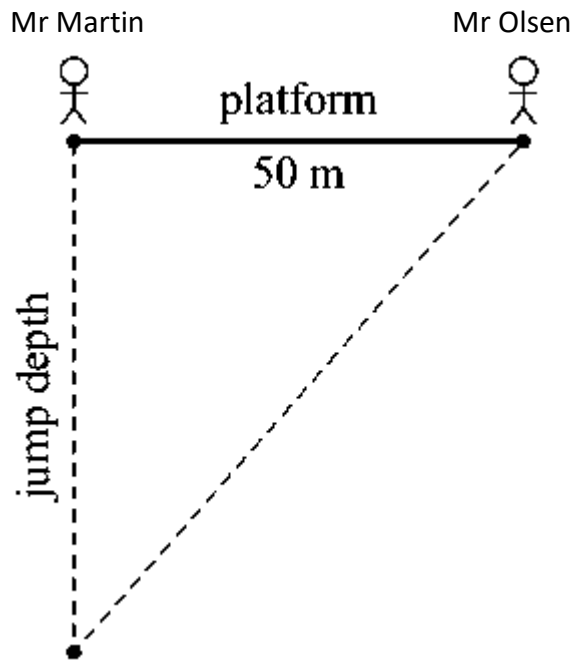
1. (a) Draw a bearing that represents your birthday (**day and month only**) on the compass below. For example, if you were born on 1<sup>st</sup> of June, the bearing will be 017. If you were born from October to December, add the digits that form the month. For example, 11<sup>th</sup> of December (12, 1+2=3) will be 113. **(2 mark)**



- (b) Write your birthdate (**do not include the year**) as a decimal in degrees. For example, 1<sup>st</sup> June will be  $1.07^\circ$  or 11<sup>th</sup> December will be  $11.12^\circ$ . Convert this value to degrees and minutes, to the nearest degree. **(1 mark)**
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- (c) Write your birthdate (**day and month only**) as decimal with four decimal places. For example, 1<sup>st</sup> June will 0.0107 or 11<sup>th</sup> December will be 0.1112. Your number is equal to  $\cos X$ . Then, find  $X$ , to the nearest degree if  $\cos X = 0.1112$ . **(1 mark)**
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2. Mr Olsen is watching a number of members of the maths faculty bungee jump from a distance 50m away from the jumping platform but level with the jumping platform as shown below.



(a) Mr Martin has a maximum fall of 70m. Find the angle of depression from Mr Olsen to the maximum depth of Mr Martin's jump.

(i) Show the angle of depression and label the side that represents Mr Martin's maximum fall on the diagram above. **(1 mark)**

(ii) Hence find the angle of depression, correct to 2 decimal places.

**(2 marks)**

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(b) Ms McLaughlin's maximum angle of depression from Mr Olsen is  $68^\circ$ . Find Ms McLaughlin's maximum depth, correct to 2 decimal places. **(2 marks)**

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(c) Ms Karu wants to do the 'Head Dunk' into the river below. This occurs when Mr Olsen's angle of depression to the river is  $75^\circ$ . Find, correct to the nearest metre, the height of the platform above the river. **(2 marks)**

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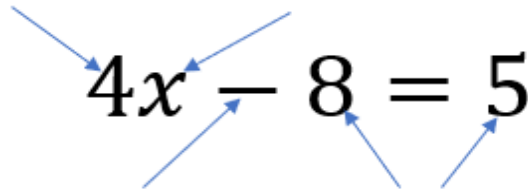
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## Part C: Equations and Inequalities

1. Write the names of the parts of the equation shown below with arrows:

Choose from this list of words: **Opera, Condition, Coefficient, Constant, Operator, Variable, Constable, Valley.** (2 marks)


$$4x - 8 = 5$$

2. Write an equation for the following statements and then solve them:

(i) A number is increased by 4, then the result is halved to give 20. (3 marks)

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(ii) Mr Lee threw the javelin 3m more than twice the distance that Mr Martin threw it. If Mr Lee threw the javelin 19m, how far did Mr Martin throw? (3 marks)

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3. Solve these equations: **(4 marks)**

(iii)  $3w - 6 = 18$

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(iv)  $3(x + 1) = 12$

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4. Roll a die twice. Your first number represents  $x$ , and your second number represents  $y$ . Substitute the values for  $x$  and  $y$  into the equation to find the value of  $A$ .

**(2marks)**

$$A = \frac{x+y}{2}$$

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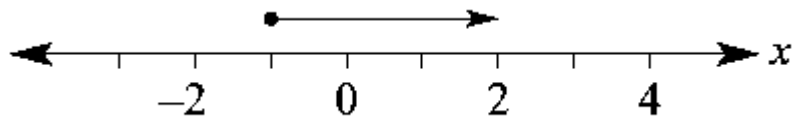
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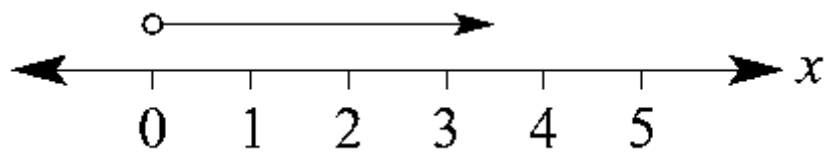
5. Write the inequality displayed on the following number lines: (2 marks)

(a)



