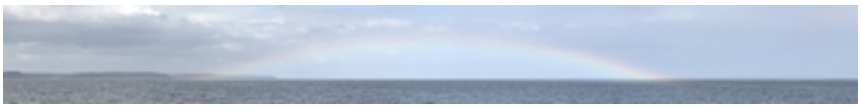
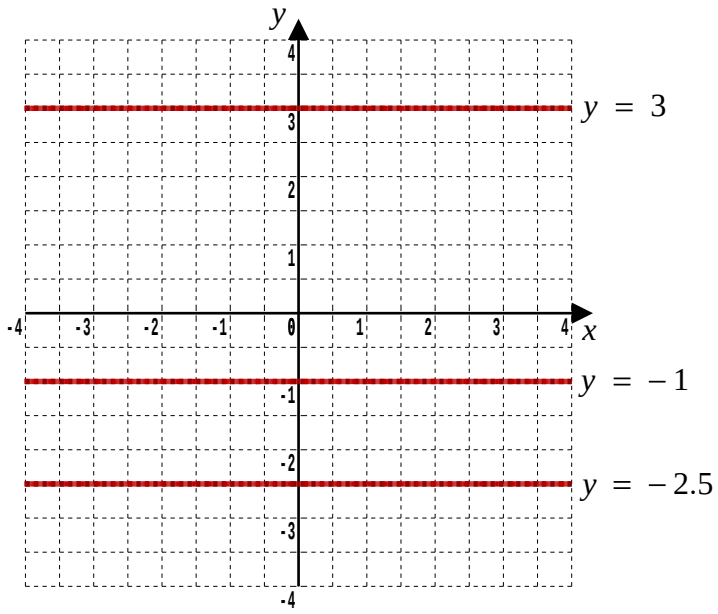
2.1 Horizontal Lines



The horizon is an imaginary line between the sea and the sky.
On a graph the the *x*-axis lies parallel to the horizon.
Any straight line parallel to the *x*-axis will have an equation of the form $y = c$
As before, *c*, is the number where the line goes through the *y*-axis

Examples



Equation of the *x*-axis

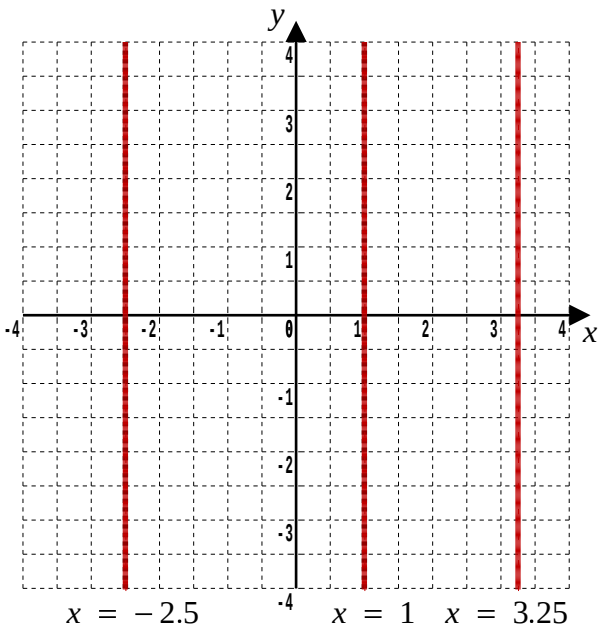
Confusingly, although it is called the *x*-axis, it has equation $y = 0$

Line Art #1

2.2 Vertical Lines

A vertical rock face on a mountain is a wall of rock that heads straight up into the sky.
On a graph the *y*-axis lies parallel to the vertical.
Any straight line parallel to the *y*-axis will have an equation of the form $x = b$
This is a new situation where *b* is the number where the line goes through the *x*-axis

