

**YEAR 11 MATHEMATICS APPLICATIONS (AEMAA)**  
**Test 4 2021: Univariate Data and Applications of Trigonometry**

NAME: \_\_\_\_\_

**TEACHER: Day Friday Hill Kelly Loh Staffe**

**Calculator-Assumed: 1 A4 page notes allowed.**

**Formula sheet provided.**

**Total time: 50 minutes**

**Total Marks:**  
**46**

**Question 1 [6 marks: 2,2,2]**

At the Tokyo Olympics the Australian(A) sailing team sailed from the Jetty(J) on a bearing of  $75^\circ$  for 5 kilometres on a training run. At the same time the New Zealand(NZ) team sailed from the same Jetty(J) for 12 kilometres on a bearing of  $130^\circ$ .

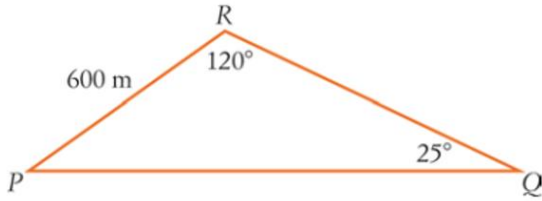
(a) Draw a fully labelled diagram showing where each of the two teams ended up.

(b) Calculate how far apart the two sailing teams are.

(c) Find the bearing of the Jetty(J) from the Australian team(A).

**Question 2 [4 marks: 3, 1]**

The open water swimming course began at point P. The swimmers then swam up to and around a buoy at point R and then on to the finish at point Q.

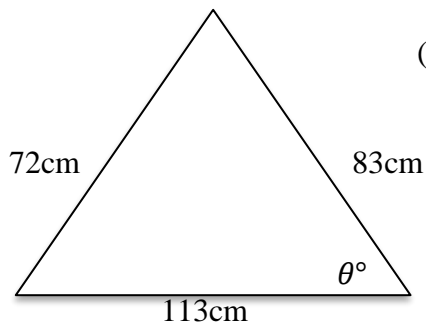


(a) Calculate the distance from the buoy at R to the finish point at Q.

(b) Hence, calculate the total swimming course distance, to the nearest metre, from start to finish.

**Question 3 [5 marks:2,3]**

A koi fishpond was built in the athletes village. It is a triangular shape with side length dimensions of 72cm, 83cm and 113cm as shown in the diagram below.



(a) Determine the angle( $\theta^\circ$ ) of the fish pond as shown in the diagram.

(b) Show the use of Heron's Rule to calculate the area of the koi fish pond to the nearest square centimetre.

**Question 4 [3 marks: 1,1,1]**

The Australia Olympic Committee collected some data at the Olympics. Describe the type of data collected by circling the best description of it as either Nominal, Ordinal, Discrete or Continuous.

(a) The number of gold medals won by each country at the Tokyo Olympic Games.

Nominal      Ordinal      Discrete      Continuous

(b) The type of medals won (Gold, Silver or Bronze) by Australia at the Olympic Games.

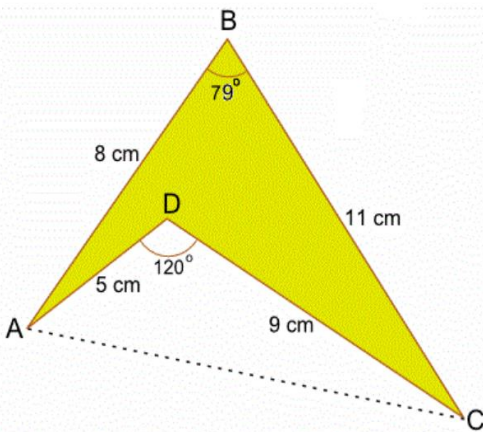
Nominal      Ordinal      Discrete      Continuous

(c) The height of the players in the Australian beach volleyball team.

Nominal      Ordinal      Discrete      Continuous

**Question 5 [3 marks]**

Determine the area of the following logo that was considered for use on uniforms for an Olympic team in 2021, shown by the shaded area in the following diagram.





**Question 8 [11 marks: 2,2,2,3,2]**

The service times for taking food orders in the athlete village at two different restaurants were recorded. The Steakhouse results have been displayed below using a box plot.

