Core 1: Linear Co-ordinate Geometry

Past Paper Questions
2006 - 2013

Name:

2 The point A has coordinates $(1, 1)$ and the point B has coordinates $(5, k)$.

The line AB has equation $3x + 4y = 7$.

(a) (i) Show that $k = -2$. *(1 mark)*

(ii) Hence find the coordinates of the mid-point of AB. *(2 marks)*

(b) Find the gradient of AB. *(2 marks)*

(c) The line AC is perpendicular to the line AB.

(i) Find the gradient of AC. *(2 marks)*

(ii) Hence find an equation of the line AC. *(1 mark)*

(iii) Given that the point C lies on the x-axis, find its x-coordinate. *(2 marks)*

1 The point A has coordinates $(1, 7)$ and the point B has coordinates $(5, 1)$.

(a) (i) Find the gradient of the line AB. *(2 marks)*

(ii) Hence, or otherwise, show that the line AB has equation $3x + 2y = 17$. *(2 marks)*

(b) The line AB intersects the line with equation $x - 4y = 8$ at the point C. Find the coordinates of C. *(3 marks)*

(c) Find an equation of the line through A which is perpendicular to AB. *(3 marks)*

2 The line AB has equation $3x + 5y = 8$ and the point A has coordinates $(6, -2)$.

(a) (i) Find the gradient of AB. *(2 marks)*

(ii) Hence find an equation of the straight line which is perpendicular to AB and which passes through A. *(3 marks)*

(b) The line AB intersects the line with equation $2x + 3y = 3$ at the point B. Find the coordinates of B. *(3 marks)*

(c) The point C has coordinates $(2, k)$ and the distance from A to C is 5. Find the **two** possible values of the constant k. *(3 marks)*

1 The points A and B have coordinates $(6, -1)$ and $(2, 5)$ respectively.

(a) (i) Show that the gradient of AB is $-\dfrac{3}{2}$. *(2 marks)*

(ii) Hence find an equation of the line AB, giving your answer in the form $ax + by = c$, where a, b and c are integers. *(2 marks)*

(b) (i) Find an equation of the line which passes through B and which is perpendicular to the line AB. *(2 marks)*

(ii) The point C has coordinates $(k, 7)$ and angle ABC is a right angle.

Find the value of the constant k. *(2 marks)*

1 The triangle ABC has vertices $A(-2, 3)$, $B(4, 1)$ and $C(2, -5)$.

(a) Find the coordinates of the mid-point of BC. *(2 marks)*

(b) (i) Find the gradient of AB, in its simplest form. *(2 marks)*

(ii) Hence find an equation of the line AB, giving your answer in the form $x + qy = r$, where q and r are integers. *(2 marks)*

(iii) Find an equation of the line passing through C which is parallel to AB. *(2 marks)*

(c) Prove that angle ABC is a right angle. *(3 marks)*

No linear geometry questions

1 The points A and B have coordinates $(1, 6)$ and $(5, -2)$ respectively. The mid-point of AB is M.

(a) Find the coordinates of M. *(2 marks)*

(b) Find the gradient of AB, giving your answer in its simplest form. *(2 marks)*

(c) A straight line passes through M and is perpendicular to AB.

(i) Show that this line has equation $x - 2y + 1 = 0$. *(3 marks)*

(ii) Given that this line passes through the point $(k, k + 5)$, find the value of the constant k. *(2 marks)*

1 The line AB has equation $3x + 5y = 11$.

   (a)   (i) Find the gradient of AB.   *(2 marks)*

         (ii) The point A has coordinates $(2, 1)$. Find an equation of the line which passes through the point A and which is perpendicular to AB.   *(3 marks)*

   (b) The line AB intersects the line with equation $2x + 3y = 8$ at the point C. Find the coordinates of C.   *(3 marks)*
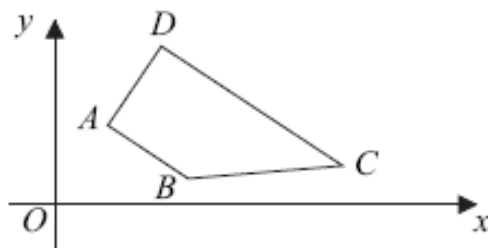
2 The triangle ABC has vertices $A(1, 3)$, $B(3, 7)$ and $C(-1, 9)$.