Examples



Equation of the *y*-axis

Confusingly, although it is called the *y*-axis, it has equation $x = 0$

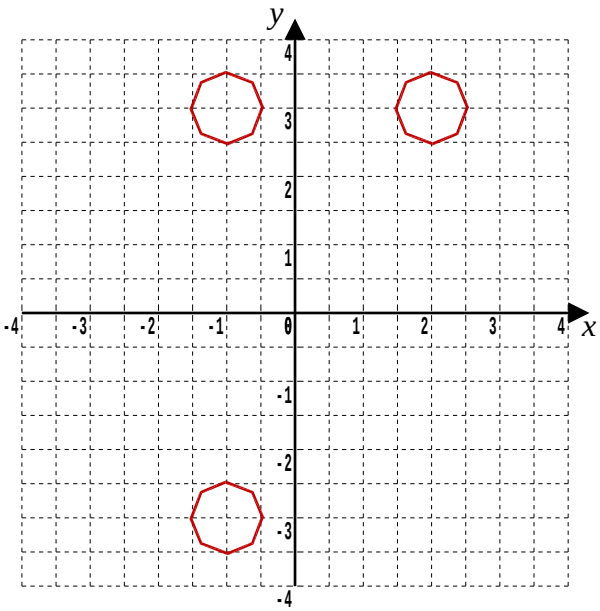
Line Art #2

String Art places metal nails in a wooden board, then loops colourful thread around the nails. It shows that the simple straight line can be used to great effect in art.

2.3 Example

On the graph are three octagons.
Draw the three lines that pass through the octagon centres in pairs.
Write down the equation of each of the three lines.

Teaching Video: http://www.NumberWonder.co.uk/v9005/2.mp4



[4 marks]

