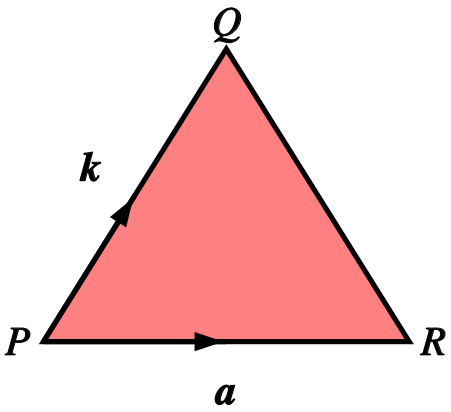
Vector Geometry

Name:	Class:	Date:

Mark	/ 15	%

1) Triangle PQR is shown below where $\overrightarrow{PQ}$ = **k** and $\overrightarrow{PR}$ = **a**.



Express the following vectors in terms of **k** and **a**.

a) $\overrightarrow{PQ}$ b) $\overrightarrow{RP}$ c) $\overrightarrow{QR}$ d) $\overrightarrow{RQ}$

[1]

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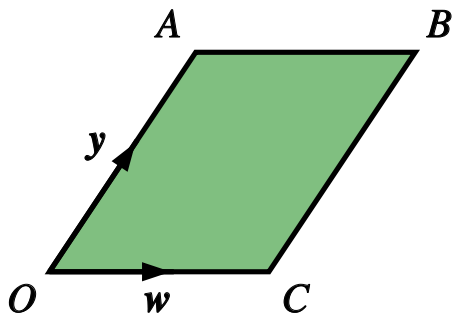
2) OABC is a parallelogram where $\overrightarrow{OA}$ = **y** and $\overrightarrow{OC}$ = **w**.

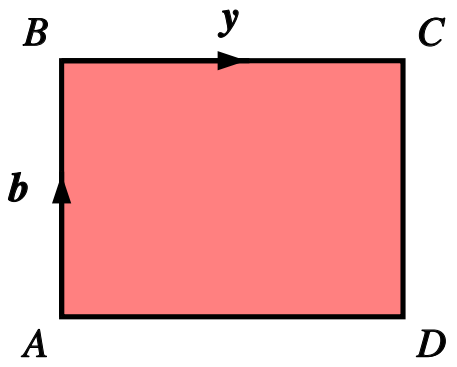


Express the following vectors in terms of **y** and **w**.

a) $\overrightarrow{AB}$ b) $\overrightarrow{BC}$ c) $\overrightarrow{OB}$ d) $\overrightarrow{AC}$

[1]

3) ABCD is a rectangle where $\overrightarrow{AB}$ = **b** and $\overrightarrow{BC}$ = **y**.



Express the following vectors in terms of **b** and **y**.

a) $\overrightarrow{AD}$ b) $\overrightarrow{AC}$ c) $\overrightarrow{CD}$ d) $\overrightarrow{BD}$

[1]

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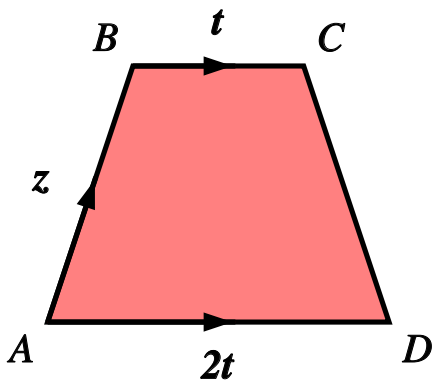
4) ABCD is a trapezium where $\overrightarrow{AB}$ = **z**, $\overrightarrow{BC}$ = **t** and $\overrightarrow{AD}$ = 2 $\overrightarrow{BC}$.

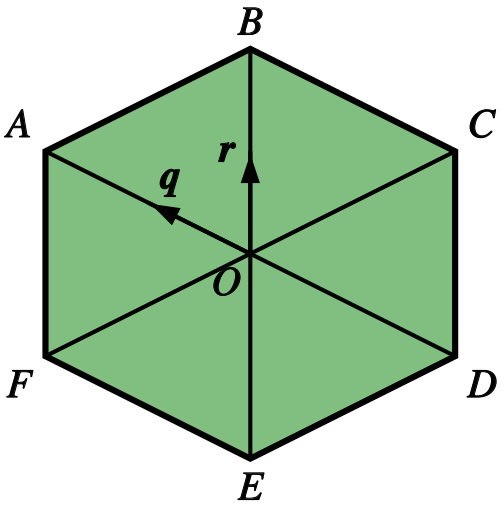


Express the following vectors in terms of **t** and **z**.

a) $\overrightarrow{AC}$ b) $\overrightarrow{DB}$ c) $\overrightarrow{CD}$ d) $\overrightarrow{DC}$

[1]

5) ABCDEF is a regular hexagon where $\overrightarrow{OA}$ = **q** and $\overrightarrow{OB}$ = **r**.



