HIGHER

3.4 Vectors in Two Dimensions: Notation, Magnitude and Arithmetic: 30-minute Pack

EDEXCEL 4MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write down whether the following pairs of vectors are parallel, perpendicular or neither. (i) [2; 4] and [1; 2] (ii) [3; -6] and [2; 1]

(Total for Question 1 is 2 marks)

2 Are the vectors [2; -3] and [4; -6] parallel? Give a reason.

(Total for Question 2 is 3 marks)

3 The point A has position vector OA = [-7; 6] and the point B has position vector OB = [-4; -5], where O is the origin.
Find the vector AB.

(Total for Question 3 is 2 marks)

4 The point P(-4, 0) is translated by the vector [8; -2] to the point Q. Find the distance PQ. Give your answer as an integer or as a surd in its simplest form.

(Total for Question 4 is 3 marks)

© Revision Library | revisionlibrary.co.uk

5 a = [3; -1] and b = [7; 6]
Work out 2a + b as a column vector.

(Total for Question 5 is 3 marks)

---

6 v = [-4; -1] and w = [-4; 0]
Find |v + 2w|. Give your answer as an integer or as a surd in its simplest form.

(Total for Question 6 is 3 marks)

---

7 With a = [2; -3] and b = [-1; 4] as above, calculate the vector a + b and give your answer in column form.

(Total for Question 7 is 2 marks)

---

8 Given vectors m = [6; 15] and n = [-2; -5], show that m = -3 n, and hence state whether m and n are parallel. Give working.

(Total for Question 8 is 4 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 3.4 Vectors in Two Dimensions: Notation, Magnitude and Arithmetic: 30-minute Pack

Question 1

i) parallel, ii) perpendicular; both correct statements	**B1**
brief justification implicit in identification, e.g. first is a scalar multiple of the other, second has dot product 3 x 2 + (-6) x 1 = 0	**B1**

Answer: i) parallel ii) perpendicular

Question 2

compares the ratios of corresponding components	**M1**
2 and 2	**A1**
Yes, [4; -6] = 2 x [2; -3]	**A1**

Answer: Yes, [4; -6] = 2 x [2; -3]

Question 3

uses AB = OB - OA	**M1**
AB = [3; -11]	**A1**

Answer: [3; -11]

Question 4

PQ is the magnitude of the translation vector	**M1**
$\sqrt{(8)^2 + (-2)^2} = \sqrt{68}$	**M1**
PQ = $2\sqrt{17}$	**A1**

Answer: $2\sqrt{17}$

Question 5

finds 2a = [6; -2] or b = [7; 6]	**M1**
adds corresponding components	**M1**
[13; 4]	**A1**

Answer: [13; 4]

Question 6

finds v + 2w = [-12; -1]	**M1**
uses $\sqrt{(-12)^2 + (-1)^2} = \sqrt{145}$	**M1**
$\sqrt{145}$	**A1**

Answer: $|v + 2w| = \sqrt{145}$

Question 7

adds corresponding components 2 + (-1) and -3 + 4	**M1**
a + b = [1; 1] cao	**A1**

Answer: [1; 1]

Question 8

compares components and shows factor -3: -3[-2; -5] = [6;15]	**M1**
states the conclusion m = -3 n	**M1**
states that since one is a scalar multiple of the other they are parallel	**B1**
final statement is correct and clear, cao	**A1**

© Revision Library | revisionlibrary.co.uk