Name:	Target Grade:	Actual Grade:

BRIGHT CULTURE

COORDINATE GEOMETRY

READ THESE INSTRUCTIONS FIRST

INSTRUCTIONS TO CANDIDATES

1. Find a quiet, comfortable spot free place from distractions.

2. Spend one minute on each mark.

3. Time yourself for every single question.

4. Every chapter has their own question types. Ensure that you know the different question type for each chapter.

5. Make a conscientious effort to remember your mistakes, especially in terms of answering techniques. E.g Take a picture for the mistakes that you made, keep it in a photo album, and revise it over and over again.

6. Highlight question types that you tend to keep making mistakes and review them nearing exams.

7. Always review the common questions and question type that you tend to make mistakes nearing exams.

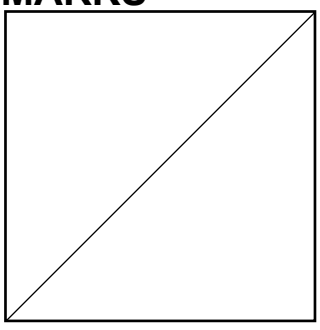
8. During exams, classify the question type and recall what you have learnt, how you need to analyse the questions for the different question type, what you need to take note of and answer with the correct answering techniques!

✨ **Wishing you all the best for this test!**

You've got this!

💡 **With lots of love,**
Bright Culture 💛

MARKS



If you are struggling in this paper, means you need to work harder!

If you need any professional guidance and further advice on how to advance, feel free to WhatsApp us at 91870820 or find us at [www.bright-culture.com/.](http://www.bright-culture.com/) We are committed to connect you to your future to reach your goals.

CHAPTER 4: COORDINATE GEOMETRY

1 A is the point (-4.2) and B is the point (3,0).

(a) Find the equation of the line AB.

Answer …….. [3]

(b) Find the length AB.

Answer …… units [2]

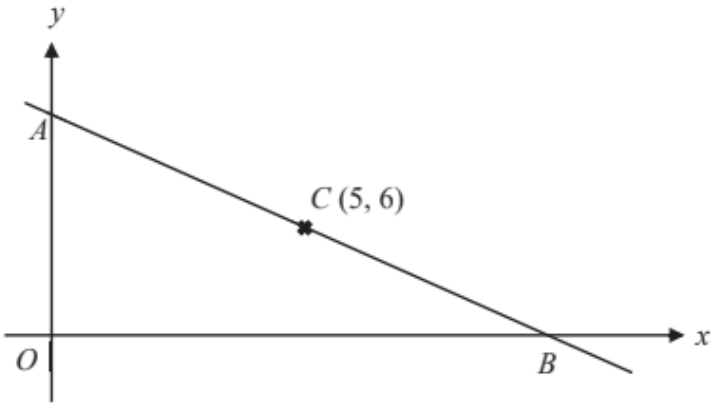
(c) State the number of points of intersection between the line AB and the line $y = \frac{1}{2}x + 1$.
Explain your answer.

Answer……

……

…… [2]

2 In the diagram, not drawn to scale, point A lies on the y-axis and point B lies on the x-axis. The coordinates of C is (5, 6)



(a) Given that C lies on the line AB and that $5OA = 3OB$, show that y-intercept of the line AB is 9.

Answer

[3]

(b) Given that point D lies on the y-axis, state the coordinates of D such that triangle ACD is an isosceles triangle.

Answer (……. , ……..) [1]

