CARLINGFORD HIGH SCHOOL

Year 11 Mathematics

Preliminary Assessment Task 2 Term 2 2018

Time allowed: 50 minutes

Student Number: ___________________________________

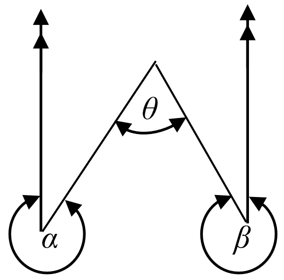
Instructions:

- All questions should be attempted.
- Show ALL necessary working on your own paper.
- Marks may not be awarded for careless or badly arranged work.
- Only board-approved calculators may be used.
- Start each question on a new page and only write on one side of each page.

Question 1 Plane Geometry	Question 2 Trigonometry	Question 3 Linear Functions	Total
/14	/17	/19	/50

QUESTION 1 (14 marks) - START A NEW PAGE –

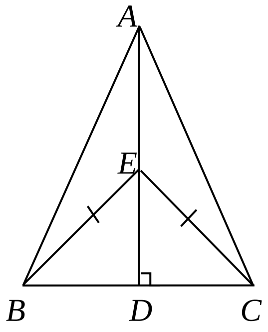
a). For the figure given, express θ in terms of α and β. **[3]**



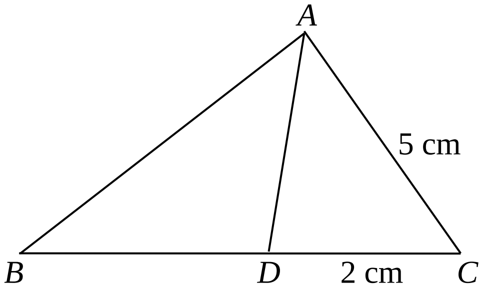
b). For the figure given, AD is an altitude of ΔABC.
E is a point on the side AD and $BE = CE$.

Prove that **i).** $BD = CD$ **[3]**

ii). $AB = AC$ **[3]**

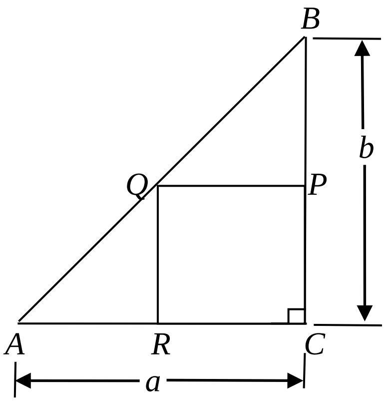


c). For the figure given, $\Delta ABC \parallel\!| \Delta DAC$.
If $AC = 5$ cm and $DC = 2$ cm, find the value of BD. **[2]**



d). For the figure given, ΔABC is a right-angled triangle and $CPQR$ is a square.

Prove that $CP = \frac{ab}{a+b}$. **[3]**



QUESTION 2 (17 marks) - START A NEW PAGE -

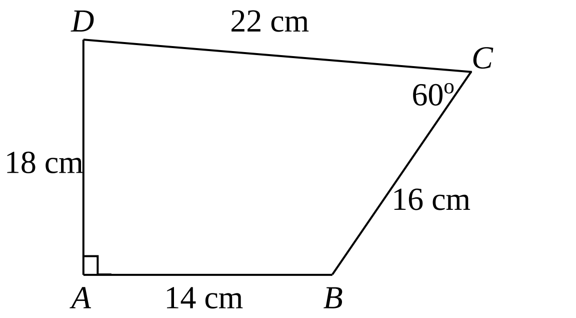
a). Find the exact value for cot 300°. **[2]**

b). Indicate in which quadrant(s) for $\cos\theta \times \sin\theta > 0$ is true. **[2]**

c). Prove $(\sec^2\theta - 1)\cos^2\theta = \sin^2\theta$. **[2]**

d). Solve $\sin x = \cos x$ for $0^{\circ} \leq x \leq 360^{\circ}$. **[2]**

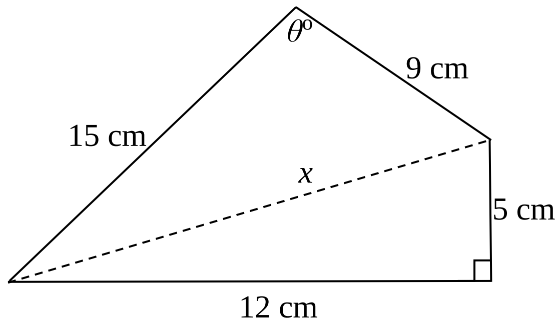
e). Find the area of the quadrilateral *ABCD*, correct to 1 decimal place. **[2]**



f). For the given diagram, find

i). the value of *x*. **[1]**

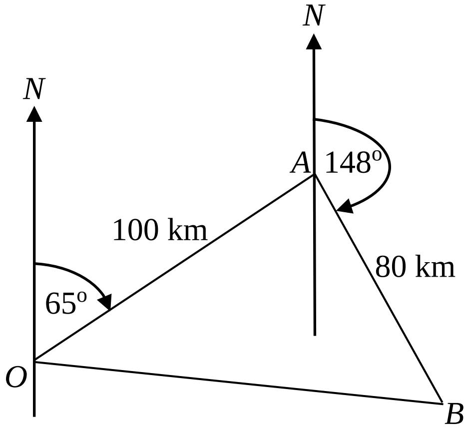
ii). the value of θ, correct to 2 decimal places. **[2]**



g). A ship sails on a course of 065° for 100 km and then changes to a course of 148° for 80 km. Find the

i). distance of the ship from the starting point, correct to 1 decimal place. **[2]**

ii). bearing of the final position from the starting point, correct to 1 decimal place. **[2]**



<u>QUESTION 3</u> (19 marks) - START A NEW PAGE -

a). The interval joining $A(-2, 4)$ and $B(6, -2)$ is a diameter of a circle.
Find the

i). centre and **[2]**

ii). radius of the circle. **[2]**

b). Given the vertices of a triangle are $A(-1, -1)$, $B(1, 2)$ and $C(2, 1)$.
Find the

i). equation of line BC in the general form. **[2]**

ii). perpendicular distance (in exact value) of A from BC. **[2]**

iii). area of triangle ABC. **[2]**

c). The lines $2x + y - 5 = 0$ & $x - y + 2 = 0$ intersect at A.
Write down the general equation of a line through A, and
show that it can be written in the form $(2 + k)x + (1 - k)y + (2k - 5) = 0$, **[2]**
where k is a constant.

d). The point $Q(-2, 1)$ lies on the line L_1 whose equation is $9x - 2y + 20 = 0$.
The point $R(4, -2)$ lies on the line L_2 whose equation is $3x + y - 10 = 0$.

i). Show that L_1 and L_2 intersect at a point P on the y–axis. **[2]**

ii). Show that the equation of QR is $x + 2y = 0$. **[2]**

iii). Show, by shading on a sketch on the last page of the exam, the region defined by the 3 inequalities $9x - 2y + 20 \geq 0$,
$3x + y - 10 \leq 0$ and $x + 2y > 0$.

[3]

<u>END OF EXAM</u>

Q3 d). iii) Sketch