MATHEMATICS APPLICATIONS

UNIT 2 - YEAR 11

TEST 5 - 2021

SECTION ONE – CALCULATOR FREE

STUDENT'S NAME: _____

CIRCLE YOUR TEACHER'S NAME:

Dr Duan	**Mr Galbraith**	**Mr Hamilton-Brown**
Mr Riemer	**Mrs Thompson**	**Mr Stillitano**

MARKS:_____ / 24

TIME: 20 mins

- No calculators are allowed during this section of the test.
- Show all necessary working in order to obtain full marks.
- A formula sheet will be provided.

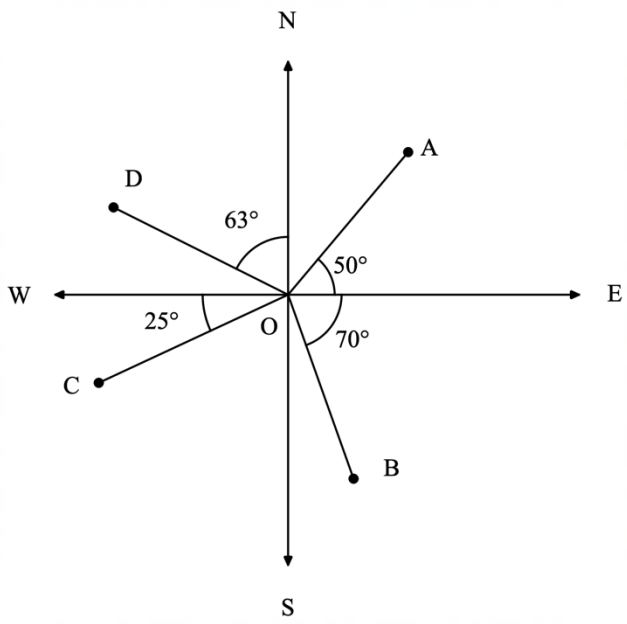
QUESTION 1 **[1, 1, 1, 1, = 4 marks]**

Using the diagram shown on the right to determine:

i) The true bearing

a) From O to A: _____

b) From O to B: _____



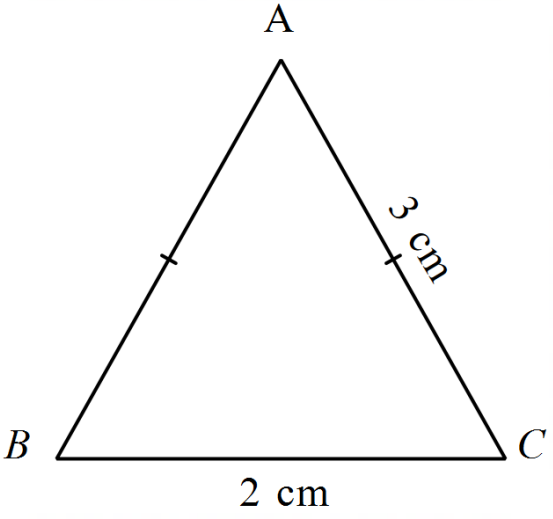
ii) The compass bearing

a) From O to C: _____

b) From O to D: _____

QUESTION 2 **[3 marks]**

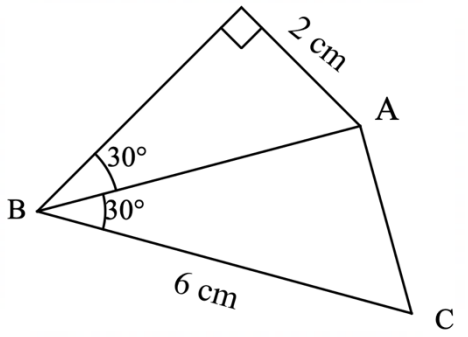
Find the area of the triangle on the right. Leave your answer as an exact value.



QUESTION 3 **[2, 2 = 4 marks]**

Given $sin30° = \frac{1}{2}$

a) find the length of AB



b) hence, find the area of ΔABC

QUESTION 4 **[2, 2 = 4 marks]**

Tim wants to represent WSHS in a swimming competition. He enters the 100 m freestyle and 100 m butterfly qualification trials. The results for the competitors are normally distributed and shown below:

100 m free style:	mean of 90 seconds,	and a standard deviation of 5 seconds
100 m butterfly:	mean of 100 seconds,	and a standard deviation of 7 seconds

Tim recorded a time of 85 seconds for freestyle, and a standard score of -2 for butterfly. Determine:

a) Tim's 100 m butterfly time.

b) In which swimming stroke did Tim perform better? Justify mathematically.