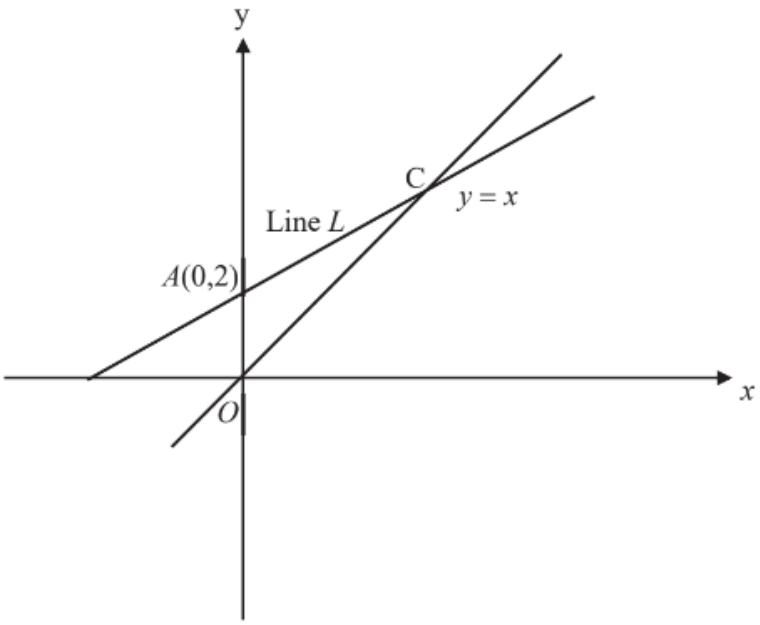
(c) Given further that $OCEA$ is a parallelogram, state the coordinates of the point E.

Answer (……. , ……..) [1]

(d) Find the area of parallelogram. $OCEA$,

Answer …….. units² [2]

3



The line L passes through the point A (0,2) and meets the line $y = x$ at point C. O is the origin.

The area of OAC is 3 units^2.

(a) What is the equation of line L ?

Answer _____ [2]

(b) There is a point B such that OC is the line of symmetry of the figure $OACB$.

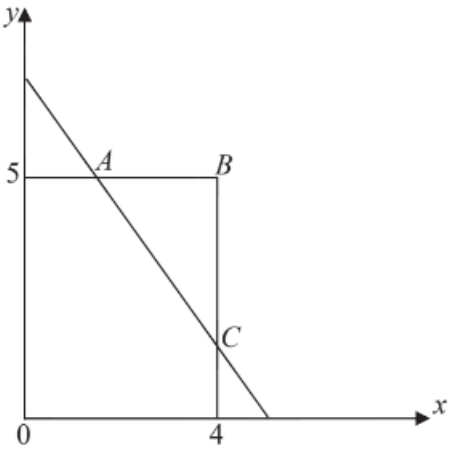
(i) What is the name of quadrilateral $OACB$?

Answer _____ [1]

(ii) State the coordinates of the point B.

Answer B (,) [1]

4



In the diagram, AB is parallel to the x-axis and BC is parallel to the y-axis.

Line AC crosses the x-axis at (5, 0) and the y-axis at (0, 7) .

(a) Find the equation of AC.
Give your answer in the form $ay = bx + c$, where a, b and c are integers.

Answer …….. [2]

(b) Find the area of triangle ABC.

Answer …….units² [3]

(c) The line $y = px$, where p is an integer, passes through triangle ABC.
Find the greatest possible value of p.

Answer p = …….. [1]

5 X is the point (1, 4) and Y is the point (6, 9).

Find

(a) the length of the line XY,

Answer …… units [2]

(b) the equation of the line XY,

Answer …….. [3]

(c) the equation of the line l, which is parallel to XY and passes through the point A which has coordinates (2, 0),

Answer …….. [3]

(d) the coordinates of the point Z that lies on XY such that $XY = 4\,XZ$.

Answer $Z($…… , ……..) [2]

6 A is the point (-20 , -11) and B is the point (8,10)

(a) Find the equation of the line AB.

Answer …….. [2]

(b) Show that the line AB does not pass through the point (1, 5) .

Answer

[2]

(c) A line l, perpendicular to the line AB, passes through the point (-15,10)
The point (gradient of l) x (gradient of AB) equals -1.

Use this information to find the equation of the line l.