Express the following vectors in terms of **q** and **r**.

a) $\overrightarrow{AB}$ b) $\overrightarrow{DB}$ c) $\overrightarrow{OC}$ d) $\overrightarrow{FD}$

[1]

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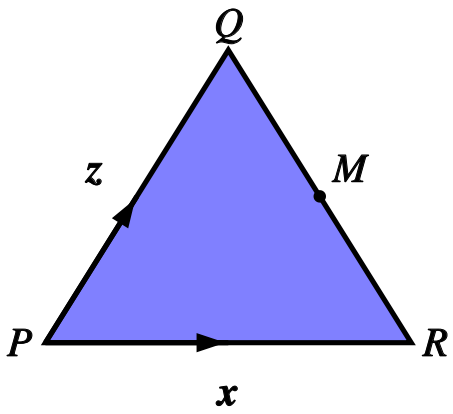
6) Triangle PQR is shown below where $\overrightarrow{PQ}$ = **z**, $\overrightarrow{PR}$ = **x**

M is the mid-point of QR.

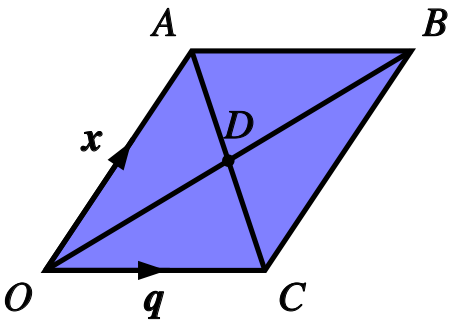


Express the following vectors in terms of **z** and **x**.

a) $\overrightarrow{QR}$ b) $\overrightarrow{QM}$ c) $\overrightarrow{PM}$

[1]

7) OABC is a parallelogram where $\overrightarrow{OA}$ = **x** and $\overrightarrow{OC}$ = **q**.



Express the following vectors in terms of **x** and **q**.

a) $\overrightarrow{OC}$ b) $\overrightarrow{AC}$ c) $\overrightarrow{BO}$ d) $\overrightarrow{AD}$

[1]

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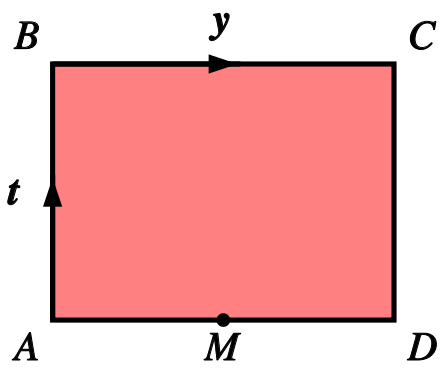
8) ABCD is a rectangle where $\overrightarrow{AB}$ = **t**, $\overrightarrow{BC}$ = **y** and M is the mid-point of AD.



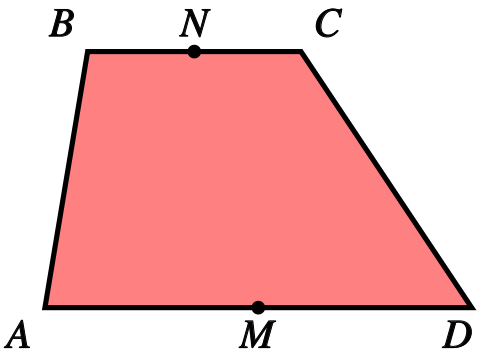
Express the following vectors in terms of **t** and **y**.

a) $\overrightarrow{AM}$ b) $\overrightarrow{BM}$ c) $\overrightarrow{MC}$

[1]

9) ABCD is a trapezium with BC parallel to AD. [1]
M is the midpoint of AD and N is the midpoint of BC.

