IB Maths: AA HL

Systems of Linear Equations

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	1.10 Systems of Linear Equations
Difficulty	Medium

Level: IB Maths

Subject: IB Maths AA HL

Board: IB Maths

Topic: Systems of Linear Equations

Question 1

a)

Solve the following simultaneous equations.

$$5x - 3y = 19$$
$$2x + y = 1$$

[2 marks]

b)

$$a - 11b = 23$$
$$5a + 5b = -5$$

[2 marks]

c)

$$\frac{5}{4} - m\ \frac{3}{2}\ n = -\ \frac{9}{8}$$

$$\frac{1}{2}\ m + \frac{5}{3}\ n = \frac{11}{36}$$

[3 marks]

Question 2

Use the method of substitution to solve the following systems of linear equations.

(i)

$$\begin{aligned} x - y - z &= 0 \\ 2x + y - 3z &= 5 \\ 2x - 3y + 4z &= 4 \end{aligned}$$

(ii)

$$\begin{aligned} 2x - y - 3z &= 3 \\ 3x + 2y - 2z &= 12 \\ 2x + y + 2z &= -7 \end{aligned}$$

[8 marks]

Question 3

A festival charges \$x USD for an adult ticket, \$y USD for a child ticket and \$ zUSD for a car parking pass.

Given that 4 adult tickets, 7 child tickets and 2 car passes cost \$540 USD, 2 adult tickets, 2 child tickets and 1 car pass cost \$210 USD and 7 adult tickets and 3 car passes cost \$450 USD,

(i)

set up a system of linear equations in three unknowns,

(ii)

find the values of x, y, and z.

[6 marks]

Question 4

Solve the following system of linear equations.

$$3x + 2y - z = 1$$
$$x - y + 5z = -2$$
$$2x + y = 3$$

[6 marks]

Question 5

Solve the following the system of linear equations.

$$2x + 2y - 3z = -8$$
$$3x + 2y - z = 0$$
$$x - y + z = 11$$

[6 marks]

Question 6

Consider the system of equations

$$-6a + (k - 3)b = 1$$
$$3ka - 5b = 4$$

a)

Find the values of the real parameter k such that the system has a unique solution.

[4 marks]

b)

Find the unique solution in terms of k.

[4 marks]

Question 7

Solve the following system of equations using row operations.

$$3x + 9y - 3z = 45$$
$$6x + 3y + 3z = 21$$
$$3x - 3y - 6z = 0$$

[6 marks]

Question 8

Consider the following system of equations

$$2x + y - 3z = -4$$
$$x - y + 2z = 2$$
$$4x + 2y - 6z = k$$

where $k \in \mathbb{R}$

Show that the system has no unique solution for any value of k.

[6 marks]