**IB Math HL1: 14I Parallelism**

1. Find  and  so that  and **b** are parallel if , .

Hint: **b** is a multiple of **a**.

2. Given ,

a. Find a unit vector in the direction of **a**.

Step 1: Find 

Step 2: Divide **a** by its own magnitude.

b. Find a vector of length 4 in the direction of **a**.

. Show that A(-1, 2, 3), B(4, 0, -1), and C(14, -4, -9) are collinear.

Hint: Find  and . What do you notice about these vectors?

4. Find a and b if K(1, -1, 0), L(4, -3, 7), and M(a, 2, b) are collinear.

**14J Dot Product**

If  and , the **Dot Product** of **v** and **w** is

defined as 

Example 1 If  and , find 

**14J Applications of the Dot Product**

Use the Law of Cosines to write an equation relating the

magnitudes of these vectors. Solve for.

Where  and 

Fill in the blanks with right, acute, or obtuse.

If , then  is \_\_\_\_\_\_\_\_\_\_\_

If , then  is \_\_\_\_\_\_\_\_\_\_\_

If , then  is \_\_\_\_\_\_\_\_\_\_\_

Example 1: Find the angle between  and .

Example 2

Find *a* if  and  are perpendicular.

More Practice)

1 Consider the prism shown

|  |  |
| --- | --- |
| a. Find the vectors  and . |  |
| b. Find the vector in opposite direction of  with magnitude of 3 units. |  |
| c. Express the angle between the two diagonals of the prism in terms of arccosine.  |  |

2. Given three points: A (1, 4, 2), B (0, 8, 0), and C(4, 10, 3).

a. Find 

c. Find the angle between  and  .

3. Find the velocity vector of a car moving in the direction  with speed of 300 km/hr.

4. Find the values of a and b so that P(-6, a, 2), Q(4, 6, 8) and R (b, 3, 17) are collinear.