Past-paper walk-through

Vectors in two dimensions ▪ E7.2

eXercise

Questions in this set

- 0580/23 N25 Q8 ▪ 3 marks
- 0580/42 N25 Q18 ▪ 4 marks
- 0580/43 N25 Q26 ▪ 5 marks
- 0580/21 J25 Q8 ▪ 4 marks
- 0580/21 J25 Q21 ▪ 5 marks
- 0580/22 J25 Q9 ▪ 6 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- // separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = "or words to that effect" – the wording need not match.

Question 8

0580/23 N25 ▪ Q8 ▪ 3 marks

8 $DE = \begin{pmatrix} \\ -4 \end{pmatrix}$

(a) Find $5\overrightarrow{DE}$.

$\begin{pmatrix} \\ \end{pmatrix}$ [1]

(b) Find $\left|\overrightarrow{DE}\right|$.

Question 8

(c) D is the point $(-2, -3)$.

Find the coordinates of the point E.

Question 8

Solution 8

(a)

Mark scheme

- 1 5

Solution 8

(b)

Mark scheme

- 5
- 2 M1 for $32 + (-4)2$ or better

Solution 8

(c)

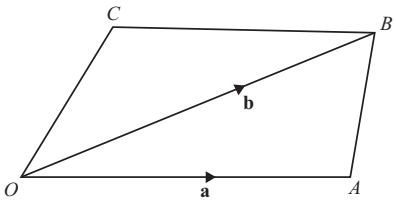
Mark scheme

- (1, 7)

Question 18

0580/42 N25 ▪ Q18 ▪ 4 marks

18



NOT TO SCALE

In the diagram, OA is parallel to CB.
$OA : CB = 4 : 3$
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.

(a) Find $\overrightarrow{AB}$ in terms of **a** and **b**.

Question 18

Question 18

(b) M is the midpoint of OC.

Find $\overrightarrow{AM}$ in terms of **a** and **b**.
Give your answer in its simplest form.

Solution 18

(a)

Mark scheme

- b − a
- 1

Solution 18

(b) Mark scheme

- 11
- 1
- 8
- 2
- $-$
- $+$
- a
- b oe simplified

Solution 18

- final answer
- 3 B2 for a correct unsimplified vector for
-
- AM seen
- or for
- 1
- 3
- 2
- 8
- =

Solution 18

- –
-
- OM
- b
- a oe soi
- or B1 for
- 3
- 4
- =
- –

Solution 18

-
- OC
- b
- a oe soi
- or for a correct vector route for
-
- AM along lines on
- the diagram
- 19
- $3x2 - 5x - 11 [= 0]$

Solution 18

- or $3y2 - 20y - 19 [= 0]$ **M2**
- M1 for $3x2 - 7x - 6 = 5 - 2x$
- or for $y =$
- 2
- 5
- 5
- 3
- 7
- 6
- 2

Solution 18

- 2
- −
- −
- (
-)
- (
-)
- −
- −
- (

Solution 18

-)
- (
-)
- (
-)
- (
-)
- y
- y
- 2

Solution 18

( ) 5

- ([ ]5)
- 4 3
- 11
- 2 3
- −−
- ±
- −
- −××−
- ×

Solution 18

- OR
- 2
- 5
- 11
- 5
- 6
- 3
- 6
- (
-)

Solution 18

- $-$
- $= \pm$
- $+$ (
-)
- (
-)
- x
- oe **M1**
- for [( )]5
- oe

Solution 18

- 2 3
- −−
- +
- ×
- k
- or [( )]5
- oe
- 2 3
- −−
- −

Solution 18

- $\times$
- k
- or for
- 2
- ([ ]5)
- 4 3
- 11
- —
- —$\times\times$—
- oe

Solution 18

- OR **M1**
- for
- 2
- 5
- 6
- (
-)
- −
- (
-)

Solution 18

- (
-)
- x
- $x = 2.92$, $y = -0.84$
- and
- $x = -1.25$, $y = 7.51$ **B2**
- B1 for one correct solution for x and y
- or for $x = 2.92$ and -1.25
- or for $y = -0.84$ and 7.51
- If B0 scored and at least two method marks scored,

Solution 18

- SC1 for correct substitution shown of both of their
- x-values or their y-values into y = 3x2 – 7x – 6 or
- y = 5 – 2x
- 20
- 620 nfww
- 3 M2 for 4810
- 5
- 7.7 to 7.8
- –
- or 4800 to 4810

Solution 18

- 7.7
- 0.05
- +
- oe
- or M1 for 4815 or 4805 or 7.75 or 7.65 oe seen
- 0580/42
- October/November 2025
- Partial Marks
- 21
- y =

Solution 18

- 2
- 242
- (6
- 2)
- +
- w
- oe final answer
- 4 M3
- for
- 2

Solution 18

- 2
- 8(3.5
- 2)
- 90
- 2
- 15 w
- +
- (
-)
- +

Solution 18

- (
-)
- (
-)
- may be done in stages
- or for correct answer seen then spoiled
- OR M2
- for y =
- 2
- 242

Solution 18

- (
- 2)
- +
- x
- or M1 for y =
- 2
- (
- 2)
- +
- k

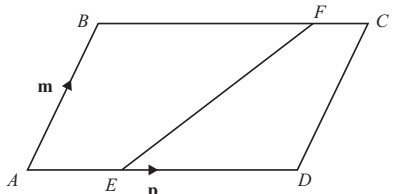
Solution 18

- x
- oe or better B1
- for w =
- 6
- x oe

Question 26

0580/43 N25 ▪ Q26 ▪ 5 marks

26



NOT TO SCALE

$ABCD$ is a parallelogram.
$\overrightarrow{AB} = \mathbf{m}$ and $\overrightarrow{AD} = \mathbf{p}$.
F is a point on BC and $BF = 4FC$.
E is a point on AD and $AE : ED = 1 : 2$.

