Chapter 3: Vectors

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c) $A \cdot B = 2 B \cdot A$ d) $\underline{A \cdot B} = \underline{B} \cdot \underline{A}$ 8The magnitude of $A \times B$ equal toa) $A B \cos\theta$ b) $\underline{A B \sin\theta}$ c) $-A B \sin\theta$ d) $A B \tan\theta$ 9A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axisa) 25c) 55		a) $A \cdot B \neq B \cdot A$		
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8The magnitude of $A \times B$ equal toa) $A B \cos\theta$ b) $\underline{A B \sin\theta}$ c) $-A B \sin\theta$ d) $A B \tan\theta$ 99A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axisa) 25c) 55		c) $A \cdot B = 2 B \cdot A$		
a) $A B \cos\theta$ b) $\underline{A B \sin\theta}$ c) $-A B \sin\theta$ d) $A B \tan\theta$ 9 A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axis a) 25 c) 55		$\mathbf{d}) \ \underline{A \cdot B} = \underline{B \cdot A}$		
b) $\underline{AB \sin\theta}$ c) $-AB \sin\theta$ d) $AB \tan\theta$ 9 A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axis a) 25 c) 55	8	The magnitude of $A \times B$ e	qual to	
c) $-AB sin\theta$ d) $AB tan\theta$ 9A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axisa) 25c) 55		a) <i>A B cosθ</i>		
d) $A B tan\theta$ 9A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axisa) 25c) 55		b) <u>A B sin0</u>		
9 A vector B is given by its component $B_x = 2.5$ and $B_y = 7.5$. what the angle does vector B makes with the positive x-axis a) 25 c) 55		c) $-AB\sin\theta$		
angle does vector B makes with the positive x-axisa) 25c) 55		d) $A B tan \theta$		
angle does vector B makes with the positive x-axisa) 25c) 55	9	A vector B is given by its component $B_x = 2.5$ and $B_v = 7.5$. what the		
a) 25 c) 55				
			*	
0) 10 0) 1		b) 18	d) 72	

10	Let's the vector $A = 5i + 6j - 7k$ the magnitude of this vector is		
10	a) 10.5 c) 20		
	b) 18 d) -10		
11	Let the vector $A = 3i - 5j + 4k$ and $B = 7i - 8j - 9k$. $S = A - B$ equal		
	a) 4i – 3j -13k		
	b) $-4i + 3j + 13k$		
	c) $\frac{10i - 12j - 13k}{10i - 12j - 13k}$		
	d) $-10i + 12j - 13k$		
12	The vectors A and its negative vector have		
	a) Same magnitude and direction		
	b) Same magnitude and opposite direction		
	c) Same magnitude only		
	d) No correct answer		
13	A vector has component $x = 6$ m and $y = 8$ m what its magnitude and		
	direction		
	a) 10 m and 30 degrees		
	b) 14 m and 37 degrees		
	c) <u>10 m and 53 degrees</u>		
	d) 14 m and 53 degrees		
14	Referring to the following figure, the correct		
	relation is: \vec{z}		
	×°		
	Ă		
	a) $A + B = C$		
	b) $B + C = A$		
	c) $A + C = B$		
	$\mathbf{d}) \ \underline{\mathbf{A} + \mathbf{B} + \mathbf{C} = 0}$		
15	Two vectors are given as follows: $A = -2i - 5j + 2k$, $B = -4i - 2j - 3k$. the		
	angle between the vectors is		
	a) 132 <u>c) 67</u>		
	b) 114 d) 41		
16	Two vectors are given as follows: $A = -3i + 6j - 5k$ and $B = -2i^2 + 3j^2 + k$		
	The vector dot product $A \cdot B$ equals:		
	a) -12 c) 14		
	b) <u>19</u> d) 30		
17	Two vectors are given as follows: A = $-2i - 5j + 2k$ and B = $-5i^2 - 2j^2 - 3k$		
	The vector dot product $A \times B$ equals:		
	a) 43 c) 12		
	b) 18 d) <u>31</u>		

10			
18	The magnitude of vector A is 6m and vector $B = 2i+j$ (m). If the angle (θ)		
	between them is 30 their so	calar product (A . B) is:	
	a) 16.4m ²	c) <u>11.6m²</u>	
	b) 2.24m ²	d) 32.8m ²	
19	5 55 5 5		
	relation $A + B = 4i + j$ are	:	
	a) (-1,-2)	c) (1,-4)	
	b) <u>(2,-5)</u>	d) (0,-3)	
20	0 If two vectors have same magnitude and are parallel to each other, then		
	they are said to be		
	a) Same	c) negative	
	b) Different	<u>d) equal</u>	
21	21 Position vector r of point A(3,4,5) is		
	a) <u>7.07</u>	c) 8.18	
	b) 3.21	d) 6.54	
22	Scalar product of two vectors is also known as		
	a) vector product	c) point product	
	b) dot product	d) both a and b	
23	Unit vectors are normally used to represent other vector's		
	a) place	c) velocity	
	b) direction	d) magnitude	
24 Dot product of A.B with angle 0 would produce results equal t		ngle 0 would produce results equal to	
	a) A	<u>c) A B</u>	
	b) B	d) zero	
25	Cross product of two same vectors is equal to		
	a) Zero	c) i	
	b) 1	d) j	

Solved the questions:

[1] Three vectors are given by A=6i, B=9j, and C=(3i+4j).