QUESTION 5 **[2, 2, 3, 2 = 9 marks]**

Tim needs to buy a special swimming cap for the competition. A local factory produces this type of swimming cap. The diameter of a medium size cap is normally distributed with a mean of 215 mm, and a standard deviation of 5 mm. Use the 68%, 95%, and 99.7% rule to answer the following:

a) What percentage of swimming caps have a diameter greater than 210 mm?

b) A medium size swimming cap with diameter less than 200 mm or more than 230 mm is classified as faulty. What is the percentage of faulty products?

c) Tim knows that he can wear any cap as long as it falls between 205 mm and 220 mm in diameter. If there are 1000 caps produced in this factory, how many would fit Tim?

d) The largest 0.15% of the Medium size cap will be labelled as Large size. What is the smallest diameter of the Large size?

END OF SECTION ONE

MATHEMATICS APPLICATIONS

UNIT 2 - YEAR 11

TEST 5 - 2021

SECTION TWO – CALCULATOR ALLOWED

STUDENT'S NAME: _____

CIRCLE YOUR TEACHER'S NAME:

Dr Duan	**Mr Galbraith**	**Mr Hamilton-Brown**
Mr Riemer	**Mrs Thompson**	**Mr Stillitano**

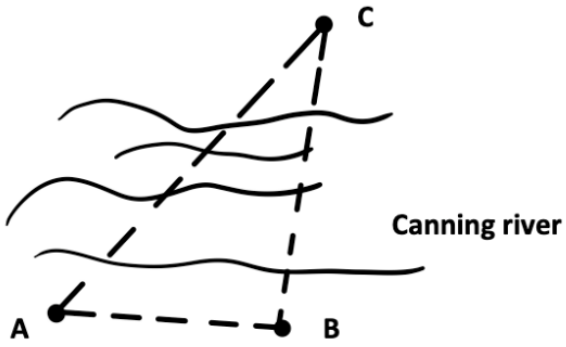
MARKS:_____ / 30

TIME: 30 mins

- A scientific calculator and/or Classpad is allowed.
- 1 × A4 sheet (single-sided) of notes is allowed.
- A formula sheet will be provided.
- Show all necessary working in order to obtain full marks.

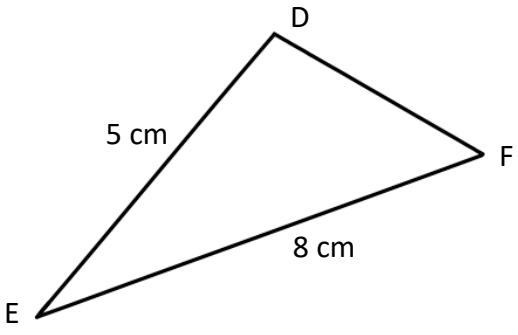
QUESTION 6 **[3 marks]**

Tim has been selected to represent WSHS in a Triathlon. He started early morning endurance training with his teammates. They need to jog for 5 km along the Canning River from points A to B, and then swim across the river to point C. If $\angle CAB = 45°$, and $\angle ACB = 30°$, determine the distance Tim has to swim.



QUESTION 7 **[4 marks]**

If the area of triangle *EDF*, shown below, is 10 cm^2, find the length of DF.



QUESTION 8 **[2, 5 = 7 marks]**

Tim's coach stood on top of the diving block at the end of a lane. She watched Tim and his teammate, Bruce, swimming towards her in the same lane. She saw Tim at an angle of depression of 7° and Bruce, ahead of Tim, at an angle of depression of 9°. The vertical distance from the water level to the coach's eyes is 1.9m.

a) Draw a diagram to represent the situation above.

b) What is the distance between Tim and Bruce?

QUESTION 9 **[1, 1, 2, 3 = 7 marks]**

At a hardware store, the lengths of a certain type of power extension cord, marked as 2 metres long, were normally distributed with a mean of 202 cm and a standard deviation of 3 cm.

a) Find the probability that the length of a randomly chosen cord is less than 200 cm.

b) What is the probability that the length of randomly chosen cord is between 196 cm and 208 cm.

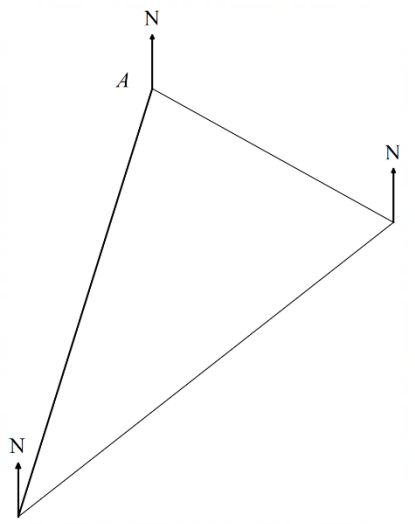
c) To the nearest centimetre, determine the 40^{th} percentile.

d) What percentage of cord is within 2.5 standard deviations of the mean size?

QUESTION 10 **[3, 2, 4 = 9 marks]**

A rescue ship leaves the base, represented by point A, and travels for 40 kilometres on a bearing of 120° to point B. Then it received a distress signal from point C, which is 60 kilometres away from B on a bearing of 220° from B to C.

a) Label the diagram below and show all the given information.



b) Find the distance from point A to point C.

c) Find the bearing of point A from point C to the nearest degree.

END OF SECTION TWO