National 5 Mathematics

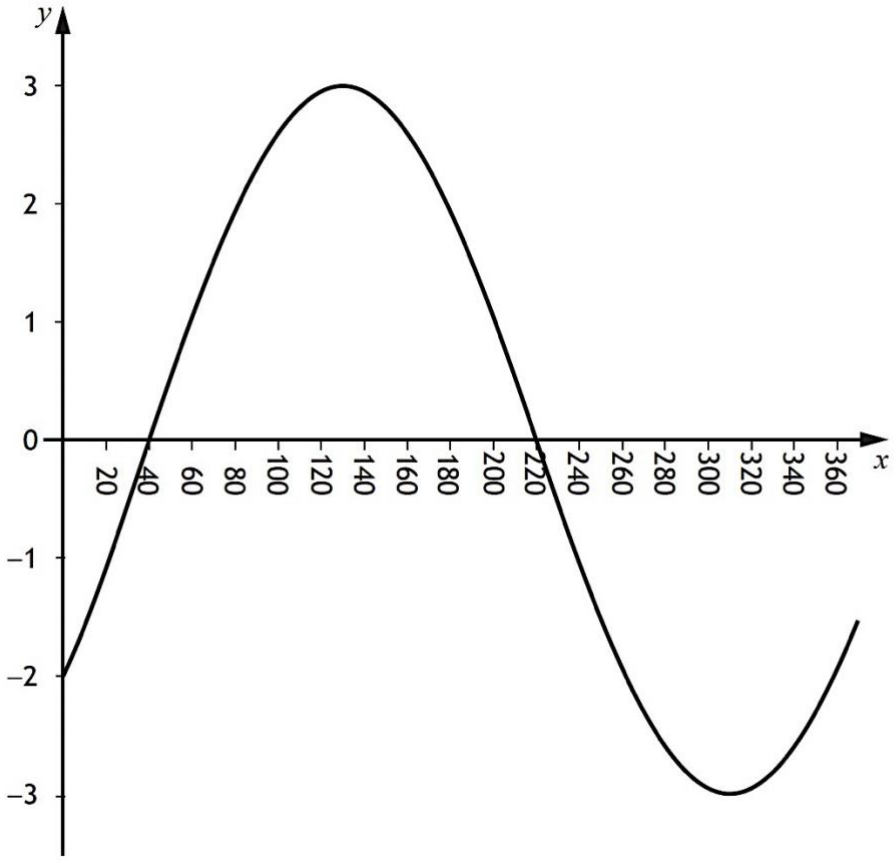
Trigonometry - Questions

Note that 'Trigonometry' is a different topic from 'Using Trigonometry' which includes the Sine and Cosine Rules, and bearings.

Marks are indicated in brackets after each question number

2014 Paper 1 Question 10, (2)

The graph of $y = a\sin(x+b)°$, $0 \le x \le 360$, is shown below.



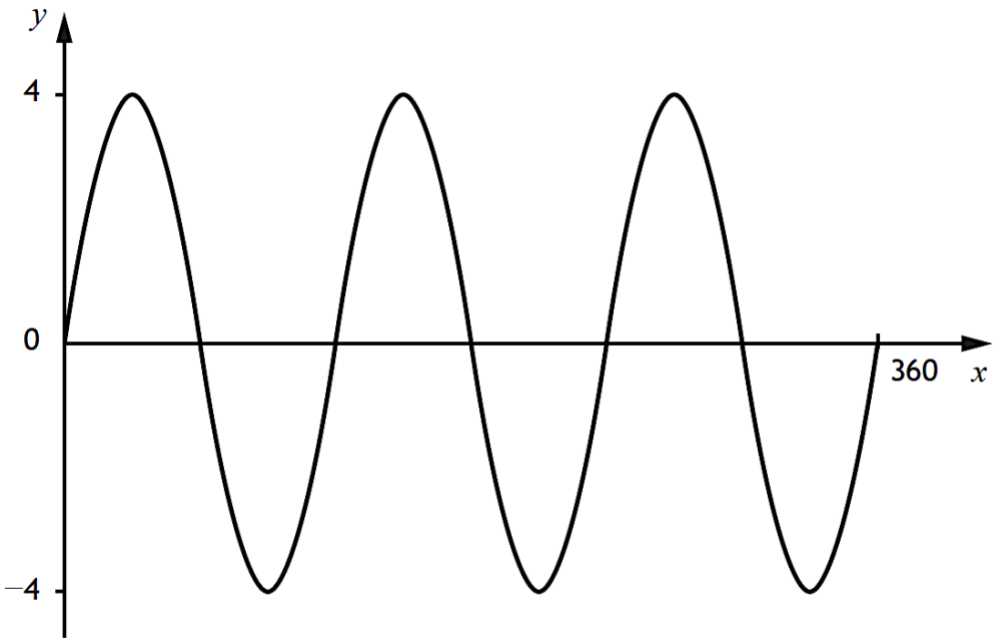
Write down the values of *a* and *b*.