Answer …….. [2]

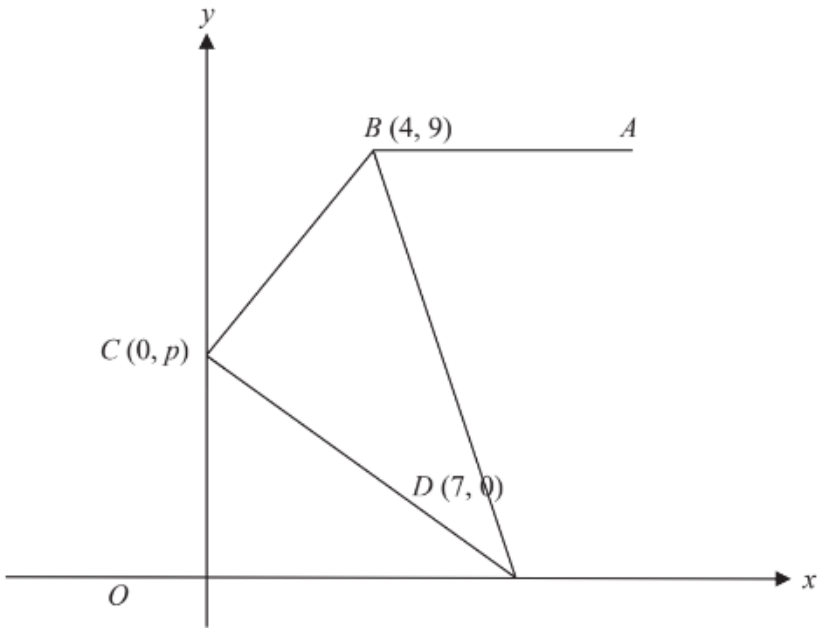
(d) The equation of another line h is $4x + 3y - 15 = 0$.

Without solving for x and y, explain whether line l intersects line h.

Answer

[2]

7 The diagram, not drawn to scale, shows a triangle with vertices B(4, 9), C(0, p) and $D(7,0)$



(a) Given that AB is parallel to the x axis and $AB = BC = 5$ units. State the coordinates of A.

Answer A (…… , ……..) [1]

(b) Find the value of p.

Answer p =…… , ……. [2]

(c) Find the equation of the line BD.

Answer …… , …….. [2]

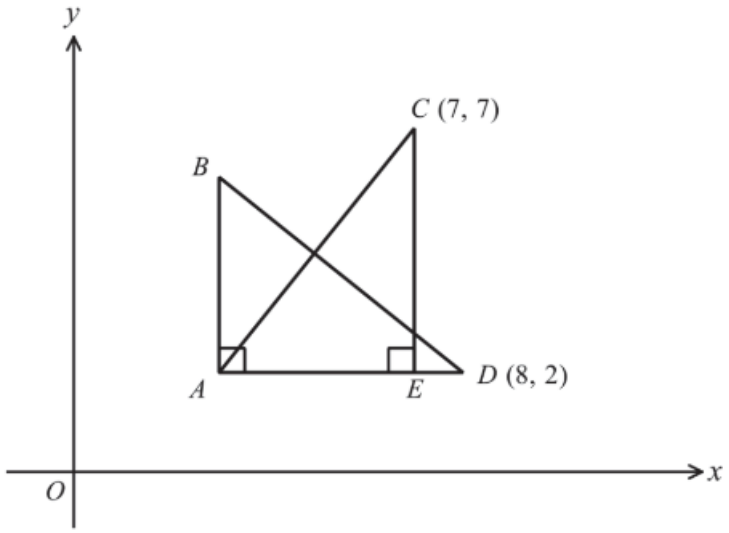
(d) The point E lies on the y-axis such that D, B and E lie on a straight line. Find the coordinates of point E.

Answer E (…… , ……) [1]

(e) Find the area of triangle BCD.

Answer …….. unit² [3]

8 The diagram shows two congruent right-angled triangles *ACE* and *BDA*.
The sides *AB* and *CE* are vertical.
The side *AD* is horizontal and point *E* lies on it.
Point *C* has coordinates (7, 7) and *D* has coordinates (8, 2).



Find the equation of line *AC*.

Answer …….. [3]

9 A is the point (3, 2) and B is the point (9, −1).

(a) Find the length of the line AB.

Answer ..... units [2]

(b) Find the equation of the straight line that is parallel to AB, and passes through point C (−4, 0) .

