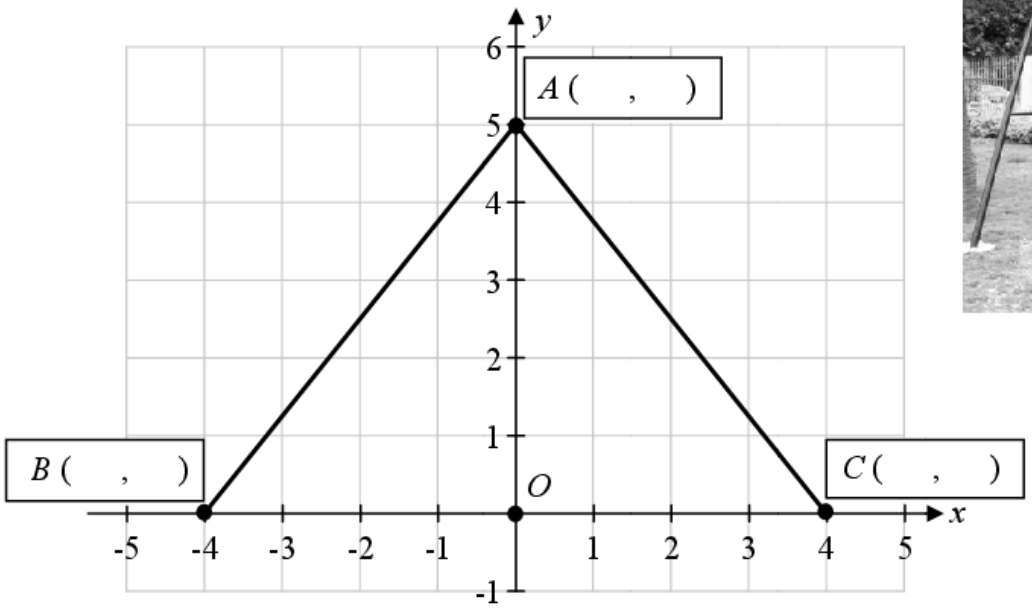
Question 1

The diagram below shows part of the frame of a swing on a co-ordinate grid.
Each unit on the grid represents one metre.
The line segments $[AB]$ and $[AC]$ represent metal bars.



(i) Write the co-ordinates of the points A, B, and C in the spaces provided in the diagram.

(ii) Find the total length of metal bar needed to make this part of the swing.
Give your answer in metres, correct to one decimal place.

(iii) Find the slope of AB and the slope of AC.

AB:

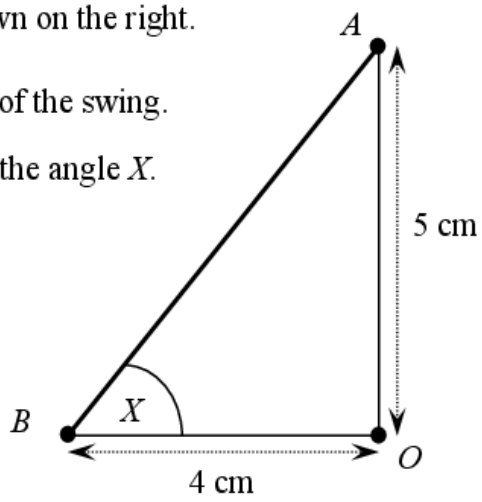
AC:

(iv) Is AB perpendicular to AC? Give a reason for your answer.

Answer:

Reason:

(v) Madison draws the scale diagram of the triangle OAB shown on the right.
She marks in the angle X.
Recall that $[AB]$ is a metal bar, which is part of the frame of the swing.



Write down the value of $\tan X$, and hence find the size of the angle X.
Give the size of the angle X correct to two decimal places.

$\tan X =$

$|\angle X| =$

In order to increase the height of the swing, it is decided to increase X by 20%.
The distance $|AB|$ will be kept the same.

(vi) Find the new height of the swing. Give your answer in metres, correct to one decimal place.