2014 Paper 2 Question 12, (3)

Solve the equation $11\cos x° - 2 = 3$, for $0 \le x \le 360$.

2015 Paper 1 Question 6, (2)

Part of the graph of $y = a \sin bx^\circ$ is shown in the diagram.



State the values of a and b.

2015 Paper 1 Question 9, (2)

Write the following in order of size starting with the smallest.

$\cos 90^\circ$ $\cos 100^\circ$ $\cos 300^\circ$

Justify your answer.

2016 Paper 1 Question 11, (2)

Simplify

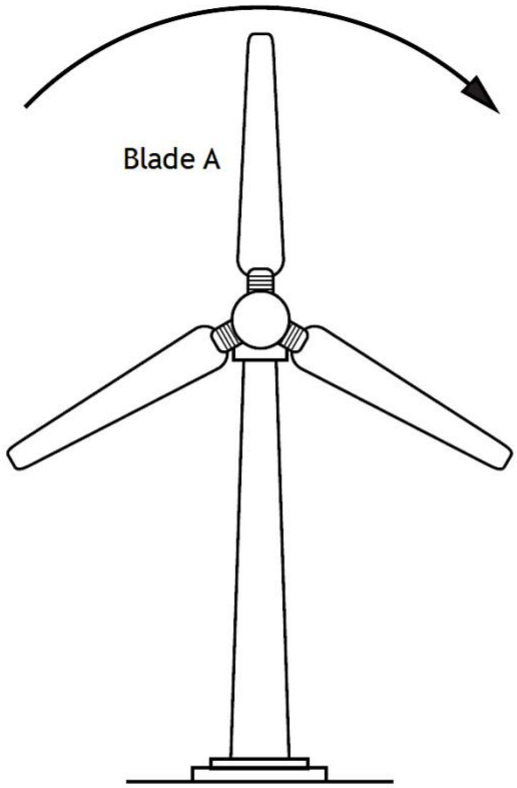
$$\tan^2 x^\circ \cos^2 x^\circ .$$

2016 Paper 2 Question 14, (3)

Solve the equation $2 \tan x^\circ + 5 = -4$, for $0 \leq x \leq 360$.

2017 Paper 2 Question 15, (1) (1) (4)

A wind turbine has three blades as shown below.



The height, h metres, of the tip of blade A above the ground in each rotation is given by

$$h = 40 + 23\cos x°, \qquad 0 \leq x < 360$$

where x is the angle blade A has turned clockwise from its vertical position.

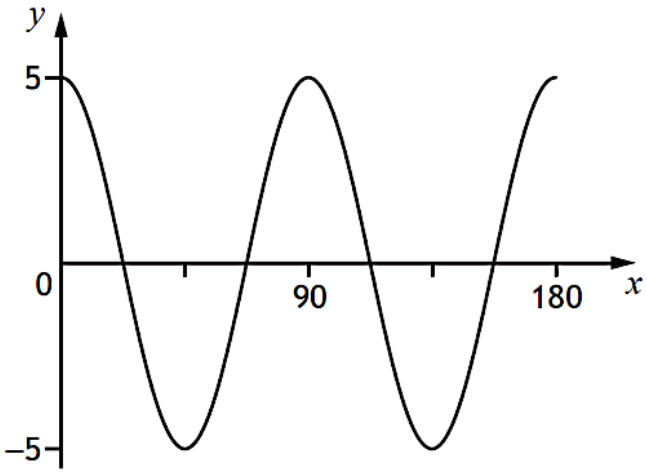
(a) Calculate the height of the tip of blade A after it has turned through an angle of 60°.

(b) Find the minimum height of the tip of blade A above the ground.

(c) Calculate the values of x for which the tip of blade A is 61 metres above the ground.

2018 Paper 1 Question 6, (2)

Part of the graph of $y = a\cos bx°$ is shown in the diagram.



State the values of a and b.

2018 Paper 1 Question 12, (1)

Given that $\cos 60° = 0{\cdot}5$, state the value of $\cos 240°$.

2018 Paper 1 Question 18, (2)

Express $\sin x° \cos x° \tan x°$ in its simplest form.