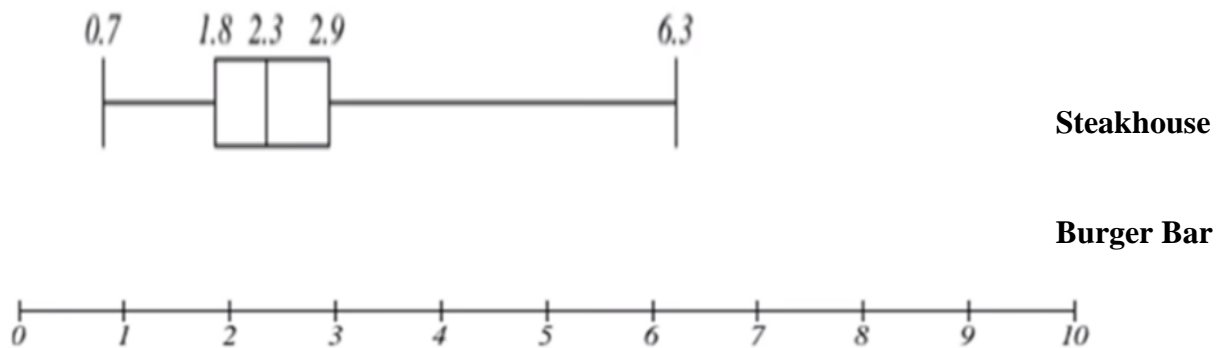
The Burger Bar had the following service times, in minutes, for taking food orders:

0.5 9.6 2.1 5.7 1.1 1.2 1 1.1 1.8 1.9 2.4 6 8 9 0.8

(a) Calculate the five number summary for the Burger Bar service times.

(b) Show calculations to determine if the Burger Bar had any service times which were outliers.

(c) Represent the Burger Bar service times as a parallel box plot in the position provided below.

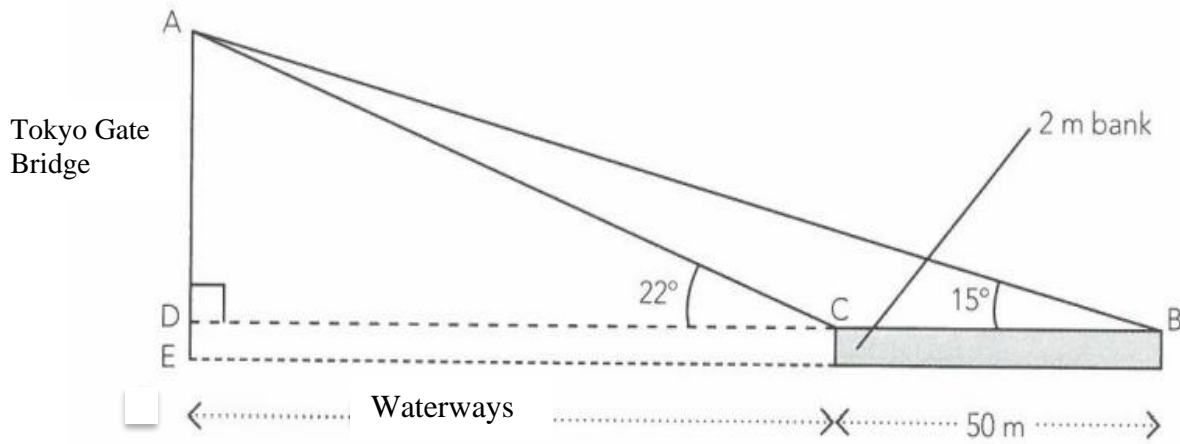


(d) Compare the location, shape and spread of the the steakhouse and burger bar with three clear statements including relevant calculations.

(e) Which restaurant should an athlete choose to eat from if they were in a hurry to order food? Justify your choice.

**Question 9 [6 marks: 4,2]**

Cynthia wanted to know the width of the Sea Forest Waterways where the Olympic Rowing competition was conducted. She measured the angle of elevation from the top of the 2 metre high bank where she is standing to be  $22^\circ$  to the top of the Tokyo Gate Bridge on the other side of the waterway. She then moved 50 metres back from the bank and measured the angle of elevation to be  $15^\circ$ .



(a) Calculate the height of the Tokyo Gate Bridge ( $AE$ ).

(b) Calculate the width of the Waterways ( $DC$ ).