Given that $\overrightarrow{AB}$ = 2**a**, $\overrightarrow{BC}$ = 2**z** and $\overrightarrow{AD}$ = 6**z**, express $\overrightarrow{MN}$ in terms of **z** and **a**.



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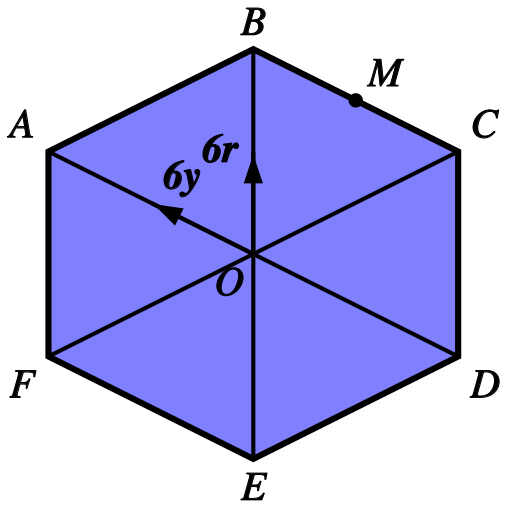
10) ABCDEF is a regular hexagon where $\overrightarrow{OA}$ = 6**y**, $\overrightarrow{OB}$ = 6**r** and M is the midpoint of BC.



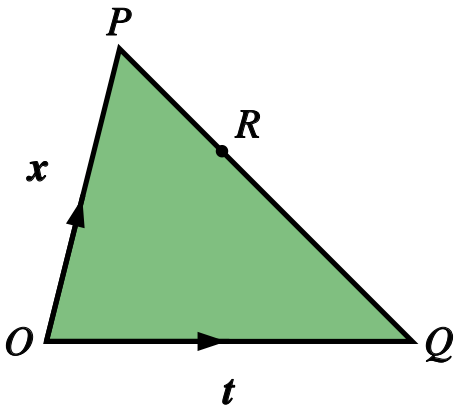
Express the following vectors in terms of **y** and **r**.

a) $\overrightarrow{AB}$ b) $\overrightarrow{EF}$ c) $\overrightarrow{EM}$

[1]

11) OPQ is a triangle where $\overrightarrow{OP}$ = **x**, $\overrightarrow{OQ}$ = **t**

R is the point on QR for which PR:RQ = 1:2.



Express the following vectors in terms of **x** and **t**.

a) $\overrightarrow{QP}$ b) $\overrightarrow{OR}$

[1]

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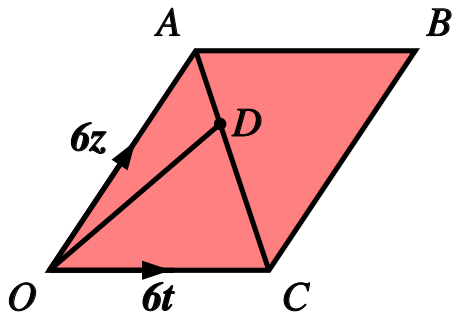
12) OABC is a parallelogram where $\overrightarrow{OA} = 6\mathbf{z}$ and $\overrightarrow{OC} = 6\mathbf{t}$. [1]

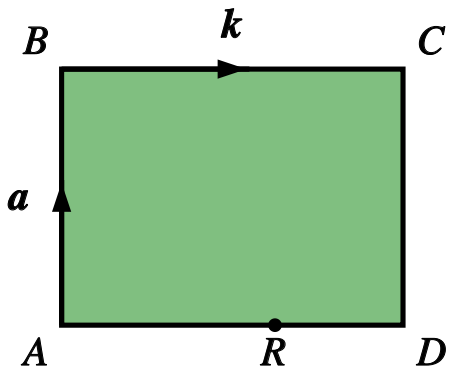
D is the point on AC for which AD = $\frac{1}{3}$AC.



Express $\overrightarrow{OD}$ in terms of **z** and **t**.

13) ABCD is a rectangle where $\overrightarrow{AB} = \mathbf{a}$, $\overrightarrow{BC} = \mathbf{k}$. [1]

R is the point on AD for which AR:AD = 2:3.



Express $\overrightarrow{BR}$ in terms of **a** and **k**.

