4.13 Coordinates and Line Geometry: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A is the point (-2, -8) and B is the point (-5, -2). Work out the coordinates of the midpoint of AB.

(2)

2 M is the midpoint of AB. A is (-8, -6) and M is (-1.5, 0). Work out the coordinates of B.

(3)

3 Work out the gradient of the straight line through (0, 3) and (1, 7).

(2)

4 Find the midpoint of the line joining the points A(2, 5) and B(8, 1).

(2)

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5 Does the point (3, 2) lie on the line y = 2x - 4? You must show your working.

(2)

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6 Find the coordinates of the point where the line y = -2x - 8 crosses the x-axis.

(2)

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7 The point (k, 32) lies on the line y = 6x - 4. Find the value of k.

(2)

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8 A is the point (-8, -1) and B is the point (7, -6). Work out the coordinates of the midpoint of AB.

(2)

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9 Work out the distance between the points (2, -4) and (5, 0).

(3)

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10 The point (k, 5) lies on the line y = 5x. Find the value of k.

(2)

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11 Work out the distance between (-4, 2) and (2, 5). Give your answer correct to 1 decimal place.

(3)

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12 Find the midpoint of C(-3, -4) and D(1, 2).

(2)

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13 Work out the distance between the points (2, 0) and (22, 21).

(3)

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14 Work out the gradient of the straight line through (0, 0) and (3, -3).

(2)

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15 Work out the distance between (-4, -2) and (-2, -1). Give your answer correct to 1 decimal place.

(3)

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16 Find the coordinates of the points where the line $y = 4x + 20$ crosses (a) the y-axis (b) the x-axis.

(2)

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17 Work out the gradient of the straight line through (2, -10) and (3, -14).

(2)

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18 Work out the distance between the points (3, 0) and (13, 24).

(3)

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19 Work out the distance between (-2, -4) and (1, 1). Give your answer correct to 1 decimal place.

(3)

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20 Work out the gradient of the straight line through (4, 20) and (5, 24).

(2)

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21 Does the point (-3, -8) lie on the line y = 2x - 3? You must show your working.

(2)

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22 Find the coordinates of the point where the line y = 4x + 4 crosses the x-axis.

(2)

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23 Find the coordinates of the points where the line y = 5x - 25 crosses (a) the y-axis (b) the x-axis.

(2)

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24 M is the midpoint of AB. A is (4, -7) and M is (4.5, 0). Work out the coordinates of B.

(3)

---

25 A is the point (6, -1) and B is the point (-4, -4). Work out the coordinates of the midpoint of AB.

(2)

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26 A straight line passes through (-3, 12) and (-1, 2). Find the equation of the line.

(3)

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27 Three corners of a rectangle are (-1, 6), (1, 6) and (1, 10). Write down the coordinates of the fourth corner and work out the area of the rectangle.

(3)

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28 Work out the gradient (slope) of each line joining the two points. Give answers as fractions or integers.

(a) Gradient of line through J(1, 2) and K(4, 11). **(2)**

(b) Gradient of line through L(-2, 5) and M(4, 2). **(2)**

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29 A straight line passes through the points P(0, 3) and Q(2, 7). Work out the equation of the line in the form $y = mx + c$.

(3)

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30 Work out the gradient of the line through J(2, 3) and K(6, 15).

(2)

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31 Work out the gradient of the line through L(-1, 8) and M(5, 2).

(2)

---

32 A straight line passes through the points P(0, 5) and Q(3, 11). Work out the equation of the line in the form $y = mx + c$.

(3)

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33 A straight line passes through the points R(2, 7) and S(6, 15). Work out the equation of the line in the form $y = mx + c$.

(3)

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34 A triangle has vertices A(1, 1), B(7, 1) and C(1, 9). Using the coordinates, find the lengths of AB and AC, and hence work out the area of triangle ABC.

(3)

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35 Points A(-3, 1) and B(5, 7) are given.

(a) Find the midpoint M of AB. **(2)**

(b) Find the distance AB, using the horizontal and vertical differences and Pythagoras' theorem. **(2)**

36 Write down the coordinates of the origin.

(1)

37 State which axis the point (9, 0) lies on.

(1)

38 Write down the coordinates of the point that is 3 units to the right and 2 units up from (1, 1).

(1)

39 Find the midpoint of the line joining the points A(4, 9) and B(10, 3).

(2)

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Mark scheme · 4.13 Coordinates and Line Geometry: 2-hour Pack

Question 1

adds the x-coordinates (or y-coordinates) and halves **M1**
(-3.5, -5) cao **A1**
Answer: **(-3.5, -5)**

Question 2

uses the change from A to M **M1**
applies the same change again from M **M1**
(5, 6) cao **A1**
Answer: **(5, 6)**

Question 3

(7 - (3))/(1 - (0)) or equivalent **M1**
4 cao **A1**
Answer: **4**

Question 4

midpoint method used: ((2+8)/2, (5+1)/2) or equivalent **M1**
(5, 3) cao **A1**
Answer: **(5, 3)**