Answer ..... [3]

10 (a) Solve the equation $\frac{a^2}{7} = \frac{a}{3}$.

Answer a =..... [3]

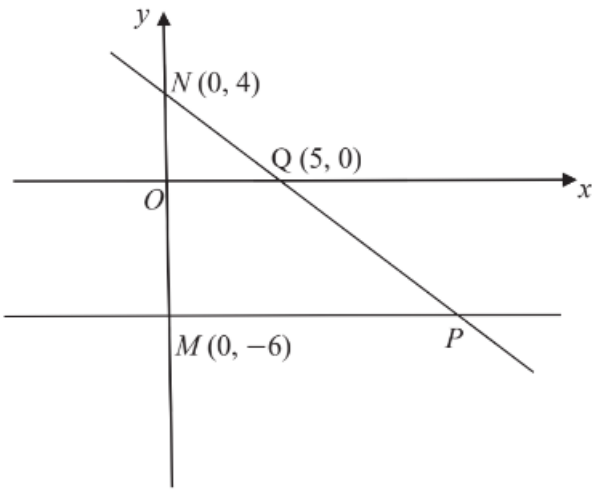
(b) Solve the inequalities $-2 < \frac{7x+3}{2} \leq 3-x$.

Answer ..... [3]

(c) Express $\frac{6}{18d^2-30d+8}+\frac{3}{16-9d^2}$ as a single fraction in its simplest form.

Answer ..... [4]

11 In the diagram, M is the point (0, -6) and N is the point (0, 4).
The line MP is parallel to the x-axis and line NP cuts the x-axis at $Q(5, 0)$.



(a) State the equation of line MP.

Answer (a) _____ [1]

(b) Find the equation of line NP.

Answer (b) _____ [2]

(c) Find the coordinates of P.

Answer (c) (_____ , _____) [2]

12 (d) (i) On the same axes, draw the line with gradient 2 that passes through the point (3, 4). [1]

(ii) Write down the equation of this line.

Answer _____ [1]

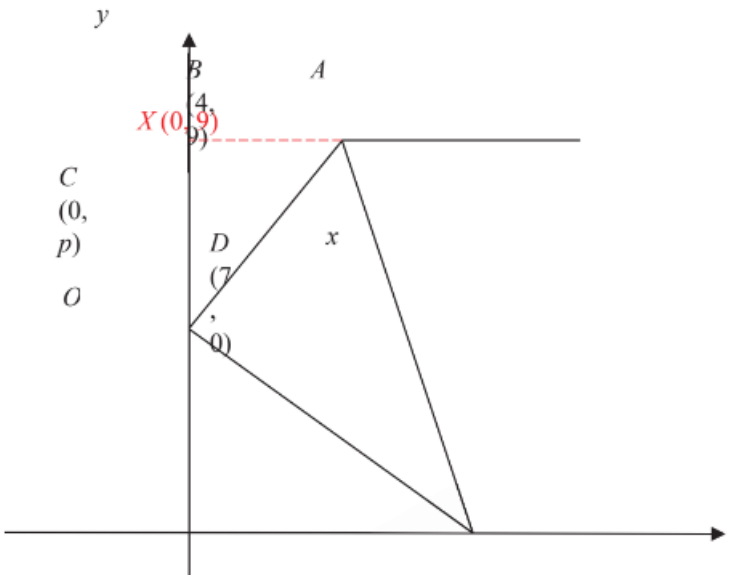
(iii) The x-coordinate of the point where this line intersects the curve is the solution of the equation $x^3 + Ax^2 + Bx - 4 = 0$.
Find the value of A and of B.