(a) Find the magnitude and direction of the resultant vector.

(b) What vector must be added to these three to make the resultant vector zero?

A=6i, B=9j C=(-3i+4j)

The resultant vector is A + B + C = 3i + 13j

The Magnitude of the resultant vector is 13.34 units

The direction is 77° with respect to the positive x-axis

(b) The vector must be added to these three to make the resultant vector zero is

-3i - 13j

[2] A particle moves from a point in the *xy* plane having cartesian coordinates (-3.00, -5.00) m to a point with coordinates (-1.00, 8.00) m.

(a) Write vector expressions for the position vectors in unitvector form for these two points.

(b) What is the displacement vector?

The vector position for the first point (-3,-5)m is

A = -3i - 5j

The vector position for the first point (-1,8)m is

 $\mathbf{B} = -\mathbf{i} + \mathbf{8j}$

(b) The displacement vector is

B - A = 2i + 3j

[3] Two vectors are given by A= 4i+3j and B= -i+3j.
Find (a) A.B and (b) the angle between A and B.
(a)
A.B = A_xB_x+A_yB_y
A.B = -4 + 9 = 5 units
(b)
cos θ = A.B/AB = 1/3.16
θ = 71.6°

[4] Vector A has a magnitude of 5 units, and B has a magnitude of 9 units. The two vectors make an angle of 50° with each other. Find A.B

A.B = A B cos θ A.B = 5 x 9 cos 50° = 28.9 unit

[5] For the three vectors A=3i+j-k, B= -i+2j+5k, and C= 2j-3k, find C.(A-B)

A - B = 4i - j - 6k C = 2j - 3k C.(A-B) = 0 - 2 + 16 = 14 unit [6] The scalar product of vectors A and B is 6 units. The magnitude of each vector is 4 units. Find the angle between the vectors.

A.B = 6 units A = B = 4 units $\cos \theta = 6/16$ $\theta = 67.9^{\circ}$

[7] The polar coordinates of a point are r = 5.5m and $q = 240^{\circ}$. What are the cartisian coordinates of this point?

$$x = r \cos q = 5.5 \times \cos 240^\circ = -2.75 \text{ m}$$

 $y = r \sin q = 5.5 \times \sin 240^\circ = -4.76 \text{ m}$

[8] A point in the *xy* plane has cartesian coordinates (-3.00, 5.00) m. What are the polar coordinates of this point?

المراد من السؤال هو التحويل من الاحداثيات الكارتيزية إلى القطبية. $r = \sqrt{9+25} = 5.8m$ T $\theta = \tan^{-1} \frac{5}{-3} = -59^{\circ}$

-59 with respect to the negative x-axis

 $\theta = 121^{\circ}$ with respect to the positive x-axis

 $(-3,5)m = (5.8m, 121^{\circ})$

[9] A point is located in polar coordinate system by the coordinates r = 2.5m and $q = 35^{\circ}$. Find the *x* and *y* coordinates of this point, assuming the two coordinate system have the same origin.

$$r = 2.5$$
 , $\theta = 35^{\circ}$
 $x = r \cos 35 = 2$
 $y = r \sin 35 = 1.4$

[10] Find the magnitude and direction of the resultant of three displacements having components (3,2) m, (-5, 3) m and (6, 1) m.

نحول كل نقطة من النقاط الثلاثة في السؤال إلى الصورة المتجهة كما يلي:

$$A = 3i + 2j$$

 $B = -5i + 3j$
 $C = 6i + j$
نوجد المحصلة بالجمع الإتجاهي
 $A + B + C = 4i$

[11] Obtain expressions for the position vectors with polar coordinates (a) 12.8m, 150°; (b) 3.3cm, 60°; (c) 22cm, 215°.

(a) 12.8m, 150° $x = r \cos \theta = 12.8 \cos 150 = -11.1m$ $y = r \sin \theta = 12.8 \sin 150 = -17.5 m$

A = -11.1i - 17.5jاستخدم نفس الطريقة لباقي النقاط لإيجاد متجه الموضع