

IB Maths: AA SL

Past Paper 1

Question Paper

These practice questions can be used by students and teachers and is Suitable for IB Maths AA SL Past Papers

Course	IB Maths
Section	Set C
Topic	Past Paper 1
Difficulty	Medium

Level: IB Maths

Subject: IB Maths AA SL

Board: IB Maths

Topic: Past Paper 1

Question 1

The following diagram shows a circle with centre O and radius 6 cm . Points X and Y are points on the circumference and $\widehat{XOY} = \theta$ radians.

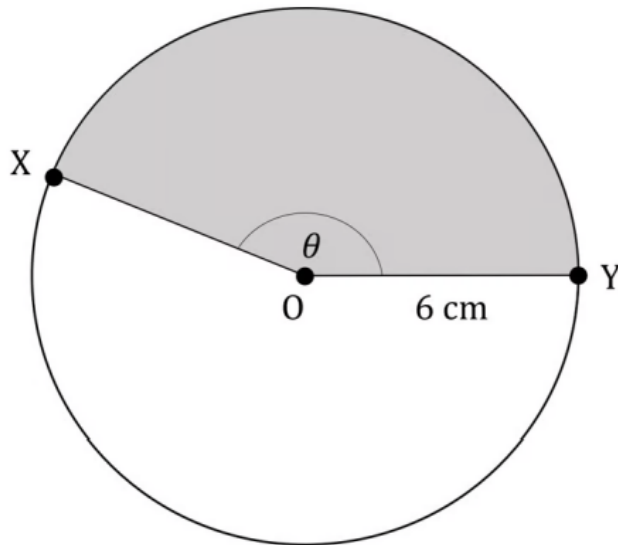


diagram not to scale

The perimeter of the shaded sector is 30 cm .

(a) Find the value of θ .

[3 marks]

(b) Hence, find the exact area of the **unshaded** sector.

[3 marks]

Question 2

Prove that the square of an odd number is always odd.

[4 marks]

Question 3

(a) Show that the equation $2 \sin^2 x + 3 \cos x = 0$ can be written in the form $a \cos^2 x + b \cos x + c = 0$, where a , b and c are integers to be found.

[2 marks]

(b) Hence, or otherwise, solve the equation $2 \sin^2 x + 3 \cos x = 0$ for $-180^\circ \leq x \leq 180^\circ$.

[3 marks]

Question 4

In the expansion of $(x + h)^5$, where $h \in \mathbb{R}$, the coefficient of the term in x^3 is 320.

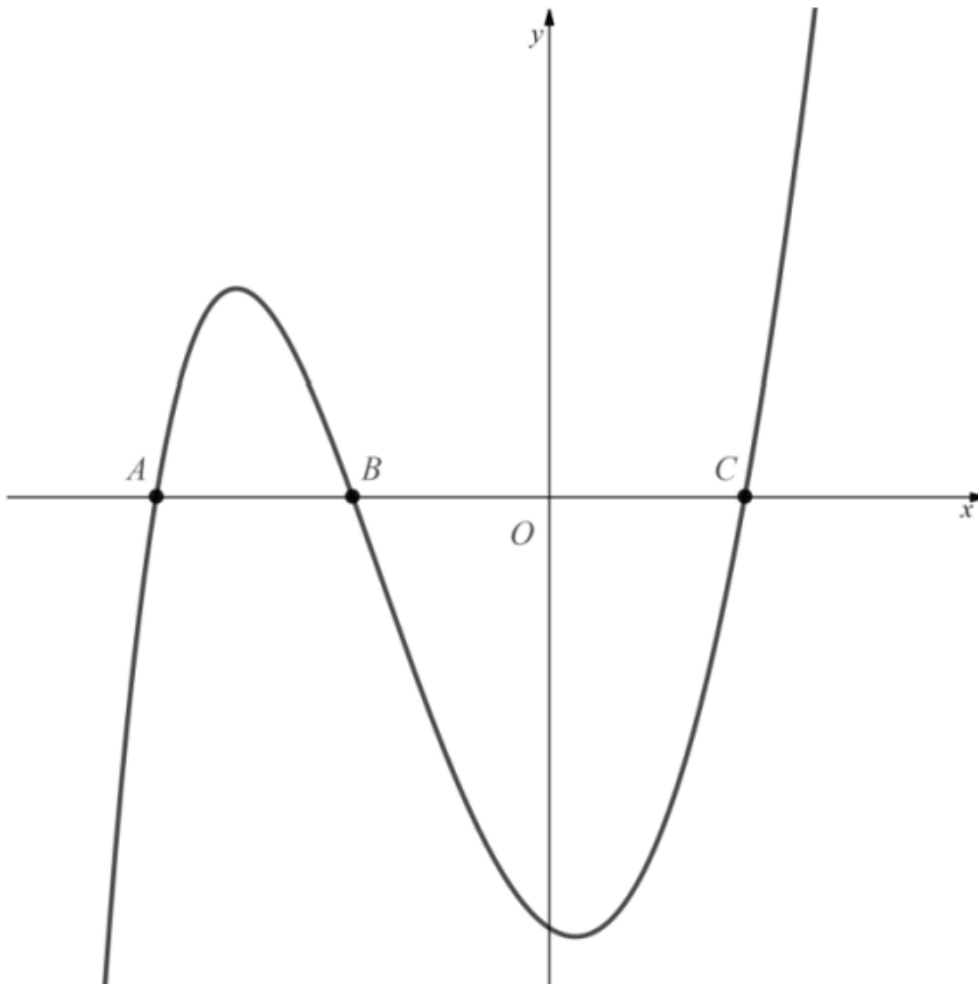
Find the possible values of h .