Answer A= _____ B =_____ [2]

ANSWERS

Qn	Solution	Marks	Total Marks
1a	gradient $= \frac{2-0}{-4-3}$ $= -\frac{2}{7}$ $y-0=-\frac{2}{7}(x-3)$ $y=-\frac{2}{7}x+\frac{6}{7}$ or $7y=-2x+6$ **Alternative Method:** $\frac{y-0}{x-3}=\frac{2-0}{-4-3}$ $y=-\frac{2}{7}x+\frac{6}{7}$	M1 M1 A1 M1 A2	3
1b	length of $AB=\sqrt{(-4-3)^2+(2-0)^2}$ $=\sqrt{53}$ units $= 7.28$ units	M1 A1	2
1c	Since both the lines have a <u>different gradient,</u> they are not parallel. Hence there will be <u>one point intersection</u> between both the lines.	B2 (No marks for answers without reasoning)	2
2a	$\frac{OA}{OC}=\frac{3}{5}$ Hence gradient of $AB=-\frac{3}{5}$ Equation of AB: $y-6=-\frac{3}{5}(x-5)$ $y=-\frac{3}{5}x+9$ Since the y-intercept of $AB=9$, therefore the line AB cuts the y-axis at 9. (shown)	M[1] (deducing gradient) M[1] (correct equation) A[1]	
b	Coordinates of $A = (0, 9)$. Coordinates of $D = (0, 3)$	B[1]	

c	Distance of $OA = 9$ units $E = (5, 15)$	B[1]
d	Area of parallelogram $= 9 \times 5$ $= 45 \text{ unit}^2$	M[1] A[1]
3a	$\frac{1}{2} \times 2 \times \text{height} = 3$ height $= 3$ $C(3, 3)$ gradient $= \frac{3-2}{3-0} = \frac{1}{3}$ ——C1] Equation : $y = \frac{1}{3}x + 2$ —C1]	
b(i)	Kite	
(ii)	(2, 0)	
4	(a) $5y = -7x + 35$ (b) 4.63 units^2 (3sf) (c) $p = 3$	
5(a)	$\sqrt{(9-4)^2 + (6-1)^2}$ $= 7.07 (3s.f)$	
(b)	$m = \frac{9-4}{6-1} = 1$ $\frac{y-4}{x-1} = 1$ $y - 4 = x - 1$ $y = x + 3$	
(c)	$m = 1$ Sub (2, 0) into $y = x + c$, $0 = 2 + c$ $c = -2$ $y = x - 2$	
(d)	$x - coordinate = 1 + (\frac{6-1}{4}) = 2\frac{1}{4}$ $y - coordinate = 4 + (\frac{9-4}{4}) = 5\frac{1}{4}$ $(2\frac{1}{4}, 5\frac{1}{4})$	
6(a)	gradient $AB = \frac{10-(-11)}{8-(-20)} = \frac{3}{4}$ Equation of AB : $y - 10 = \frac{3}{4}(x - 8)$ $y = \frac{3}{4}x - 6 + 10$ $y = \frac{3}{4}x + 4$	substitute $x = 1$ into $y = \frac{3}{4}x + 4$, $y = 4\frac{3}{4} \neq 5$

(b)	substitute $x=1$ into $y=\frac{3}{4}x+4$, $y=4\frac{3}{4}\neq 5$	
(c)	$m_l\times\frac{3}{4}=-1$ $m_l=-\frac{4}{3}$ Equation of l : $y-10=-\frac{4}{3}(x+15)$ $y=-\frac{4}{3}x-10$	
(d)	For $4x+3y-15=0$ $y=-\frac{4}{3}x+5$ Since gradient of line h = gradient of line l, the 2 lines are parallel and hence do not intersect.	
7(a)	 $A(9, 9)$ (B1)	
(b)	$\sqrt{(4-0)^2+(9-p)^2}=5$ (M1) $16+(9-p)^2=25$ $9-p=\sqrt{9}$ or $-\sqrt{9}$ $-p=3-9$ or $-3-9$ $p=6$ (shown) or 12 (rejected) (A1)	