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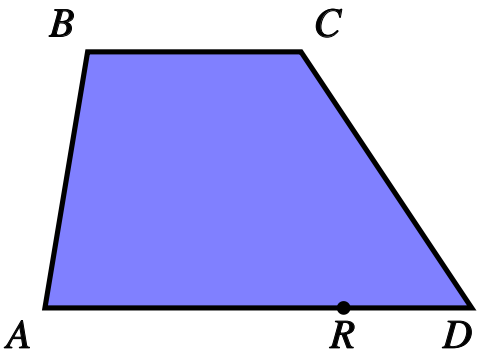
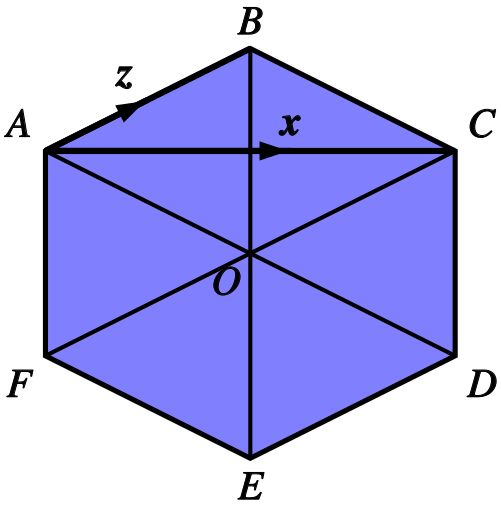
14) ABCD is a trapezium with BC parallel to AD and AD = 2BC. [1]
R is the point on AD for which AR:RD = 3:1.

Given that $\overrightarrow{AB}$ = **t** and $\overrightarrow{BC}$ = **x**, express $\overrightarrow{RC}$ in terms of **t** and **x**.



15) ABCDEF is a regular hexagon where $\overrightarrow{AB}$ = **z** and $\overrightarrow{AC}$ = **x**.



Express the following vectors in terms of **z** and **x**.

a) $\overrightarrow{BE}$

b) $\overrightarrow{CE}$

[1]

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Solutions for the assessment Vector Geometry

1) a) $\overrightarrow{PQ} = \mathbf{k}$
b) $\overrightarrow{RP} = \mathbf{-a}$
c) $\overrightarrow{QR} = \mathbf{-k + a}$
d) $\overrightarrow{RQ} = \mathbf{k-a}$

2) a) $\overrightarrow{AB} = w$
b) $\overrightarrow{BC} = -y$
c) $\overrightarrow{OB} = y + w$
d) $\overrightarrow{AC} = w - y$

3) a) $\overrightarrow{AD} = y$
b) $\overrightarrow{AC} = b + y$
c) $\overrightarrow{CD} = -b$
d) $\overrightarrow{BD} = y - b$

4) a) $\overrightarrow{AC} = z + t$
b) $\overrightarrow{DB} = z - 2t$
c) $\overrightarrow{CD} = t - z$
d) $\overrightarrow{DC} = z - t$

5) a) $\overrightarrow{AB} = r - q$
b) $\overrightarrow{DB} = q + r$
c) $\overrightarrow{OC} = r - q$
d) $\overrightarrow{FD} = r - 2q$

6) a) $\overrightarrow{QR} = x - z$
b) $\overrightarrow{QM} = \frac{x}{2} - \frac{z}{2}$
c) $\overrightarrow{PM} = \frac{x}{2} + \frac{z}{2}$

7) a) $\overrightarrow{OC} = q$
b) $\overrightarrow{AC} = q - x$
c) $\overrightarrow{BO} = -x - q$
d) $\overrightarrow{AD} = \frac{1}{2}q - \frac{1}{2}x$

8) a) $\overrightarrow{AM} = \frac{y}{2}$
b) $\overrightarrow{BM} = \frac{y}{2} - t$
c) $\overrightarrow{MC} = \frac{y}{2} + t$

9) $\overrightarrow{MN} = 2a - 2z$

10) a) $\overrightarrow{AB} = 6r - 6y$
b) $\overrightarrow{EF} = 6y$
c) $\overrightarrow{EM} = 12r - 3y$

11) a) $\overrightarrow{QP} = x - t$
b) $\overrightarrow{OR} = \frac{2x}{3} + \frac{t}{3}$

12) $\overrightarrow{OD} = 4z + 2t$

13) $\overrightarrow{BR} = \frac{2}{3}k - a$

14) $\overrightarrow{RC} = t - \frac{x}{2}$

15) a) $\overrightarrow{BE} = 2x - 4z$
b) $\overrightarrow{CE} = x - 3z$

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