[5 marks]

Question 5

The diagram below shows part of the graph of $y = f(x)$, where $f(x)$ is the function defined by

$$f(x) = (x^2 - 1) \ln(x + 3), \quad x > -3$$



Points A , B and C are the three places where the graph intercepts the x -axis.

(a) Find $f'(x)$.

[4 marks]

(b) Show that the coordinates of point A are $(-2, 0)$.

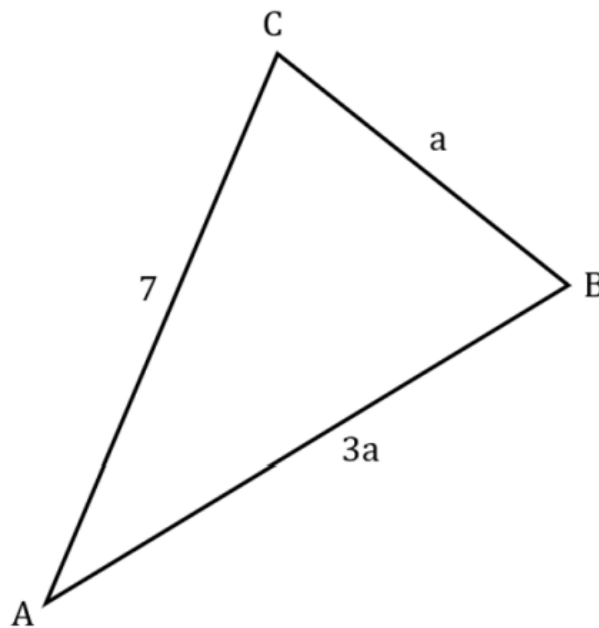
[2 marks]

(c) Find the equation of the tangent to the curve at point A .

[3 marks]

Question 6

The following triangle shows triangle ABC , with $AB = 3a$, $BC = a$ and $AC = 7$.