(c)	Gradient of $BD = \frac{0-9}{7-4}$ $= -3$ To find c, the y intercept of line BD: (M1) $0 = -3(7) + c$ $c = 21$ The equation of BD is $y = -3x + 21$. (A1)	
(d)	$E(0, 21)$ (B1)	
(e)	Area of trapezium $OXBD = \frac{1}{2}(4+7)(9)$ $= 49.5$ units^2 (M1) Area of $\Delta BCX = \frac{1}{2}(3)(4)$ $= 6$ units^2 Area of $\Delta OCD = \frac{1}{2}(7)(6)$ (M1 for either are $= 21$ units^2 Area of $\Delta BCD = 49.5 - 6 - 21$ $= 22.5$ units^2 (A1)	
8	y-coordinate of A $= 2$ Length of CE $= 7 - 2$ $= 5$ x-coordinate of A $= 8 - 5$ $= 3$ Gradient of AC $= \frac{7-2}{7-3}$ $= \frac{5}{4}$ **Equation of AC:** $y - 7 = \frac{5}{4}(x - 7)$ $y = \frac{5}{4}x - \frac{7}{4}$	
9 (a)	Length AB $= \sqrt{(9-3)^2 + (-1-2)^2}$ $= \sqrt{45}$ $= 6.7082 = 6.71$ units (3 s.f)	

(b)	$Gradient_{AB} = \frac{-1-2}{9-3}$ $= \frac{-3}{6} = -\frac{1}{2}$ $y = -\frac{1}{2}x + c$ Sub $C(-4, 0)$ $0 = -\frac{1}{2}(-4) + c$ $c = -2$ $y = -\frac{1}{2}x - 2$	
10	(a) $\frac{a^2}{7} = \frac{a}{3}$ $3a^2 = 7a$ $3a^2 - 7a = 0$ $a(3a-7) = 0$ $a = 0 \quad or \quad a = 2\frac{1}{3}$	
	(b) $-2 < \frac{7x+3}{2} \le 3 - x$ $-2 < \frac{7x+3}{2} \quad and \quad \frac{7x+3}{2} \le 3 - x$ $-4 < 7x + 3 \quad and \quad 7x + 3 \le 2(3 - x)$ $-4 < 7x + 3 \quad and \quad 7x + 3 \le 6 - 2x$ $-7x < 7 \quad and \quad 9x + 3 \le 6$ $-x < 1 \quad and \quad 9x \le 3$ $x > -1 \quad and \quad x \le \frac{1}{3}$ $Ans: \quad -1 < x \le \frac{1}{3}$	

	(c) $\frac{6}{18d^2-30d+8}+\frac{3}{16-9d^2}$ $=\frac{6}{2(3d-1)(3d-4)}+\frac{3}{(4-3d)(4+3d)}$ $=\frac{3}{(3d-1)(3d-4)}+\frac{3}{(4-3d)(4+3d)}$ $=\frac{3}{(3d-1)(3d-4)}-\frac{3}{(3d-4)(4+3d)}$ $=\frac{3(4+3d)-3(3d-1)}{(3d-1)(3d-4)(4+3d)}$ $=\frac{12+9d-9d+3}{(3d-1)(3d-4)(4+3d)}$ $=\frac{15}{(3d-1)(3d-4)(4+3d)}$ *or* $=\frac{-15}{(4-3d)(3d-1)(4+3d)}$ Alternative solution $\frac{6}{18d^2-30d+8}+\frac{3}{16-9d^2}$ $=\frac{6(16-9d^2)+3(18d^2-30d+8)}{(16-9d^2)(18d^2-30d+8)}$ $=\frac{6(4-3d)(4+3d)+6(3d-1)(3d-4)}{2(4-3d)(4+3d)(3d-1)(3d-4)}$ $=\frac{6(4-3d)(4+3d)-6(3d-1)(4-3d)}{2(4-3d)(4+3d)(3d-1)(3d-4)}$ $=\frac{6(4-3d)\left[(4+3d)-(3d-1)\right]}{2(4-3d)(4+3d)(3d-1)(3d-4)}$ $=\frac{15}{(3d-1)(3d-4)(4+3d)}$ [A1]	

11 (a) $y = -6$

(b) Equation is $y=-\frac{4}{5}+4$

(c) $\left(12\frac{1}{2},-6\right)$

12 (d)(ii) $y = 2x - 2$ (d)(iii) $A = -3$, $B = 4$