   (a)   (i) Find the gradient of AB.   *(2 marks)*

         (ii) Hence show that angle ABC is a right angle.   *(2 marks)*

   (b)   (i) Find the coordinates of M, the mid-point of AC.   *(2 marks)*

         (ii) Show that the lengths of AB and BC are equal.   *(3 marks)*

         (iii) Hence find an equation of the line of symmetry of the triangle ABC.   *(3 marks)*

1   The trapezium $ABCD$ is shown below.

The line AB has equation $2x + 3y = 14$ and DC is parallel to AB.

   (a)   Find the gradient of AB.   *(2 marks)*

   (b)   The point D has coordinates $(3, 7)$.

        (i) Find an equation of the line DC.   *(2 marks)*

        (ii) The angle BAD is a right angle. Find an equation of the line AD, giving your answer in the form $mx + ny + p = 0$, where m, n and p are integers.   *(4 marks)*

   (c)   The line BC has equation $5y - x = 6$. Find the coordinates of B.   *(3 marks)*

3   The line AB has equation $3x + 2y = 7$. The point C has coordinates $(2, -7)$.

  (a) (i)   Find the gradient of AB. *(2 marks)*

     (ii)   The line which passes through C and which is parallel to AB crosses the y-axis at the point D. Find the y-coordinate of D. *(3 marks)*

  (b)   The line with equation $y = 1 - 4x$ intersects the line AB at the point A. Find the coordinates of A. *(3 marks)*

  (c)   The point E has coordinates $(5, k)$. Given that CE has length 5, find the two possible values of the constant k. *(3 marks)*

1   The line AB has equation $7x + 3y = 13$.

  (a)   Find the gradient of AB. *(2 marks)*

  (b)   The point C has coordinates $(-1, 3)$.

     (i)   Find an equation of the line which passes through the point C and which is parallel to AB. *(2 marks)*

     (ii)   The point $(1\frac{1}{2}, -1)$ is the mid-point of AC. Find the coordinates of the point A. *(2 marks)*

  (c)   The line AB intersects the line with equation $3x + 2y = 12$ at the point B. Find the coordinates of B. *(3 marks)*

1   The point A has coordinates $(6, -4)$ and the point B has coordinates $(-2, 7)$.

  (a)   Given that the point O has coordinates $(0, 0)$, show that the length of OA is less than the length of OB. *(3 marks)*

  (b) (i)   Find the gradient of AB. *(2 marks)*

     (ii)   Find an equation of the line AB in the form $px + qy = r$, where p, q and r are integers. *(3 marks)*

  (c)   The point C has coordinates $(k, 0)$. The line AC is perpendicular to the line AB. Find the value of the constant k. *(3 marks)*

2   The line AB has equation $4x - 3y = 7$.

   (a) (i)   Find the gradient of AB.   *(2 marks)*

   (ii)   Find an equation of the straight line that is parallel to AB and which passes through the point $C(3, -5)$, giving your answer in the form $px + qy = r$, where p, q and r are integers.   *(3 marks)*

   (b)   The line AB intersects the line with equation $3x - 2y = 4$ at the point D. Find the coordinates of D.   *(3 marks)*

   (c)   The point E with coordinates $(k - 2, 2k - 3)$ lies on the line AB. Find the value of the constant k.   *(2 marks)*

1   The point A has coordinates $(-3, 2)$ and the point B has coordinates $(7, k)$.

         The line AB has equation $3x + 5y = 1$.

   (a) (i)   Show that $k = -4$.   *(1 mark)*

   (ii)   Hence find the coordinates of the midpoint of AB.   *(2 marks)*

   (b)   Find the gradient of AB.   *(2 marks)*

   (c)   A line which passes through the point A is perpendicular to the line AB. Find an equation of this line, giving your answer in the form $px + qy + r = 0$, where p, q and r are integers.   *(3 marks)*

   (d)   The line AB, with equation $3x + 5y = 1$, intersects the line $5x + 8y = 4$ at the point C. Find the coordinates of C.   *(3 marks)*