SQA Past paper questions

2019 – Paper 1 – Question 5

(a) Show that the points A(1,5,−3), B(4,−1,0) and C(8,−9,4) are collinear.   **3**

(b) State the ratio in which B divides AC.   **1**

Click here for video solution.

2018 – Paper 1 – Question 5

A$(-3, 4, -7)$, B$(5, t, 5)$ and C$(7, 9, 8)$ are collinear.

(a) State the ratio in which B divides AC.   **1**

(b) State the value of t.   **1**

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2016 – Paper 1 – Question 11

(a) A and C are the points $(1, 3, -2)$ and $(4, -3, 4)$ respectively.

Point B divides AC in the ratio $1 : 2$.

Find the coordinates of B.   **2**

(b) $k\overrightarrow{AC}$ is a vector of magnitude 1, where $k > 0$.
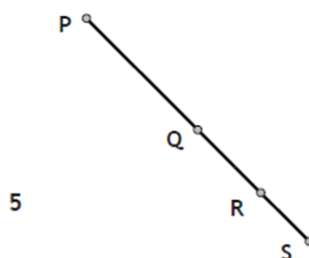
Determine the value of k.   **3**

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Specimen – Paper 1 – Question 3

In the diagram, P has coordinates (−6, 3, 9),

$\overrightarrow{PQ}$ = 6i + 12j − 6k and $\overrightarrow{PQ}$ = 2$\overrightarrow{QR}$ = 3$\overrightarrow{RS}$.

Find the coordinates of S.   **5**

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2013 – Paper 1 – Question 24

(a)   (i) Show that the points A(–7, –8, 1), T(3, 2, 5) and B(18, 17, 11) are collinear.

       (ii) Find the ratio in which T divides AB.   4

(b) The point C lies on the *x*-axis.

      If TB and TC are perpendicular, find the coordinates of C.   5

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2009 – Paper 1 – Question 22

D, E and F have coordinates (10, –8, –15), (1, –2, –3) and (–2, 0, 1) respectively.

(a) (i) Show that D, E and F are collinear.

      (ii) Find the ratio in which E divides DF.   4

(b) G has coordinates (*k*, 1, 0).

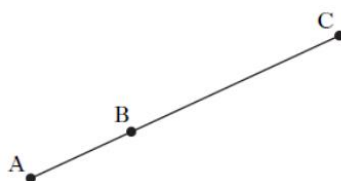   Given that DE is perpendicular to GE, find the value of *k*.   4

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2007 – Paper 1 – Question 2

Relative to a suitable coordinate system A and B are the points (–2, 1, –1) and (1, 3, 2) respectively.

A, B and C are collinear points and C is positioned such that BC = 2AB.

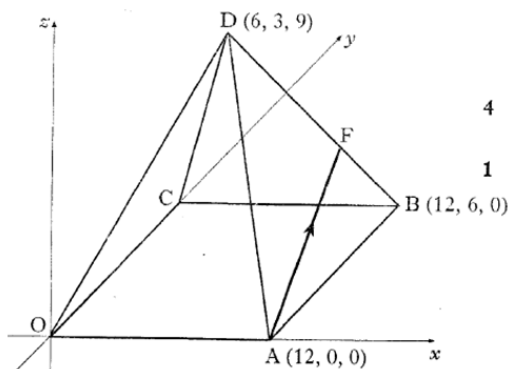Find the coordinates of C.   4

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2005 – Paper 1 – Question 6

D,OABC is a pyramid. A is the point (12, 0, 0), B is (12, 6, 0) and D is (6, 3, 9).

F divides DB in the ratio 2:1.

(a) Find the coordinates of the point F.   4

(b) Express $\overrightarrow{AF}$ in component form.   1

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2004 – Paper 1 – Question 5

A, B and C have coordinates (–3, 4, 7), (–1, 8, 3) and (0, 10, 1) respectively.

(a) Show that A, B and C are collinear.   **3**

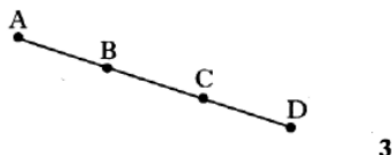(b) Find the coordinates of D such that $\overrightarrow{AD} = 4\overrightarrow{AB}$.   **2**

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2003 – Paper 1 – Question 6

A and B are the points (–1, –3, 2) and
(2, –1, 1) respectively.
B and C are the points of trisection of
AD, that is AB = BC = CD.
Find the coordinates of D.