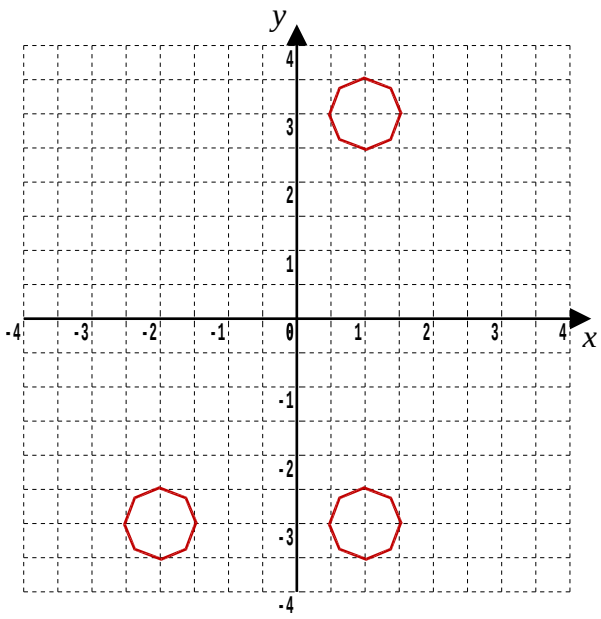
Line Art #3

2.4 Exercise

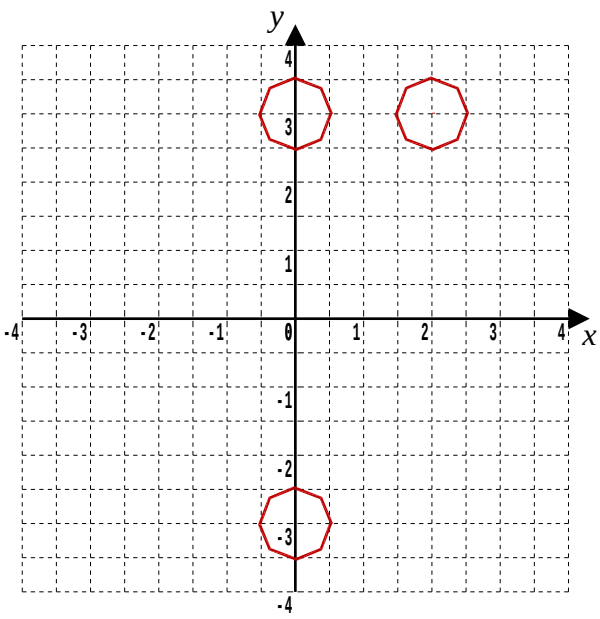
Marks Available : 62

Question 1

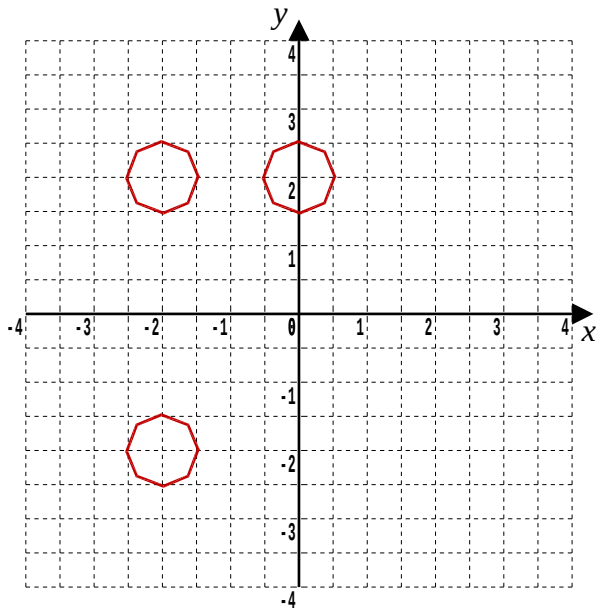
On each graph are three octagons.
Draw the three lines that pass through the octagon centres in pairs.
Write down the equation of each of the three lines.



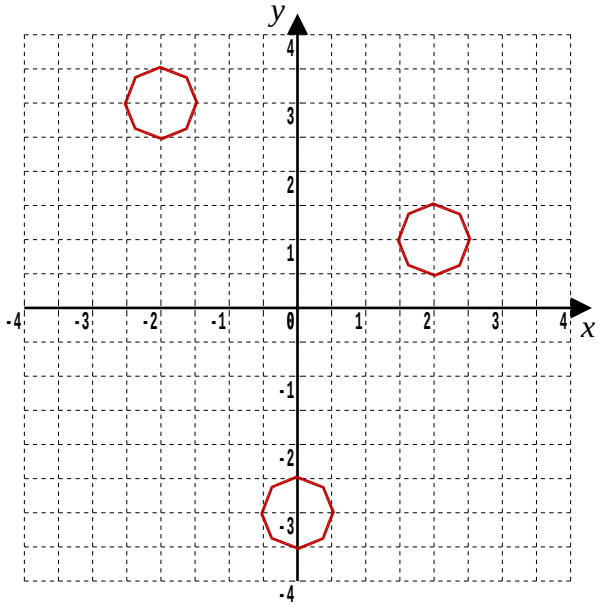
(i)



(ii)



(iii)

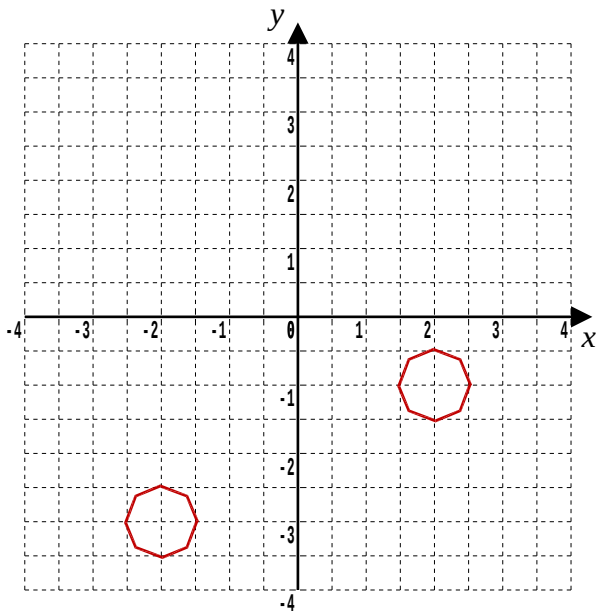


(iv)

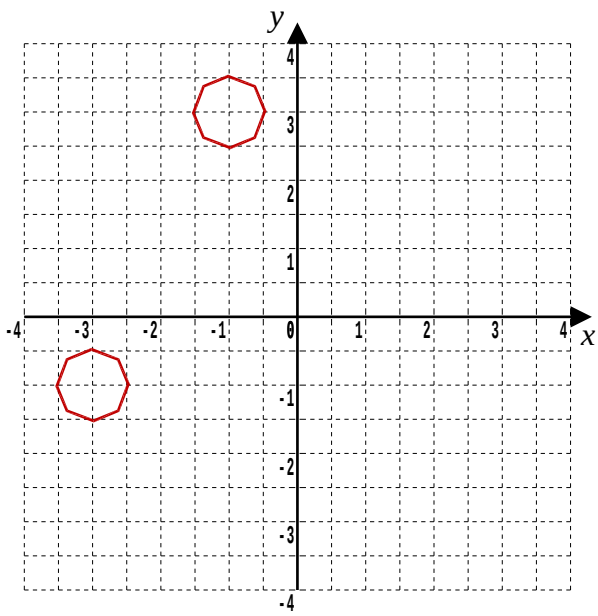
[16 marks]

Question 2

On each of the graphs write down the equation of the straight line between the ring centres. These questions are intentionally a little harder than those done previously.

