



Trigonometric formulae

Question 1.

2016 Paper 2, Q3

(a) Show that $\frac{\cos 7A + \cos A}{\sin 7A - \sin A} = \cot 3A$.

Radians

Question 2.

2014 Paper 2, Q2

- (b) The diagram shows part of the circular end of a running track with three running lanes shown. The centre of each of the circular boundaries of the lanes is at O .

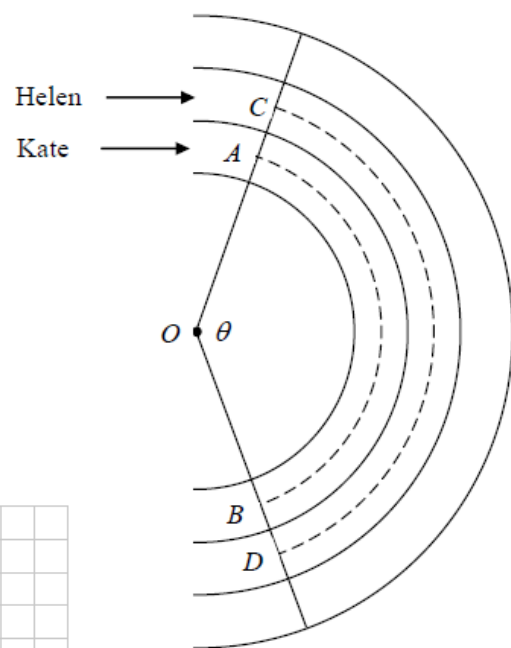
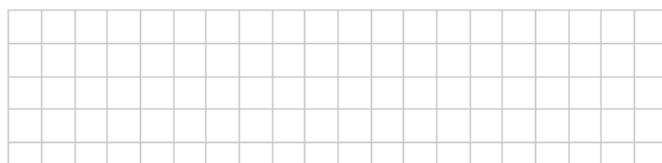
Kate runs in the middle of lane 1, from A to B as shown.

Helen runs in the middle of lane 2, from C to D as shown.

Helen runs 3 m further than Kate.

$|\angle AOB| = |\angle COD| = \theta$ radians.

If each lane is 1.2 m wide, find θ .



Solving equations

Question 3.

2016 Paper 2, Q3

(b) Given that $\cos 2\theta = \frac{1}{9}$, find $\cos \theta$ in the form $\pm \frac{\sqrt{a}}{b}$, where $a, b \in \mathbb{N}$.



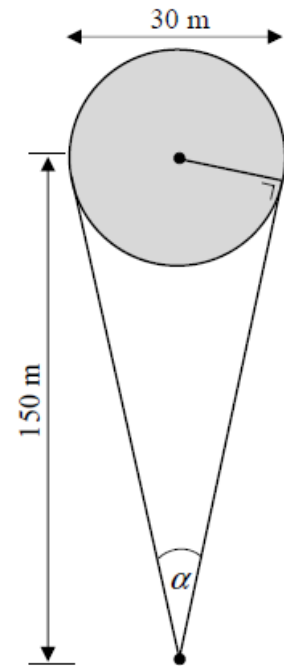
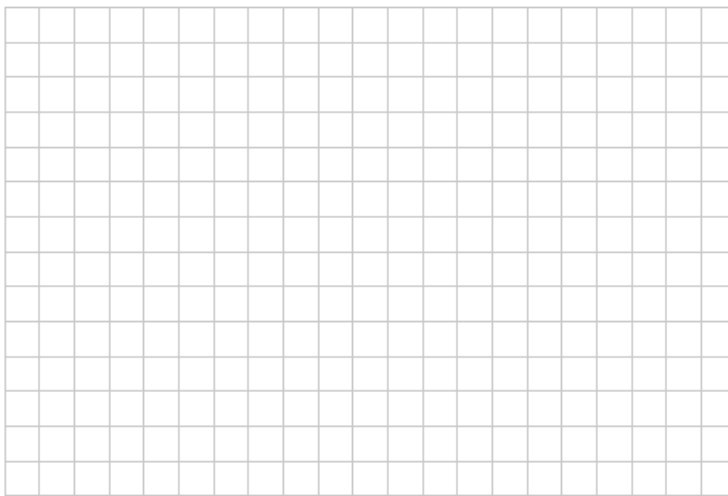
Trigonometry 2 – Questions Handout