               3

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2002 – Paper 1 – Question 2

The point Q divides the line joining P(–1, –1, 0) to R(5, 2, –3) in the ratio 2 : 1.
Find the coordinates of Q.

               3

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2001 – Paper 1 – Question 3

(a) Roadmakers look along the tops
of a set of T-rods to ensure that
straight sections of road are being
created. Relative to suitable axes
the top left corners of the T-rods
are the points A(–8, –10, –2),
B(–2, –1, 1) and C(6, 11, 5).

Determine whether or not the
section of road ABC has been   **3**
built in a straight line.
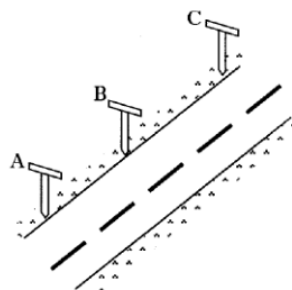
(b) A further T-rod is placed such
that D has coordinates (1, –4, 4).
Show that DB is perpendicular to   **3**
AB.
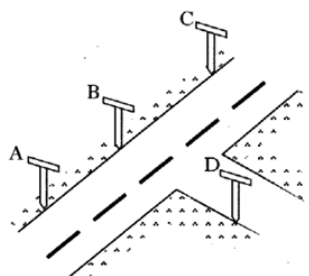
Click <u>here</u> for video solution.

2000 – Paper 1 – Question 7

VABCD is a pyramid with a rectangular base ABCD.

Relative to some appropriate axes,
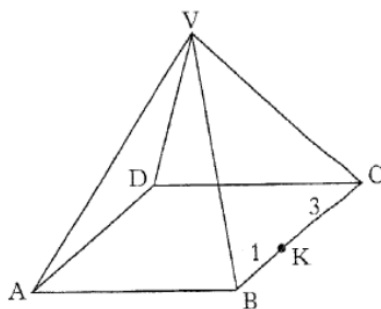
$\overrightarrow{VA}$ represents $-7i - 13j - 11k$

$\overrightarrow{AB}$ represents $6i + 6j - 6k$

$\overrightarrow{AD}$ represents $8i - 4j + 4k$.

K divides BC in the ratio 1:3.

Find $\overrightarrow{VK}$ in component form.

3

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1997 – Paper 1 – Question 2

Relative to a suitable set of axes, the tops of three chimneys have coordinates given by A(1, 3, 2), B(2, −1, 4) and C(4, −9, 8).

Show that A, B and C are collinear.

(3)

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1996 – Paper 1 – Question 6

A is the point (2, −5, 6), B is (6, −3, 4) and C is (12, 0, 1). Show that A, B and C are collinear and determine the ratio in which B divides AC.

(4)

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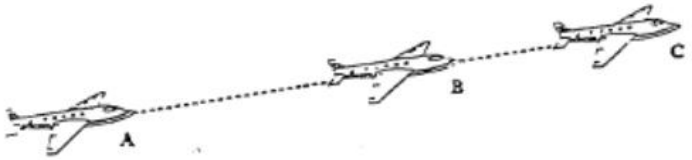## 1994 – Paper 1 – Question 4

Relative to the top of a hill, three gliders have positions given by R(−1, −8, −2), S(2, −5, 4) and T(3, −4, 6).
Prove that R, S and T are collinear.

(3)

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1992 – Paper 1 – Question 15

An aircraft flying at a constant speed on a straight flight path takes 2 minutes to fly from A to B and 1 minute to fly from B to C. Relative to a suitable set of axes, A is the point $(-1,3,4)$ and B is the point $(3, 1,-2)$. Find the coordinates of the point C.   (3)

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1991 – Paper 1 – Question 7

(a) Show that the points L$(-5, 6, -5)$, M$(7, -2, -1)$ and N$(10, -4, 0)$ are collinear.   4

(b) Find the ratio in which M divides LN.   1
                                                                    (5)

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1990 – Paper 1 – Question 4

Show that P$(2, 2, 3)$, Q$(4, 4, 1)$ and R$(5, 5, 0)$ are collinear and find the ratio in which Q divides PR.   (4)

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1989 – Paper 2 – Question 2

ABCD is a quadrilateral with vertices A$(4, -1, 3)$, B$(8, 3, -1)$, C$(0, 4, 4)$ and D$(-4, 0, 8)$.

(a) Find the coordinates of M, the mid-point of AB.   1
(b) Find the coordinates of the point T, which divides CM in the ratio $2:1$.   3
(c) Show that B, T and D are collinear and find the ratio in which T divides BD.   4

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