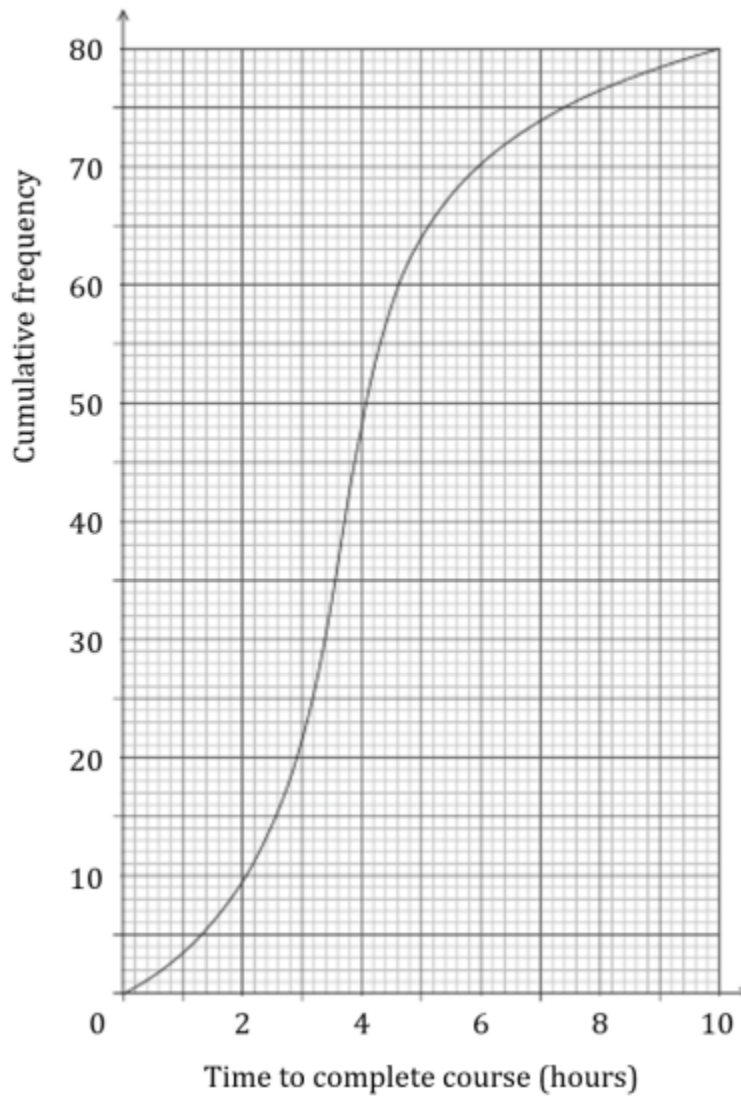


Given that $\cos \widehat{ABC} = \frac{1}{2}$, find the area of the triangle. Give your answer in the form $\frac{p\sqrt{3}}{r}$ where $p, q \in \mathbb{R}$.

[7 marks]

Question 7

The following cumulative frequency curve shows the number of hours, h , students took to complete their online driving course. The data is taken from 80 students, randomly selected from a large sample over a 12 month period.



(a) Find the median number of hours spent completing the online driving course.

[2 marks]

(b) Find the number of students whose online course time was within 1 hour of the median.

[2 marks]

(c) Calculate the interquartile range.

[2 marks]

The same information is represented by the following table.

Hours, h	$0 < h \leq 2$	$2 < h \leq 4$	$4 < h \leq 7$	$7 < h \leq 10$
Frequency	9	p	q	6

(d) Find the value of p and the value of q .

[3 marks]

It is known that 10% of students take longer than d hours to complete the online driving course.

(e) Find the value of d .

[3 marks]

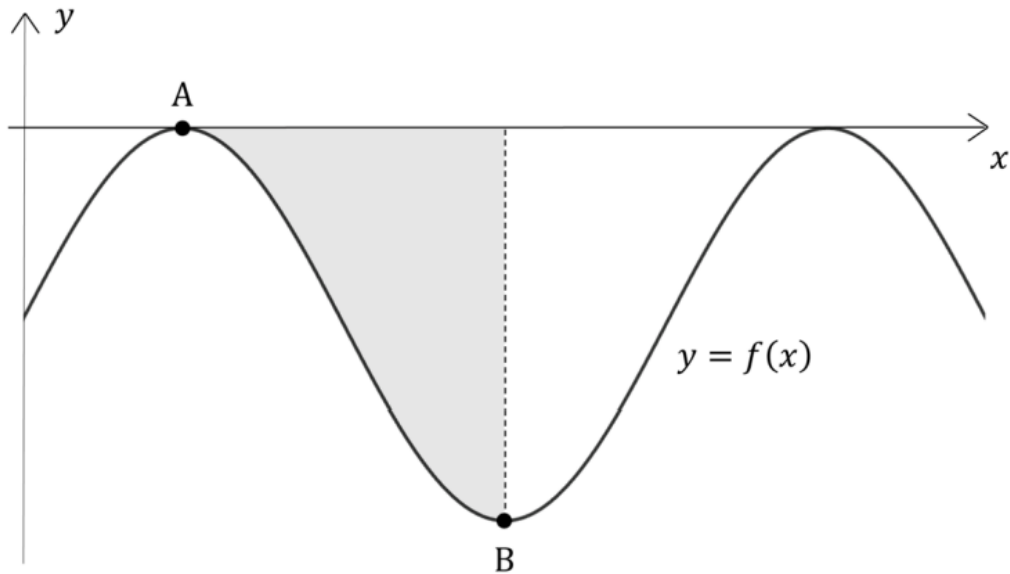
It is known that over a 12 month period, 4000 students in total sat the online driving course.