Question 2

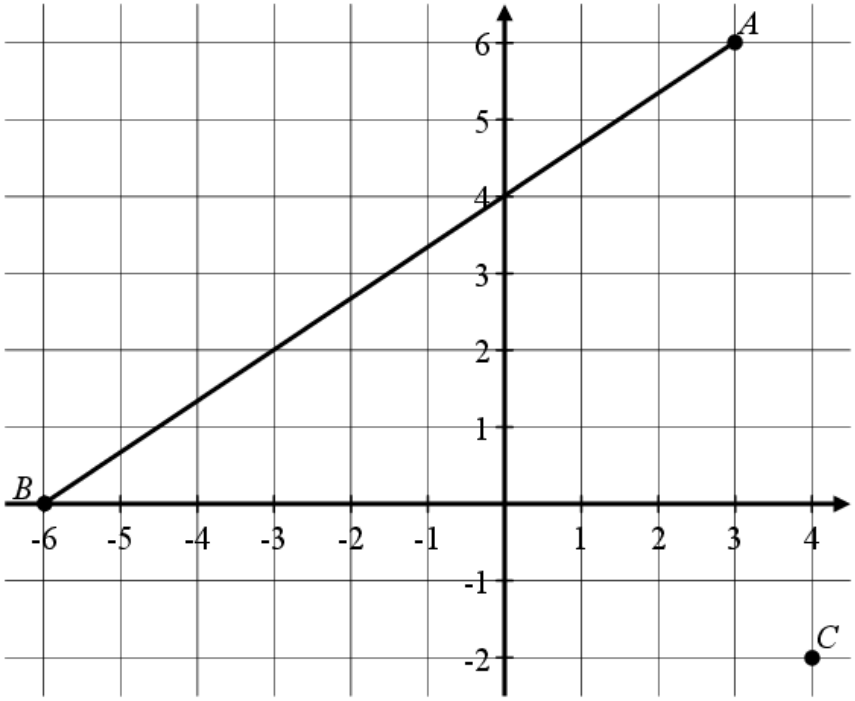
The equation of the line l is $x-3y-6=0$.

(i) Find the slope of the line l.

(ii) Show that the point $(1,-2)$ is **not** on the line l.

(iii) The line k passes through $(1,-2)$ and is parallel to the line l.
Find the equation of the line k.

Question 3



(a) Write the coordinates of A, B and C.

$A\ (\quad,\quad)$ $B\ (\quad,\quad)$ $C\ (\quad,\quad)$

(b) Find the co-ordinates of D, the mid-point of $[AB]$.

(c) Find the equation of the line AB.

(d) Find the equation of the line through C, perpendicular to AB.

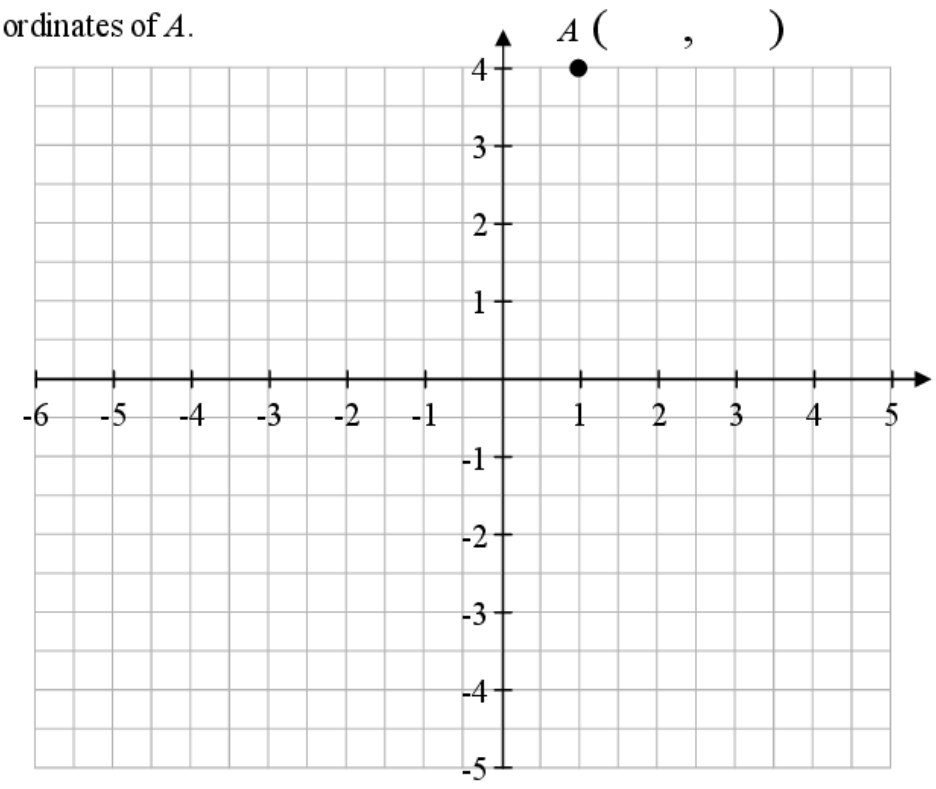
(e) Let E be the point where this perpendicular line through C intersects AB.
Calculate the coordinates of the point E.

(f) Which is the shorter distance, $|CD|$ or $|CE|$? Find this distance.