Longer questions

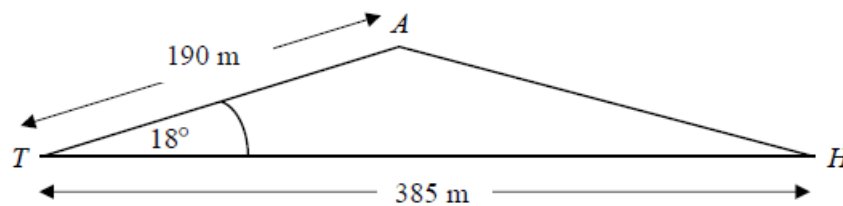
Question 6.

2015 Paper 2, Q9 [45 marks]

- (a) Joan is playing golf. She is 150 m from the centre of a circular green of diameter 30 m. The diagram shows the range of directions in which Joan can hit the ball so that it could land on the green. Find α , the measure of the angle of this range of directions. Give your answer, in degrees, correct to one decimal place.



- (b) At the next hole, Joan, at T , attempts to hit the ball in the direction of the hole H . Her shot is off target and the ball lands at A , a distance of 190 metres from T , where $|\angle ATH| = 18^\circ$. $|TH|$ is 385 metres. Find $|AH|$, the distance from the ball to the hole, correct to the nearest metre.





Trigonometry 2 – Questions Handout

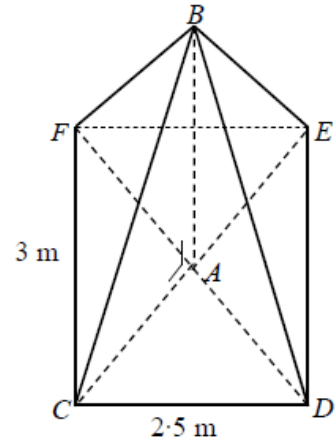
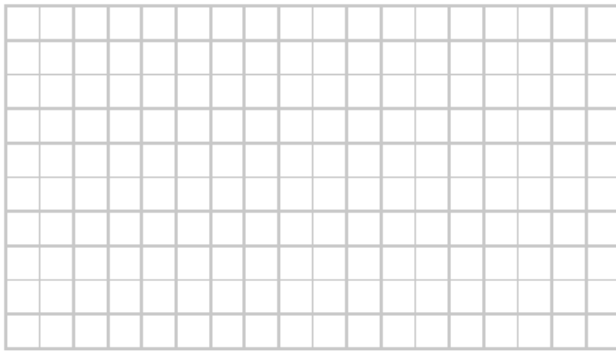
Question 7.

2016 Paper 2, Q7 [55 marks]

A glass Roof Lantern in the shape of a pyramid has a rectangular base $CDEF$ and its apex is at B as shown. The vertical height of the pyramid is $|AB|$, where A is the point of intersection of the diagonals of the base as shown in the diagram.

Also $|CD| = 2.5$ m and $|CF| = 3$ m.

- (a) (i) Show that $|AC| = 1.95$ m, correct to two decimal places.



- (ii) The angle of elevation of B from C is 50° (i.e. $|\angle BCA| = 50^\circ$).
Show that $|AB| = 2.3$ m, correct to one decimal place.

- (iii) Find $|BC|$, correct to the nearest metre.

- (iv) Find $|\angle BCD|$, correct to the nearest degree.

- (v) Find the area of glass required to glaze all four triangular sides of the pyramid.
Give your answer correct to the nearest m^2 .

- (b) Another Roof Lantern, in the shape of a pyramid, has a square base $CDEF$. The vertical height $|AB| = 3$ m, where A is the point of intersection of the diagonals of the base as shown.

The angle of elevation of B from C is 60°

(i.e. $|\angle BCA| = 60^\circ$).

Find the length of the side of the square base of the lantern.

Give your answer in the form \sqrt{a} m, where $a \in \mathbb{N}$.