(f) Estimate the number of students over a 12 month period who took less than 3 hours to complete the course.

[3 marks]

Question 8

Consider the function f defined by $f(x) = 3 \sin x - 3$, for $0 \leq x \leq 3\pi$.
The following diagram shows the graph of $y = f(x)$.



The graph of f touches the x -axis at point A as shown. Point B is a local minimum of f .
The shaded region is the area between the graph of $y = f(x)$ and the x -axis, between the points A and B.

(a) Find the x -coordinates of A and B.

[4 marks]

(b) Show that the area of the shaded region is 3π units².

[5 marks]

The right cone in the diagram below has a curved surface area of twice the shaded area in the previous part of the question.

The cone has a slant height of 3, base radius r , and height h .

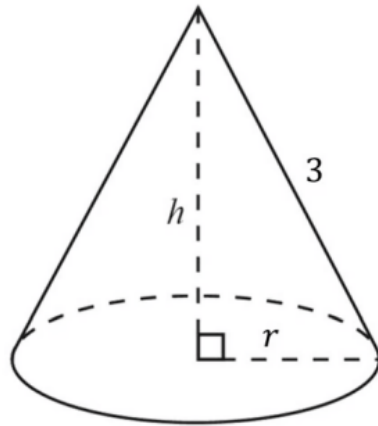


diagram not to scale

(c) Find the value of r .

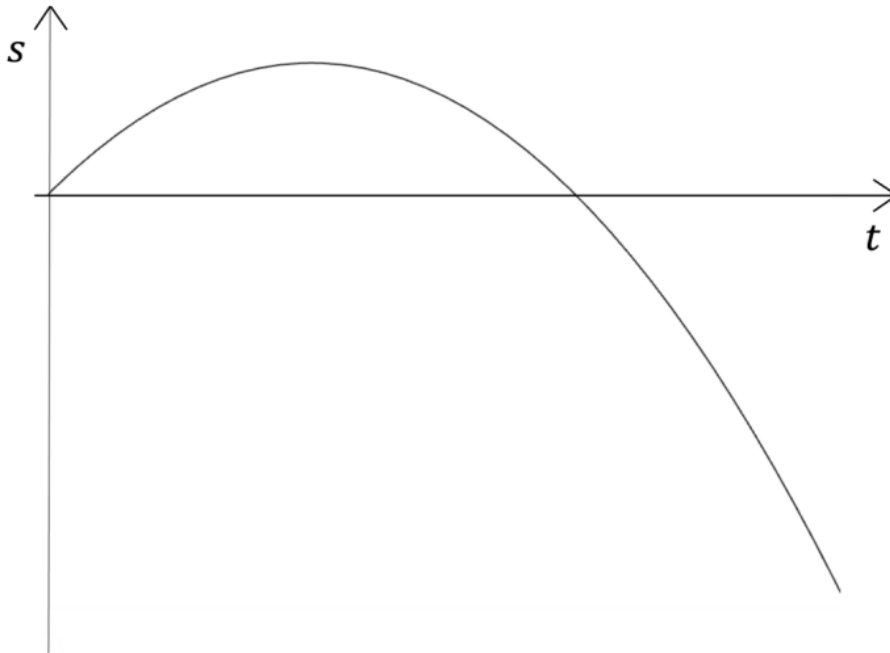
[2 marks]

(d) Hence find the volume of the cone.

[4 marks]

Question 9

Particle A travels in a straight line such that its displacement, s meters, from a fixed origin after t seconds is given by $s(t) = t(6 - t)$, for $0 \leq t \leq 9$, as shown in the following diagram.



Particle A starts at the origin and passes through the origin again when $t = p$.

(a) Find the value of p .

[2 marks]

Particle A changes direction when $t = q$.

(b) (i) Find the value of q .

(ii) Find the displacement of particle A from the origin when $t = q$.

[4 marks]

(c) Find the distance of particle A from the origin when $t = 9$.

[2 marks]

The total distance travelled by particle A is given by d .

(d) Find the value of d .

[2 marks]

A second particle, particle B, travels along the same straight line such that its velocity is given by $v(t) = 5t - 10$, for $t \geq 0$.

When $t = k$, the distance travelled by particle B is d .

(e) Find the value of k .

[4 marks]