

IB Maths: AA HL

Number & Algebra Toolkit

Topic Questions

These practice questions can be used by students and teachers and is Suitable for IB Maths AA HL Topic Questions

Course	IB Maths
Section	1. Number & Algebra
Topic	1.1 Number & Algebra Toolkit
Difficulty	Medium

Level: IB Maths

Subject: IB Maths AA HL

Board: IB Maths

Topic: Number & Algebra Toolkit

Question 1

Let $Q = \frac{30 \sin 2a}{8b}$, where $a = 45^\circ$ and $b = 2$.

(a) Calculate the exact value of Q .

[2 marks]

(b) Give your answer from part (a) correct to

- (i) two decimal places
- (ii) two significant figures.

[2 marks]

Question 2

Let $R = \frac{4x}{6 \cos 5y}$, where $x = 1.25$ and $y = 36^\circ$.

(a) Write the angle of y in radians.

[1 marks]

(b) Find the value of R . Give your answer as a fraction.

[2 marks]

(c) Give your answer from part (b) to

- (i) one decimal place
- (ii) three significant figures.

[2 marks]

Question 3

Consider the numbers $a = 4.14 \times 10^6$ and $b = 2.54 \times 10^{-7}$.

(a) Calculate $C = \sqrt[10]{\left(\frac{a}{b}\right)^3}$. Give your answer correct to the

(i) nearest integer

(ii) three significant figures.

[3 marks]

(b) Give your answer to part (a) (i) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[2 marks]

Question 4

A cylinder has radius of 12.7 cm and height of 14.4 cm.

(a) Calculate the volume of the cylinder correct to

(i) one decimal place

(ii) three significant figures

(iii) the nearest integer.

[3 marks]

(b) Write your answer to part (a) (ii) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[2 marks]

Question 5

A rectangular field has length, L , of 25.2 m and width, W , of 21.4 m, each correct to 1 decimal place.

(a) Calculate the lower and upper bound for

- (i) L
- (ii) W .

[2 marks]

(b) Calculate the lower and upper bound for the

- (i) perimeter, P
- (ii) area, A , of the field.

[4 marks]

Question 6

Calculate the following, giving your answer in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

- (i) $4 \times (6.2 \times 10^{-5})$
- (ii) $(4 \times 10^5) - (5 \times 10^4)$
- (iii) $(4321^{-1})(1.2 \times 10^{-1})$.

[6 marks]

Question 7

Consider the following four numbers.

$$a = 0.272 \quad b = 0.0272 \times 10^5 \quad c = e(10e)^{-1} \quad d = 2.72 \times 10^2$$

(a) Write down

(i) the number that is in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$

(ii) the largest of these numbers.

[2 marks]

(b) (i) Find the value $a + b - c + d$.

(ii) Give your answer to part (b)(i) in the form $a \times 10^k$, where $1 \leq a \leq 10$ and $k \in \mathbb{Z}$.

[4 marks]

Question 8

Solve the following systems of linear equations using technology.

(i)

$$2x - 5y + z = 10$$

$$3x + 3y - 2z = 1$$

$$x + y + z = 2$$

(ii)

$$x - 4y + 2z = -13$$

$$5x - 4y + 3z = 17$$

$$2x - 5y - z = -18$$

(iii)

$$5y + 5z = 20$$

$$x + 2y - z = -12$$

$$7x - 4z = -4$$

[9 marks]

Question 9

(a) Write $\frac{3}{x^2+5x+4}$ as a sum of partial fractions.

[2 marks]

(b) Write $\frac{9-x}{x^2+3x-10}$ as a sum of partial fractions.

[3 marks]

(c) Write $\frac{3x-23}{2x^2-5x-12}$ as a sum of partial fractions.

[3 marks]

Question 10

Write $\frac{33-12x}{(x+1)(x-2)^2}$ as the sum of partial fractions in the form $\frac{A}{x+1} + \frac{B}{x-2} + \frac{C}{(x-2)^2}$.

[5 marks]