

Test 4

Thursday 27.02.2025

Maths IB₁ HLSubjects : *Equations of Lines 2D & 3D*

Total : / 19

Name:

Question 1

[9 marks]

The line L_1 is given by the cartesian form $\frac{x-3}{2} = \frac{z-3}{6} = \frac{y+1}{-3}$

- i) Find a *director vector* \vec{v}_1 for L_1
- ii) Find a point A of L_1
- iii) Show that point B:(1,0,4) is *not* a point of L_1
- iv) Give a *vector equation* of the line L_2 , given that L_2 is *parallel* to L_1 and passes through B.

Question 2

[6 marks]

The line L is given by the *cartesian form* $\frac{x-13}{12} = \frac{y+1}{-3} = \frac{z-k}{6}$

- i) Find k such that L passes through point $P: (1, 2, 3)$
- ii) Then find x_Q and z_Q assuming that point $Q: (x_Q, -1, z_Q)$ is on L .
- iii) The line L_{AB} passes through A(5,-1,3) et B(1,0,1)

Find a *director vector* for L_{AB} , and write a *vector equation* of L_{AB} .

Can we say L_{AB} is *parallel* to L ? (please justify your answer)

Question 3

[4 marks]

A racing car is moving parallel to the line $\frac{x-18}{3} = \frac{y+19}{-4} = \frac{z+20}{5}$ at a speed of $\sqrt{200}$ m/s.

(the position is given in *meter* and the time t in *second*)

What is the *velocity* of the car?

Bonus

[+3]

Back to question 2 : We know that P and Q both lie on the line L .

Find the point R on L , such that distance PR = distance PQ.