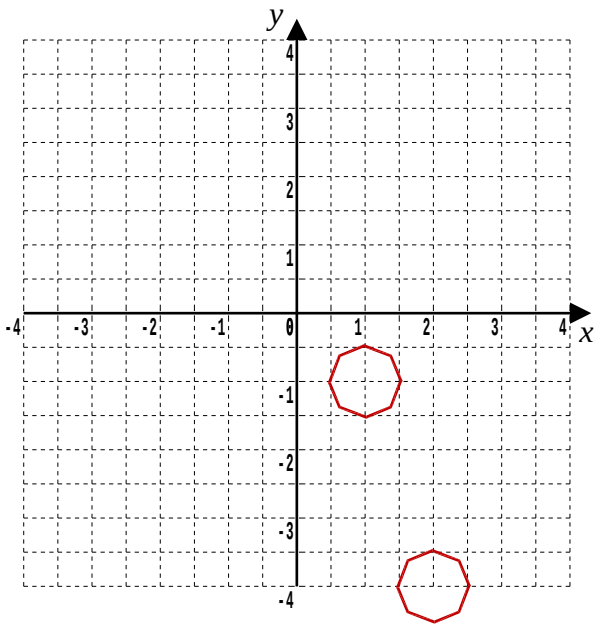


(i)

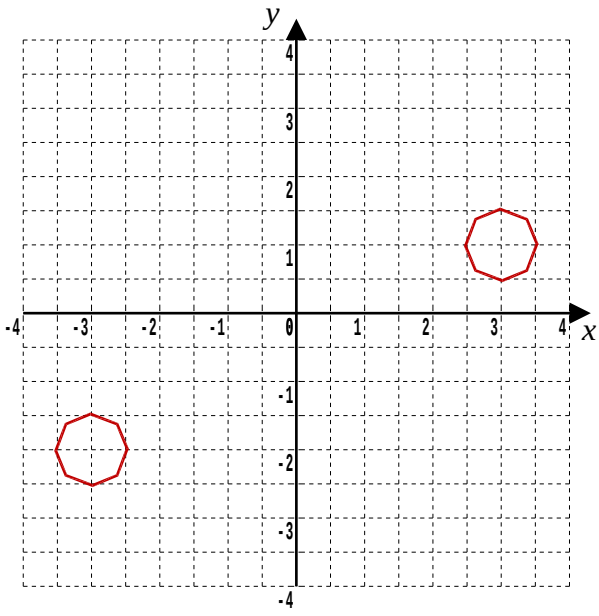


(ii)

[2, 2 marks]

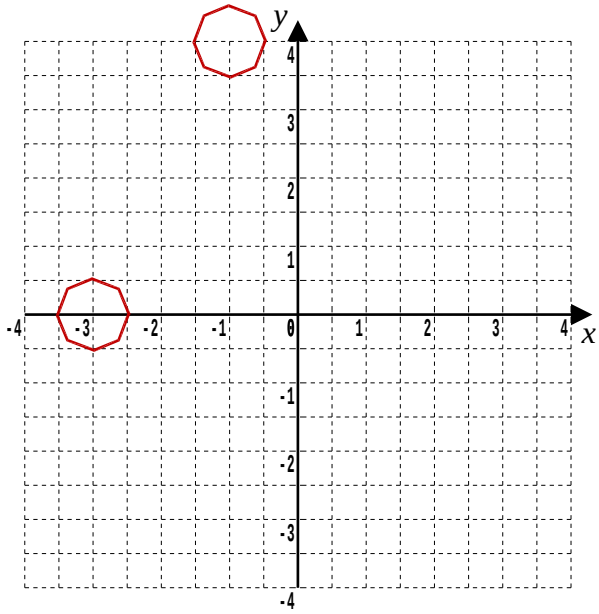


(iii)