Question 26

(a) Find $\overrightarrow{EF}$, in terms of **m** and **p**, in its simplest form.

Question 26

(b) EF and DC are extended to meet at the point G.

Find $\overrightarrow{CG}$, in terms of **m** and/or **p**, in its simplest form.

Question 26

[2]

Solution 26

(a)

Mark scheme

- m + 7/15 p
- 3 M2 for correct unsimplified expression in
- terms of m and p
- or M1 for a correct route

Solution 26

(b) Mark scheme

- 3
- 7
- m
- 2 M1 for using the ratio
- 2
- 3 p :
- 1
- 5 p

Question 8

0580/21 J25 ▪ Q8 ▪ 4 marks

8 $\mathbf{m} = \begin{pmatrix} \cdot \\ 5 \end{pmatrix}$ $\mathbf{n} = \begin{pmatrix} \cdot \\ -3 \end{pmatrix}$

(a) Find $2\mathbf{m} - \mathbf{n}$.

Question 8

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

(b) The vector $\begin{pmatrix} 5 \\ \sqrt{y} \end{pmatrix}$ has a magnitude of 7.

Find the value of y.

Question 8

Solution 8

(a) Mark scheme

- 14
- 13
- (
-)
- (
-)
- (
-)

Solution 8

- 2 B1 for 14
- (
-)
- (
-)
- (
-)
- k
- or for 13
- (

Solution 8

-)
- (
-)
- (
-)
- k
- or for 22/10 (
-)
- (
-)

Solution 8

- (
-)

Solution 8

(b)

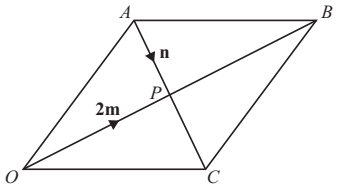
Mark scheme

- 24
- 2 M1 for $y + 52 = 72$ or better

Question 21

0580/21 J25 ▪ Q21 ▪ 5 marks

21



NOT TO SCALE

OABC is a rhombus and *O* is the origin.
The diagonals of the rhombus intersect at *P*.
$\overrightarrow{OP} = 2\,\mathbf{m}$ and $\overrightarrow{AP} = \mathbf{n}$.

(a) Find, in terms of **m** and **n**, in its simplest form

(i) $\overrightarrow{OA}$

Question 21

``

Question 21

(ii) $\overrightarrow{OC}$.

Question 21

(b) D is the point such that $\overrightarrow{AD} = 10\mathbf{m} - 3\mathbf{n}$.

Show that $OADC$ is a trapezium.

Question 21

[3]

Solution 21

(a)(i)

Mark scheme

- $2m - n$
- 1

Solution 21

(a)(ii)

Mark scheme

- 2m + n
- 1
- 0580/21
- May/June 2025
- Partial Marks

Solution 21

(b) Mark scheme

- CD = 10m – 5n M2
- Allow M2 for equivalents
- CD = –2n + 10m – 3n
- or CD = (
-)
- 2
- 2
- 10

Solution 21

- 3
- $-$
- $+$
- $+$
- $-$
- $+$
- $-$
- m
- n
- m

Solution 21

- n
- m
- n
- For M2, FT their (a) e.g.
- 1 0
- 3
- CD
- their CO
- their OA
- =

Solution 21

- $+$
- $+$
- $-$
- m
- n
- or M1 for correct route for CD using the lines
- of the diagram with AD
- e.g.
- CD
- CA

Solution 21

- AD
- =
- +
- oe
- CD = 5 OA
- leading to CD is parallel to OA

trapezium **A1**

- Dependent on **M2**

Question 9

0580/22 J25 ▪ Q9 ▪ 6 marks

9 A is the point $(3, -1)$.

$\overrightarrow{AB} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

(a) $\overrightarrow{AC} = 2\overrightarrow{AB}$

Find the coordinates of the point C.

Question 9

(b) The length of AB is $k\sqrt{5}$.

Find the value of k.

Question 9

(c) P is a point on AB.

$AP : PB = 1 : 3$

Find the position vector of P.

Question 9

( ) [2]

Solution 9

(a) Mark scheme

- (7, –9)
- 2 B1
- for (7, k) or (k, –9) or 7/9 (
-)
- (
-)
- –
- (

Solution 9

-)
- or for 4/8 (
-)
- (
-)
- –
- (
-)
- seen
- or M1 for 3/2

Solution 9

- 2
- 1
- 4
- (
-)
- (
-)
- +
- (
-)

Solution 9

- (
-)
- –
- –
- (
-)
- (
-)

Solution 9

(b)

Mark scheme

- 2
- 2 M1 for $22 + ([-]4)2$ oe or better

Solution 9

(c) Mark scheme

- 3.5
- 2
- (
-)
- (
-)
- −
- (

Solution 9

-)
- oe
- 2 B1
- for answer 3.5
- (
-)
- (
-)
- (
-)

Solution 9

- k
- or
- 2
- (
-)
- (
-)
- −
- (
-)

Solution 9

- k
- or for 0.5
- 1
- (
-)
- (
-)
- −
- (
-)

Solution 9

- or
- 1
- 2
- 1
- (
-)
- (
-)
- (
-)

Solution 9

- (
-)
- –
- (
-)
- seen
- or M1 for 3/1 (
-)
- (
-)

Solution 9

- $-$
- (
-)
- $+$
- 2
- 1
- 4
- 4
- (
-)

Solution 9

- (
-)
- −
- (
-)
- oe
- 10
- 9
- 2 oe
- 2 M1 for

Solution 9

- 45
- 2
-
- 18
- 360 $\times\times$
- $\times$
- oe