

- 1** The line l passes through the coordinates $(2, 1)$ and $(4, -5)$.

Find an equation for l .

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(Total for question 1 is 3 marks)

- 2** The line l_1 has the equation $2x + 3y + 5 = 0$

The line l_2 passes through the coordinates $(1, 7)$ and $(5, 1)$.

Determine, giving full reasons for your answer, whether l_1 and l_2 are parallel, perpendicular or neither.

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(Total for question 2 is 4 marks)

3 The line passing through the points $(-2, 5)$ and $(5, -1)$ crosses the x axis at point A , the y axis at point B and O is the origin.

- (a) Find an equation of the straight line passing through the points $(-2, 5)$ and $(5, -1)$. Give your answer in the form $ax + by + c = 0$, where a , b and c are integers.

(3)

- (b) Find the area of triangle AOB .

(3)

(Total for question 3 is 6 marks)

- 4** The points A and B have coordinates $(-1, k + 2)$ and $(2k - 3, 8)$ where k is a constant. Given the gradient of AB is $\frac{1}{3}$

(a) Show that $k = 4$

(2)

(b) Find the equation of the line that passes through A and B .

(3)

- (c) Find the equation of the perpendicular bisector of AB . Give your answer in the form $ax + by + c = 0$

(4)

(Total for question 4 is 9 marks)

- 5 The straight line l has equation $2x - 3y + 24 = 0$ and meets the coordinate axis at the points A and B .
Find the distance of the midpoint of AB from the origin. Give your answer in the form $k\sqrt{13}$

(Total for question 5 is 4 marks)

6 The line l_1 has gradient 2 and passes through $(5, 7)$.

(a) Find an equation for l_1 in the form $y = mx + c$

(2)

(b) l_2 is perpendicular to l_1 and passes through $(0, 1)$. Find an equation for l_2 .

(2)

(Total for question 6 is 4 marks)

7 The line l_1 has the equation $5x + 2y - 4 = 0$ The line l_2 has the equation $x - 4y + 1 = 0$
Find the coordinates of the point where l_1 and l_2 intersect.

(Total for question 7 is 3 marks)

- 8** The line l_1 has the equation $2x - 3y - 4 = 0$ The line l_2 is perpendicular to l_1 and passes through the point $(4, -1)$
Find an equation for l_2 in the form $ax + by + c = 0$

(Total for question 8 is 5 marks)

9 The line l passes through the points $A(1, 4)$ and $B(-2, 13)$.

(a) Find an equation for l .

(3)

(b) Find the exact length of AB

(2)

(Total for question 9 is 5 marks)

10 The line l_1 has gradient 3 and passes through $(-2, 5)$.

(a) Find an equation for l_1 in the form $y = mx + c$

(2)

(b) l_2 is perpendicular to l_1 and passes through $(0, 4)$. Find an equation for l_2 .

(2)

(c) Find the coordinates of the point where l_1 and l_2 intersect.

(3)

(Total for question 10 is 7 marks)

- 11** The line l_1 has the equation $5y - 10 = 2x$. The point P with x coordinate 4 lies on l_1 . The line l_2 is perpendicular to l_1 and passes through the point P .

(a) Find an equation for l_2 in the form $ax + by + c = 0$

(4)

(b) The lines l_1 and l_2 cross the x axis at the points Q and R respectively. Calculate the area of the triangle QPR .

(4)

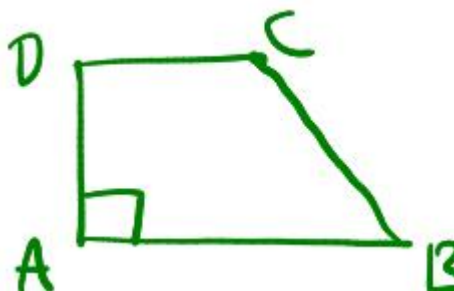
(Total for question 11 is 8 marks)

12 Three of the following points lie on the same straight line. Which point does **not** lie on this line? Tick **one** box.

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(Total for question 12 is 1 mark)

- 13** $ABCD$ is a trapezium with point $A(-2, 5)$, point $B(4, 2)$ and point $C(6, -4)$. AB is parallel to DC AB is perpendicular to AD



- (a) Find the equation of CD

(2)

- (b) Find the coordinates of D .

