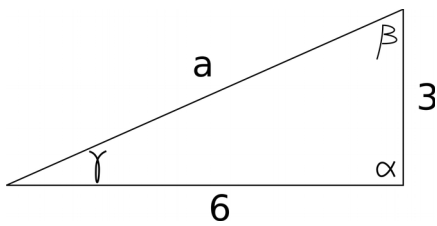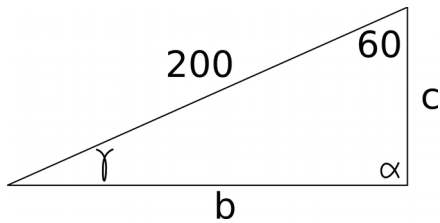# Maths A & I

Trigonometry exam.
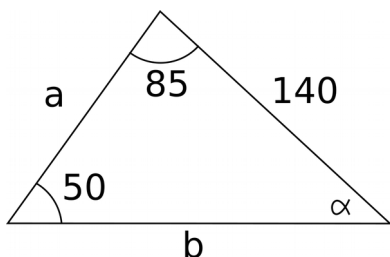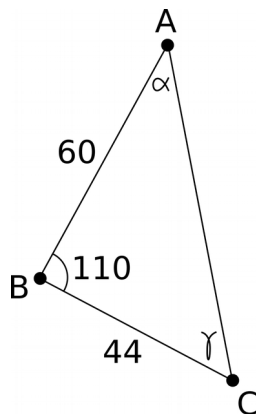
Name:
Date:

Remember:
- Show all your calculations.
- If nothing else is stated, provide your answers exactly or with 3 sf.
- When answering questions with the calculator you have to state that the answer was provided by the calculator.

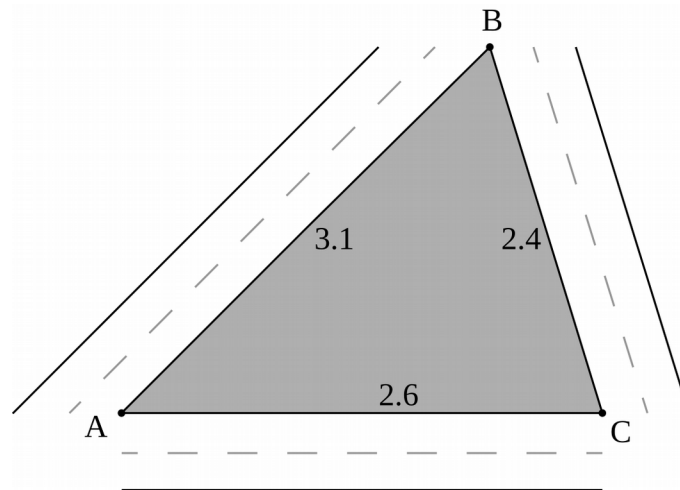1. Calculate all missing angles and sides:
       i) For these right-angle triangles [2 each]

    ii) For these triangles [2 each]

2. Three airport runways intersect to form a triangle, ABC . The length of AB is 3.1 km, AC is 2.6 km, and BC is 2.4 km .

A company is hired to cut the grass that grows in triangle ABC , but they need to know the area.

(a) Find the size, in degrees, of angle BÂC. [3]

(b) Find the area, in km , of triangle ABC . [3]

3. The ship HMS Pretzel leaves island H bearing 60 degrees and sails 58 km. At the same time the HMS Macaroon leaves bearing 345 degrees and sails 29 Km.

Make a drawing of the island and the position of the two ships. [2]

Calculate the distance between the two ships. [2]

4. The height of a vertical cliff is 450m. The angle of elevation from a ship to the top of the cliff is 31º. The ship is x metres from the bottom of the cliff.

a. Draw a diagram to show this information. [2]

b. Calculate x. [2]

5. A farmer owns a plot of land in the shape of a quadrilateral ABCD .
AB = 105 m , BC = 95 m , CD = 40 m , DA = 70 m and angle DCB = 90˚.
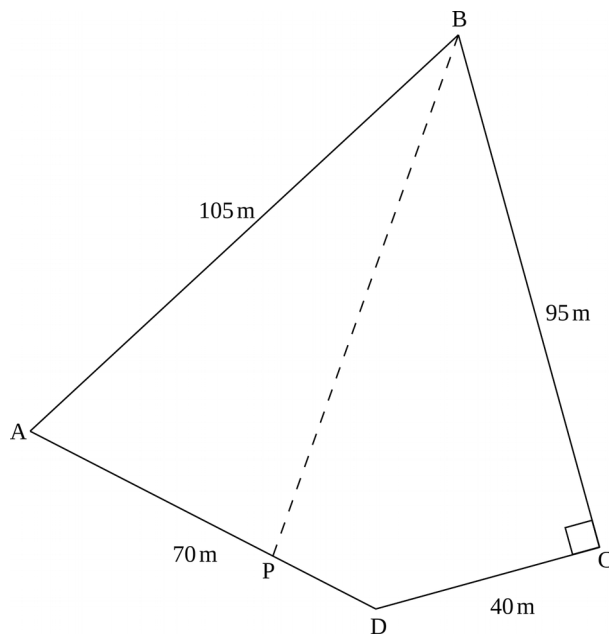

The farmer wants to divide the land into two equal areas. He builds a fence in a straight line from point B to point P on AD , so that the area of PAB is equal to the area of PBCD .
Calculate:

The length of BD	[2]
The size of angle DAB	[3]
The area of triangle ABD	[3]
The area of quadrilateral ABCD	[2]
The length of AP	[3]
The length of the fence, BP	[3]

6. A kebab pizza has a radius of 21 cm and on it there is one gram of kebab meat per square centimeter.
A slice of it is cut in the traditional radial cut fashion (see picture).
How many degrees must the slice be in order for it to have 140 g of meat on it? [3]
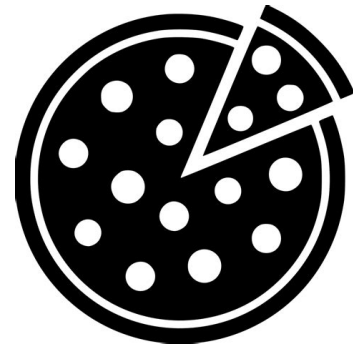
7. A greenhouse has a built-in heating system that turns on when the temperature is too low. When the heating has warmed up the interior, the system stops until the temperature drops again. This results in the temperature constantly oscillating.
The maximum temperature is 7 ºC, the minimum temperature is -1 ºC, and it takes four hours from one activation of the heating system to the next.
Establish a function that models this behaviour assuming that the cycle starts when the temperature is -1 ºC. (Use time in hours or minutes as you please). [4]

8. This sinusoidal model describes the water depth at a seaport in La Rochelle (France) at different times of the day.

y(t)=2.4 · sin(30t) + 9.5

where y is the depth and t is the time in hours starting at midnight.

Describe how the depth changes over time in terms of maximum/minimum/average depth, amplitude and period. Answers in form of a drawing are accepted. [4]