Question 5

substitutes x = 3 to get y = 2 **M1**
Yes with comparison **A1**
Answer: **Yes**

Question 6

substitutes y = 0 **M1**
(-4, 0) cao **A1**
Answer: **(-4, 0)**

Question 7

32 = 6k - 4 (or equivalent) **M1**
6 cao **A1**
Answer: **6**

Question 8

adds the x-coordinates (or y-coordinates) and halves **M1**
(-0.5, -3.5) cao **A1**
Answer: **(-0.5, -3.5)**

Question 9

differences 3 and 4 **M1**
$\sqrt{3^2 + 4^2}$ **M1**
5 cao **A1**
Answer: **5**

Question 10

5 = 5k (or equivalent) **M1**
1 cao **A1**
Answer: **1**

Question 11

$6^2 + 3^2 = 45$ **M1**
$\sqrt{45}$ **M1**
6.7 cao **A1**
Answer: **6.7**

Question 12

midpoint method used: ((-3+1)/2, (-4+2)/2) or equivalent **M1**
(-1, -1) cao **A1**
Answer: **(-1, -1)**

Question 13

differences 20 and 21 **M1**
$\sqrt{20^2 + 21^2}$ **M1**
29 cao **A1**
Answer: **29**

Question 14

(-3 - (0))/(3 - (0)) or equivalent **M1**
-1 cao **A1**
Answer: **-1**

Question 15

$2^2 + 1^2 = 5$ **M1**
$\sqrt{5}$ **M1**
2.2 cao **A1**
Answer: **2.2**

Question 16

(a) (0, 20) **B1**
(b) (-5, 0) **B1**
Answer: **(a) (0, 20), (b) (-5, 0)**

Question 17

(-14 - (-10))/(3 - (2)) or equivalent **M1**
-4 cao **A1**
Answer: **-4**

Question 18

differences 10 and 24 **M1**
$\sqrt{10^2 + 24^2}$ **M1**
26 cao **A1**
Answer: **26**

Question 19

$3^2 + 5^2 = 34$ **M1**
$\sqrt{34}$ **M1**
5.8 cao **A1**
Answer: **5.8**

Question 20

(24 - (20))/(5 - (4)) or equivalent **M1**
4 cao **A1**
Answer: **4**

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Question 21

substitutes x = -3 to get y = -9	M1
No with comparison	A1

Answer: **No**

Question 22

substitutes y = 0	M1
(-1, 0) cao	A1

Answer: **(-1, 0)**

Question 23

(a) (0, -25)	B1
(b) (5, 0)	B1

Answer: **(a) (0, -25), (b) (5, 0)**

Question 24

uses the change from A to M	M1
applies the same change again from M	M1
(5, 7) cao	A1

Answer: **(5, 7)**

Question 25

adds the x-coordinates (or y-coordinates) and halves	M1
(1, -2.5) cao	A1

Answer: **(1, -2.5)**

Question 26

gradient found	M1
substitutes a point to find c	M1
y = -5x - 3 cao	A1

Answer: **y = -5x - 3**

Question 27

uses matching x and y values	M1
(-1, 10)	A1
area 8	A1

Answer: **(-1, 10), area 8**

Question 28

(a) difference method shown: (11 - 2)/(4 - 1) or equivalent	M1
(a) 3 cao	A1
(a) Answer: **3**	
(b) difference method shown: (2 - 5)/(4 - (-2)) or equivalent	M1
(b) -1/2 cao	A1
(b) Answer: **-1/2**	

Question 29

find gradient m = (7 - 3)/(2 - 0) or equivalent	M1
substitute a point to find c, e.g. 3 = m*0 + c or use y = mx + c	M1
y = 2x + 3 cao	A1

Answer: **y = 2x + 3**

Question 30

(15-3)/(6-2) or equivalent method	M1
3 cao	A1

Answer: **3**

Question 31

(2-8)/(5-(-1)) or equivalent method	M1
-1 cao	A1

Answer: **-1**

Question 32

find the gradient, (11-5)/(3-0) = 2	M1
identify c = 5, since P is on the y-axis	M1
y = 2x + 5 cao	A1

Answer: **y = 2x + 5**

Question 33

find the gradient, (15-7)/(6-2) = 2	M1
substitute into y = 2x + c using R(2,7) to find c = 3	M1
y = 2x + 3 cao	A1

Answer: **y = 2x + 3**

Question 34

AB = 6 (horizontal) and AC = 8 (vertical)	M1
recognise the right angle at A, and use area = 0.5 x base x height	M1
24 cao	A1

Answer: **24**

Question 35

(a) average the x-coordinates and the y-coordinates	M1
(a) (1, 4) cao	A1
(a) Answer: **(1, 4)**	
(b) horizontal difference 8, vertical difference 6, then $\sqrt{8^2+6^2}$	M1
(b) 10 cao	A1
(b) Answer: **10**	

Question 36

(0, 0) cao	B1

Answer: **(0, 0)**

Question 37

x-axis cao	B1

Answer: **x-axis**

Question 38

(4, 3) cao	B1

Answer: **(4, 3)**

Question 39

average the x-coordinates and the y-coordinates	M1
(7, 6) cao	A1

Answer: **(7, 6)**

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