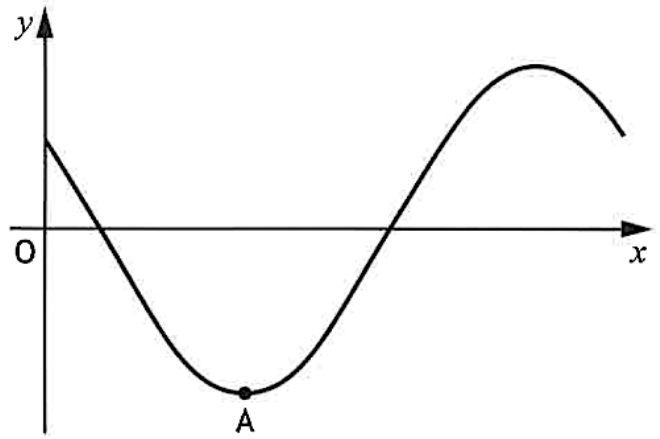
Show your working.

2018 Paper 2 Question 8, (3)

Solve the equation $7\sin x° + 2 = 3$, for $0 \leq x < 360$.

2019 Paper 1 Question 13, (2)

Part of the graph of $y = 3\cos(x+45)°$ is shown in the diagram.



The graph has a minimum turning point at A.

State the coordinates of A.

2019 Paper 2 Question 14, (3)

Solve the equation $5\cos x° + 2 = 1, \quad 0 \leq x < 360.$

2019 Paper 2 Question 17, (2)

Expand and simplify

$$(\sin x° + \cos x°)^2.$$

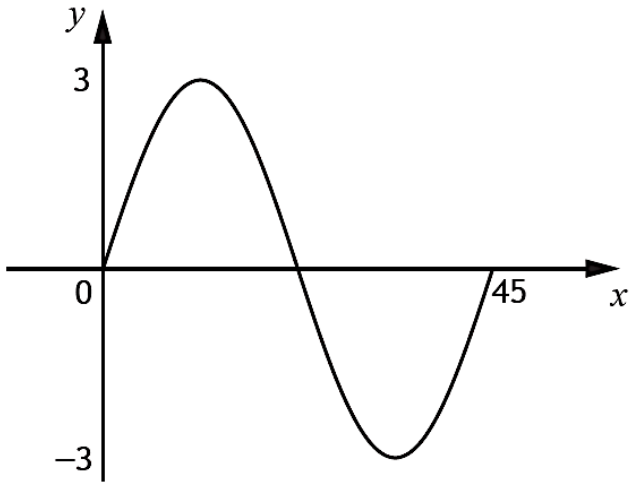
Show your working.

2022 Paper 2 Question 9, (3)

Solve the equation $3\sin x° + 4 = 6$, for $0 \leq x \leq 360$.

2022 Paper 1 Question 8, (1) (1)

Part of the graph of $y = a\sin bx^\circ$ is shown in the diagram.



(a) State the value of a.

(b) State the value of b.

2022 Paper 2 Question 13, (2)

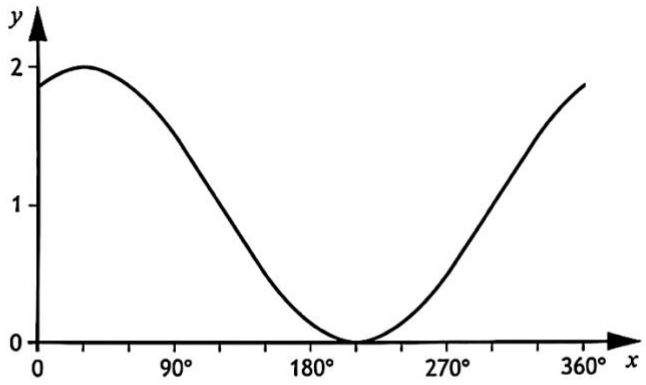
Simplify $\dfrac{\sin x^\circ + 2\cos x^\circ}{\cos x^\circ}$.

2023 Paper 1 Question 11, (1)

Given that $\sin 30° = 0.5$, state the value of $\sin 330°$.

2023 Paper 1 Question 13, (1) (1)

Part of the graph of $y = \cos(x + a)° + b$ is shown.

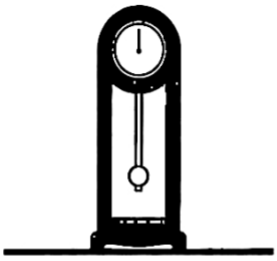


(a) State the value of a.

(b) State the value of b.

2023 Paper 2 Question 11, (4)

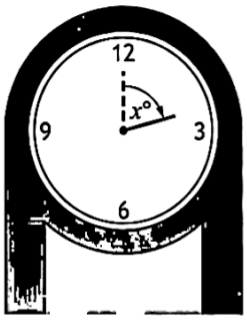
Anna has a grandfather clock in her house.