(3)

(Total for question 13 is 5 marks)

- 14** The point A has the coordinates $(-3, -4)$, point B has the coordinates $(7, 2)$.
Find the equation the perpendicular bisector of AB

(Total for question 14 is 3 marks)

- 15** The line l_1 has equation $4y - 3x = 11$ The line l_2 passes through the points $(3, 5)$ and $(-5, -1)$.
Determine, giving full reasons for your answer, whether lines l_1 and l_2 are parallel, perpendicular or neither.

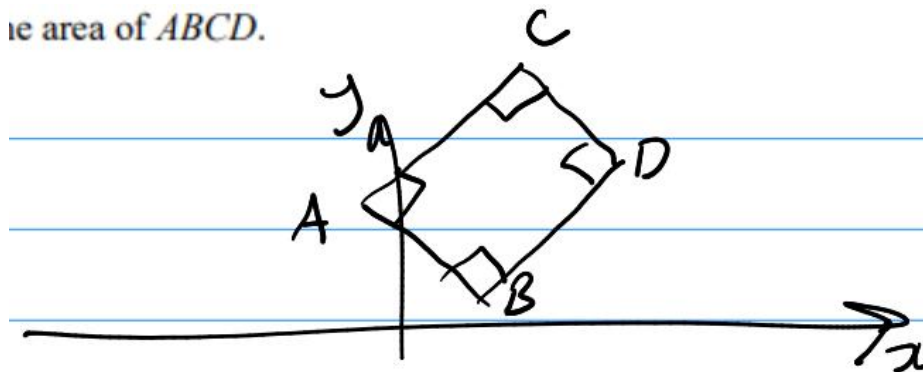
(Total for question 15 is 4 marks)

- 16** The point A has the coordinates $(-2, 3)$, point B has the coordinates $(4, -7)$. The perpendicular bisector of AB intersects the line $y = 2x + 1$ at the point P . Find the coordinates of P .

(Total for question 16 is 6 marks)

- 17 Points $A(-1, 5)$, $B(1, 1)$, $C(5, 8)$ and $D(7, 4)$ are the vertices of a quadrilateral $ABCD$.

Find the area of $ABCD$.



- (a) Prove that $ABCD$ is a rectangle.

(4)

- (b) Find the area of $ABCD$.

(2)

(Total for question 17 is 6 marks)

18 The line l_1 has equation $2y + 4x + 7 = 0$ The line l_2 has equation $y = mx + 4$, where m is a constant. Given that l_1 and l_2 are perpendicular.

(a) Find the value of m .

(2)

(b) Find the coordinates of the point where l_1 and l_2 meet.

(3)

(Total for question 18 is 5 marks)

19 In 1960 the life expectancy in the UK was 71 years In 1975 the life expectancy in the UK was 73 years Given that x years is the life expectancy n years after 1960.

(a) Using a linear model, form an equation linking x with n .

(3)

(b) In 2020 the life expectancy in the UK was 81.8 years. Comment on the suitability of your model in light of this information

(3)

(Total for question 19 is 6 marks)

20 In 1960 the life expectancy in the UK was 71 years In 1975 the life expectancy in the UK was 73 years Given that x years is the life expectancy n years after 1960.

(a) Using a linear model, form an equation linking x with n .

(3)

(b) In 2020 the life expectancy in the UK was 81.8 years. Comment on the suitability of your model in light of this information

(3)

(Total for question 20 is 6 marks)

21 Worldwide CO₂ emissions in 1990 were 22.5 billion tonnes.
Worldwide CO₂ emissions in 2010 were 33.6 billion tonnes.
Given that A billion tonnes is the CO₂ emissions n years after 1990.

(a) Using a linear model, form an equation linking A with n .

(3)

(b) In 2016 worldwide CO₂ emissions were 35.7 billion tonnes.
Comment on the suitability of your model in light of this information

(3)

(Total for question 21 is 6 marks)

- 22** Point C has coordinates $(2, c)$ and point D has coordinates $(d, 8)$.
The perpendicular bisector of CD has equation $3y + x = 10$.
Find c and d .

(Total for question 22 is 5 marks)