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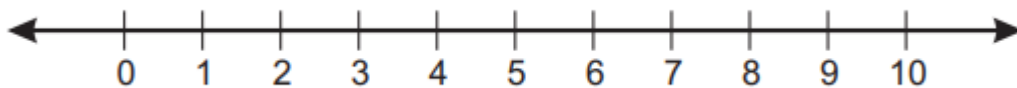
(b)



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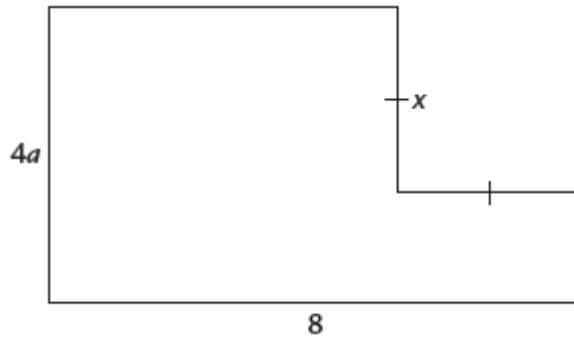
6. Solve this inequality and graph it on the number line below: (3 marks)

$$6 - 2x > 10$$



7. Mrs Lewis found that the area of this shape has the formula:

$$A = 4a \times 8 - x \times x$$



(i) Simplify Mrs Lewis' formula: **(1 mark)**

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(ii) Roll a die twice. The first number represents  $a$  and the second number represents  $x$ . Hence, find the value of  $A$ . **(2 marks)**

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(iii) Find a simplified formula for the perimeter of the shape. **(3 marks)**































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Rank	Nation	Gold	Silver	Bronze	Total
1	 <u>United States (USA)</u>	37	24	32	93
2	 <u>Russia (RUS)</u>	32	28	29	89
3	 <u>China (CHN)</u>	28	16	14	58
4	 <u>Australia (AUS)*</u>	16	25	17	58
5	 <u>Germany (GER)</u>	13	17	26	56
6	 <u>France (FRA)</u>	13	14	11	38
7	 <u>Italy (ITA)</u>	13	8	13	34
8	 <u>Netherlands (NED)</u>	12	9	4	25
9	 <u>Cuba (CUB)</u>	11	11	7	29
10	 <u>Great Britain (GBR)</u>	11	10	7	28
11	 <u>Romania (ROU)</u>	11	6	9	26
12	 <u>South Korea (KOR)</u>	8	10	10	28
13	 <u>Hungary (HUN)</u>	8	6	3	17
14	 <u>Poland (POL)</u>	6	5	3	14
15	 <u>Japan (JPN)</u>	5	8	5	18
16	 <u>Bulgaria (BUL)</u>	5	6	2	13
17	 <u>Greece (GRE)</u>	4	6	3	13
18	 <u>Sweden (SWE)</u>	4	5	3	12
19	 <u>Norway (NOR)</u>	4	3	3	10
20	 <u>Ethiopia (ETH)</u>	4	1	3	8
21	 <u>Ukraine (UKR)</u>	3	10	10	23
22	 <u>Kazakhstan (KAZ)</u>	3	4	0	7
23	 <u>Belarus (BLR)</u>	3	3	11	17
24	 <u>Canada (CAN)</u>	3	3	8	14
25	 <u>Spain (ESP)</u>	3	3	5	11
26	 <u>Turkey (TUR)</u>	3	0	2	5
27	 <u>Iran (IRI)</u>	3	0	1	4
28	 <u>Czech Republic (CZE)</u>	2	3	3	8
29	 <u>Kenya (KEN)</u>	2	3	2	7
30	 <u>Denmark (DEN)</u>	2	3	1	6

## 2004 Athens Olympics

## Appendix B

Rank	Nation	Gold	Silver	Bronze	Total
1	 United States (USA)	36	39	26	101
2	 China (CHN)	32	17	14	63
3	 Russia (RUS)	28	26	36	90
4	 Australia (AUS)	17	16	17	50
5	 Japan (JPN)	16	9	12	37
6	 Germany (GER)	13	16	20	49
7	 France (FRA)	11	9	13	33
8	 Italy (ITA)	10	11	11	32
9	 South Korea (KOR)	9	12	9	30
10	 Great Britain (GBR)	9	9	12	30
11	 Cuba (CUB)	9	7	11	27
12	 Hungary (HUN)	8	6	3	17
13	 Ukraine (UKR)	8	5	9	22
14	 Romania (ROU)	8	5	6	19
15	 Greece (GRE)*	6	6	4	16
16	 Brazil (BRA)	5	2	3	10
17	 Norway (NOR)	5	0	1	6
18	 Netherlands (NED)	4	9	9	22
19	 Sweden (SWE)	4	2	1	7
20	 Spain (ESP)	3	11	6	20
21	 Canada (CAN)	3	6	3	12
22	 Turkey (TUR)	3	3	5	11
23	 Poland (POL)	3	2	5	10
24	 New Zealand (NZL)	3	2	0	5
25	 Thailand (THA)	3	1	4	8
26	 Belarus (BLR)	2	5	6	13
27	 Austria (AUT)	2	4	1	7
28	 Ethiopia (ETH)	2	3	2	7
29	 Iran (IRI)	2	2	2	6
	 Slovakia (SVK)	2	2	2	6
31	 Chinese Taipei (TPE)	2	2	1	5