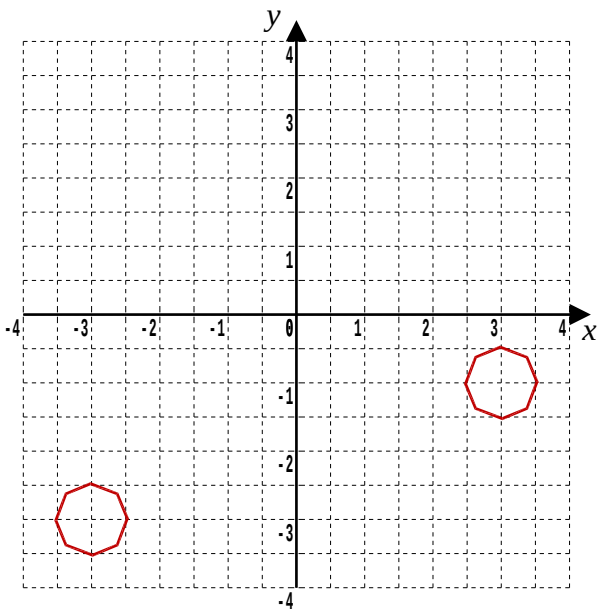


(iv)

[2, 2 marks]

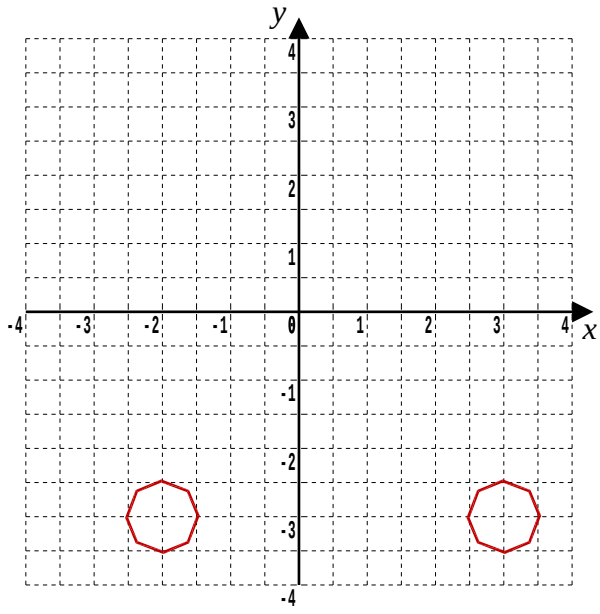


(v)

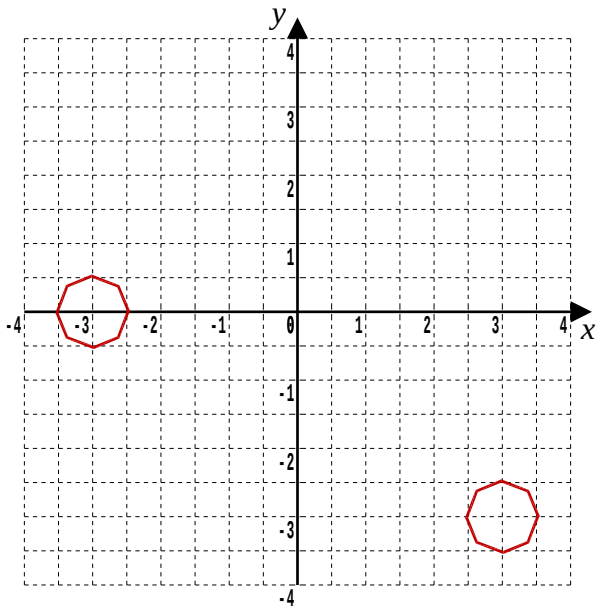


(vi)

[2, 2 marks]