Question 4

The point A is shown on the diagram.

(a) Write down the co-ordinates of A.



(b) Plot the following points on the diagram above.

B	***C***	***D***	***E***	***F***
(2, 0)	(– 4, – 4)	(0, 4)	(– 6, 0)	(4, – 4)

(c) Calculate the midpoint of $[DF]$.

(d) Find the slope of BF.

(e) Write down the equation of the line BF in the form $y = mx + c$.

(f) Find the slope of the line CE.

(g) Write the equation of the line CE in the form of $ax + by + c = 0$.

(h) What is the ratio of the area of the triangle BCE to the area of the triangle BCF?

Area of $\triangle BCE$

Area of $\triangle BCF$

Ratio:

(i) State whether the two triangles in part **(h)** above are congruent.
Give a reason for your answer.

Answer:

Reason:

Question 5

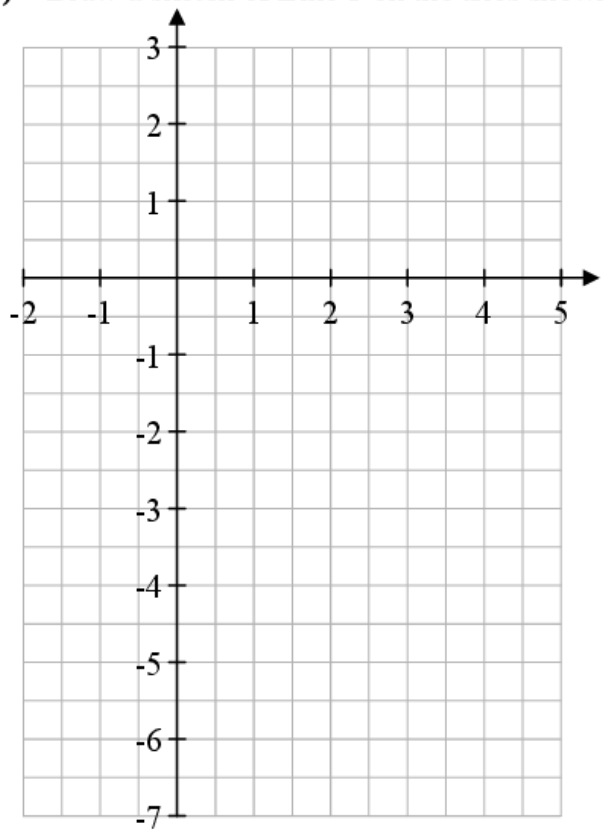
The table below gives the equations of six lines.

Line 1	$y = 3x - 6$
Line 2	$y = 3x + 12$
Line 3	$y = 5x + 20$
Line 4	$y = x - 7$
Line 5	$y = -2x + 4$
Line 6	$y = 4x - 16$

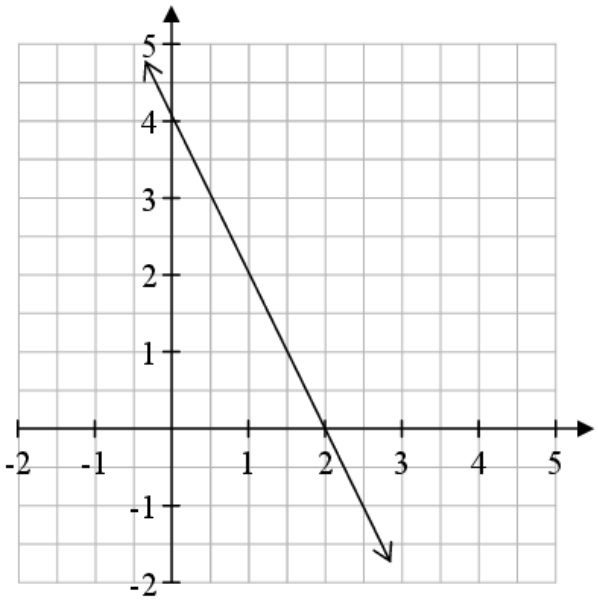
(a) Which line has the greatest slope? Give a reason for your answer.

(b) Which lines are parallel? Give a reason for your answer.

(c) Draw a sketch of Line 1 on the axes shown.



(d) The diagram below represents one of the given lines. Which line does it represent?



Answer = Line _____

(e) The table shows some values of x and y for the equation of one of the lines.
Which equation do they satisfy?

x	y
7	12
9	20
10	24

Answer = Line _____

(f) There is one value of x which will give the same value of y for Line 4 as it will for Line 6.
Find, using algebra, this value of x and the corresponding value of y.

(g) Verify your answer to **(f)** above.