The height of the tip of the hour hand above the floor, in centimetres, is given by

$$h = 20\cos x° + 147$$

where $x°$ is the angle the **hour hand** has rotated through since 12 o'clock.



Calculate the first two values of x for which the tip of the hour hand is 150 centimetres above the floor.

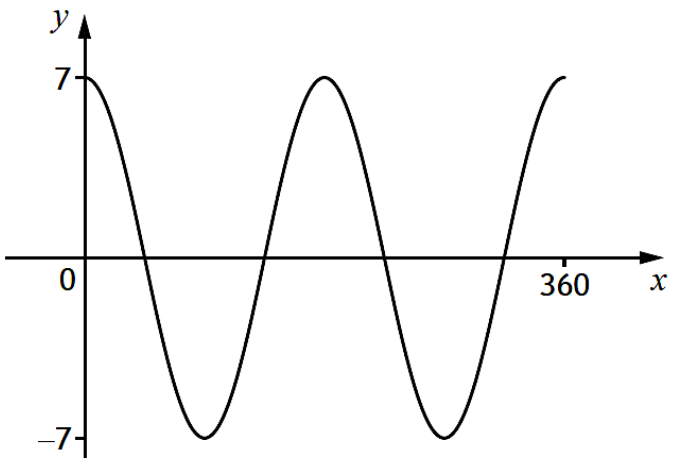
2023 Paper 2 Question 13, (2)

Simplify $2\sin^2 x° + 2\cos^2 x°$.

Show your working.

2024 Paper 1 Question 8, (1) (1)

The graph of $y = a\cos bx°$, $0 \leq x \leq 360$, is shown.



(a) State the value of a.

(b) State the value of b.

2024 Paper 1 Question 11, (3)

Solve the equation $17\sin x° + 1 = 9$, for $0 \leq x < 360$.

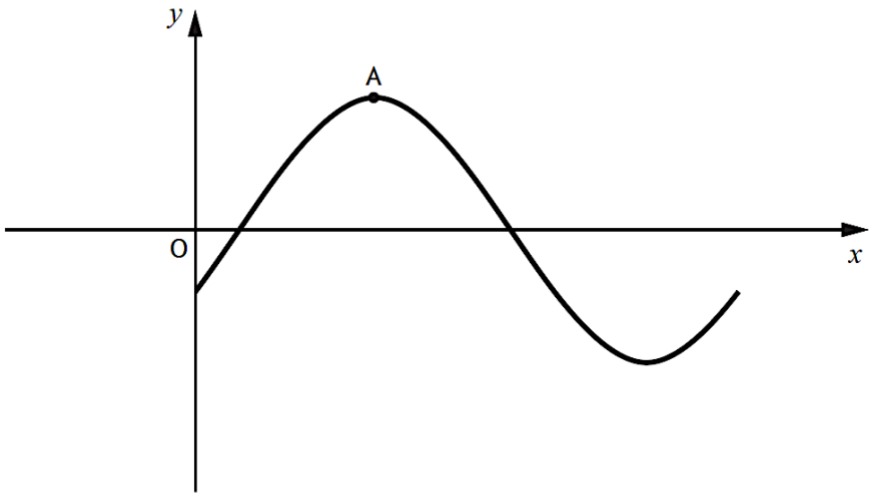
2024 Paper 2 Question 16, (3)

Express $3\cos^2 x° - 1$ in the form $a + b\sin^2 x°$.

Show your working.

2025 Paper 1 Question 8, (2)

Part of the graph of $y = 2\sin(x - 30)°$ is shown in the diagram.



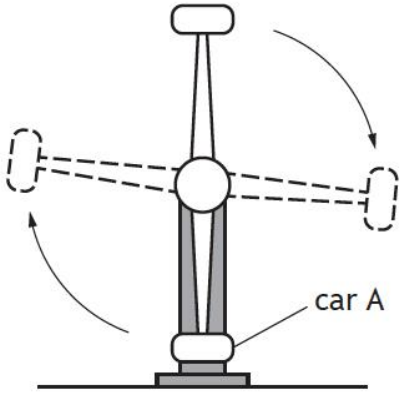
The graph has a maximum turning point at A.

State the coordinates of A.

2025 Paper 2 Question 14, (4)

A ride at a theme park has a car attached to each end of a rotating arm.

The starting position of car A is shown in the diagram.



As the arm rotates clockwise, the height, h metres, of car A above the ground in each rotation is given by

$$h = 10 - 8\cos x°, \quad 0 \leq x < 360$$

where $x°$ is the angle the arm has turned from car A's starting position.

Calculate the **two** values of x for which the height of car A is 13 metres above the ground.