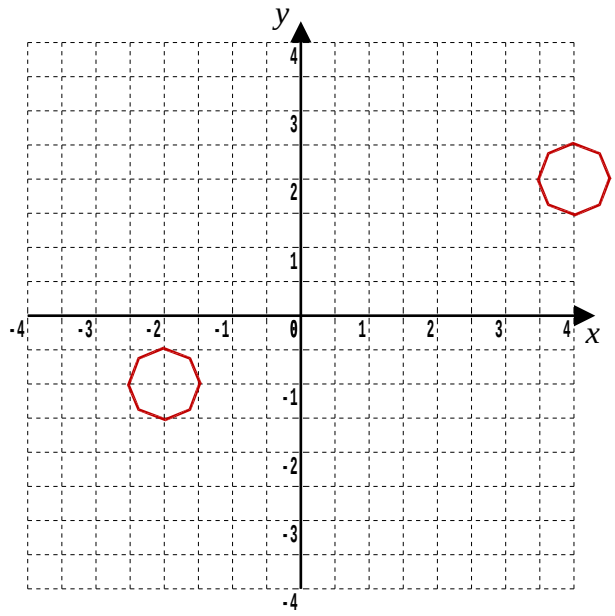


(vii)

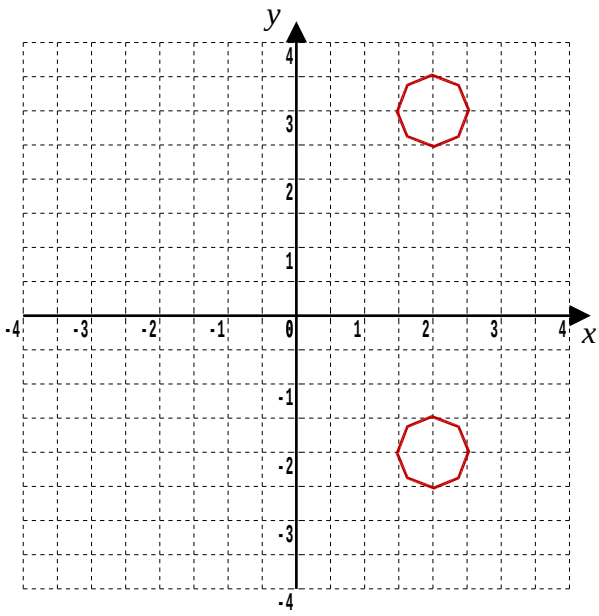


(viii)

[2, 2 marks]

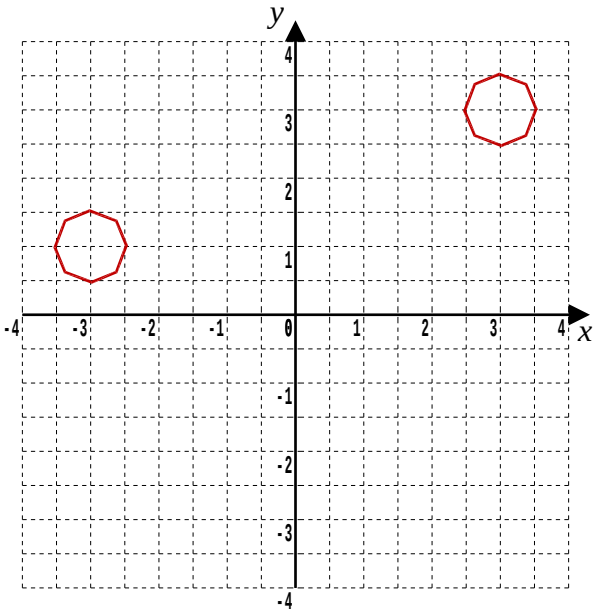


(ix)

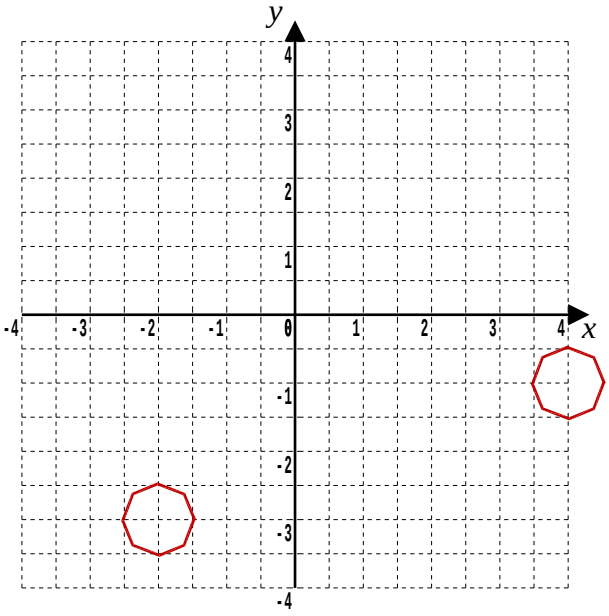


(x)

[2, 2 marks]



(xi)

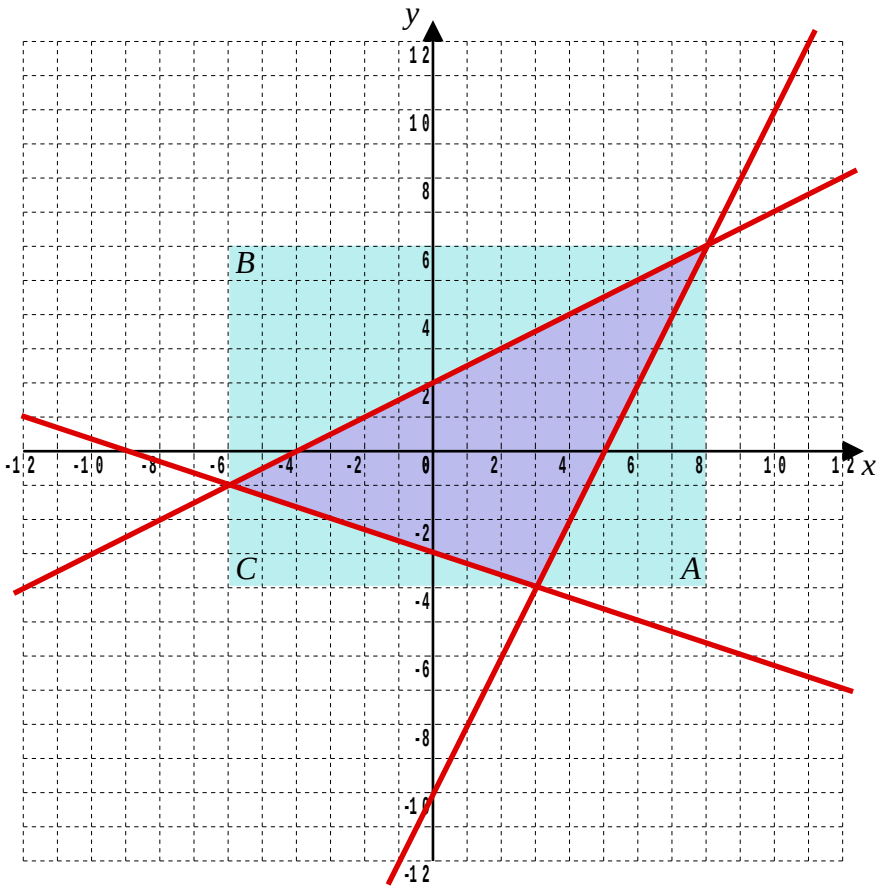


(xii)

[2, 2 marks]

Question 3

(i) Next to each line, at a suitable place, clearly write the equation of the line.



[6 marks]

(ii) Calculate the area of triangle A.

[2 marks]

(iii) Calculate the area of triangle B.

[2 marks]

(iv) Calculate the area of triangle C.

[2 marks]

(v) Hence, or otherwise, determine the area of the triangle enclosed by the three lines.

[3 marks]

Question 4

Consider the graphs of following six six equations;

(a) $y = 8x - 7$ **(b)** $y = -7x + 2$ **(c)** $y = x^3 - x$

(d) $y = 2^x$ **(e)** $y = x^2 + 2$ **(f)** $y = 8x + 72$

(i) Which graphs are not straight line graphs ?

[1 mark]

(ii) Which graph slopes downwards at all points ?

[1 mark]

(iii) Which graph passes through the origin ?

[1 mark]

(iv) Which graph crosses the *y*-axis below the *x*-axis ?

[1 mark]

(v) Which graph passes through the point (1, 3) ?

[1 mark]

(vi) Which two graphs are parallel ?

[1 mark]

(vii) Which graph passes through the point (1, 2) ?

[1 mark]