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Graphs

The common graphs at primary level are the line graphs and bar graphs.

Line graph

A line graph is a type of chart used to show information that changes over time.
We plot line graphs using several points connected by straight lines.

The line graph comprises of two axes known as 'x' axis and 'y' axis.

- The horizontal axis is known as the x-axis.
- The vertical axis is known as the y-axis.

Plotting a line graph

Plotting a line graph is easy. Here are the simple steps to consider while plotting a line graph.

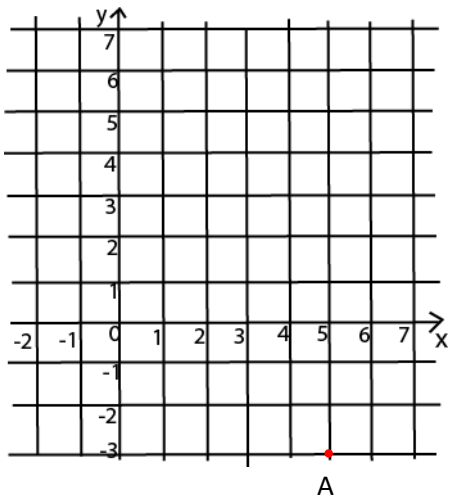
- Draw the x-axis and y-axis on the graph paper. Make sure to write the title above the table so that it determines the purpose of the graph.
- For instance, if one of the factors is time, it goes on the horizontal axis, referred to as the x-axis. The other factor would subsequently go on the vertical axis, which is known as the y-axis. Label both the axes as per their respective factors. For example, we can label the x-axis as time or day.
- Afterward, with the help of the already given data, point out the exact values on the graph. Once you join the points, you can make a clear inference about the trend.

Example 1

On the grid below mark a point A whose coordinates are (5, -3).

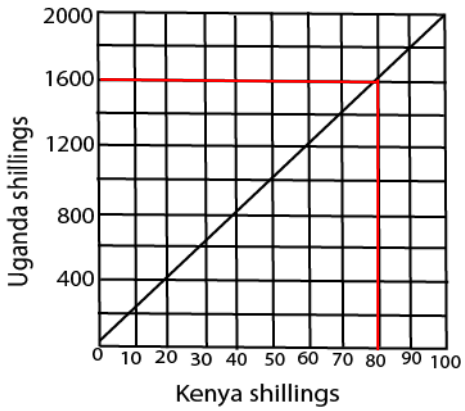
Solution

Mark point A – 5 point along the X-axis and -3 point along the y-axis



Example 2

The graph below was used for converting Kenya shillings into Uganda shillings. Use it to answer parts (a) and (b)



(a) If you had 1 Kenya shilling, how many Uganda shillings would you have got?

From the graph (red line)

K. shs 80 = Ug shs 1600

(b) H ...s 1 400?

Ug sh. 20 is equal to K. sh = 1

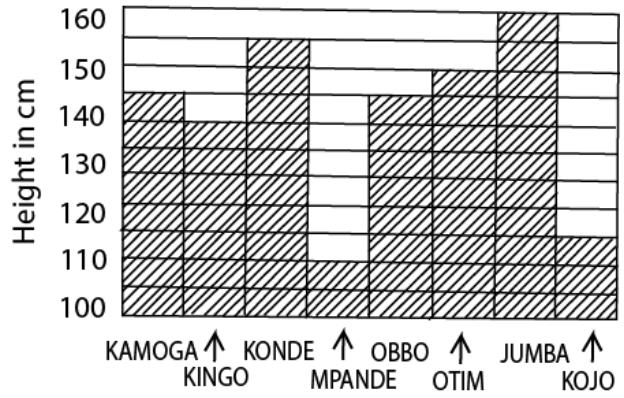
∴ Ug sh. 14000 = $\frac{14000\ x\ 1}{20}$ = K. sh. 70

Bar graphs

The length of each bar is proportional to the amount that it represents.

Example 3

The bar graph below shows heights in cm of 8 boys from Kelima Primary School. Use it to answer the questions that follow;



(a) Complete the table below

Kamoga	Kingo	Konde	Mpambe	Obbo	Otim	Jumba	Kojo
145cm	140cm	155cm	**110cm**	**145cm**	**160cm**	**160cm**	**115cm**

(b) What is the height of the shortest boy?

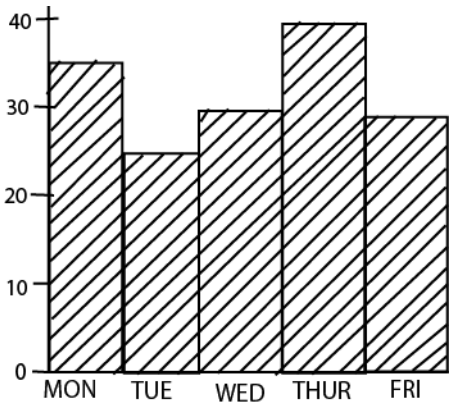
The height of the shortest boy = 110cm

(c) What does one square on the vertical axis represent? :

1square vertical axis = 5cm

Exercise

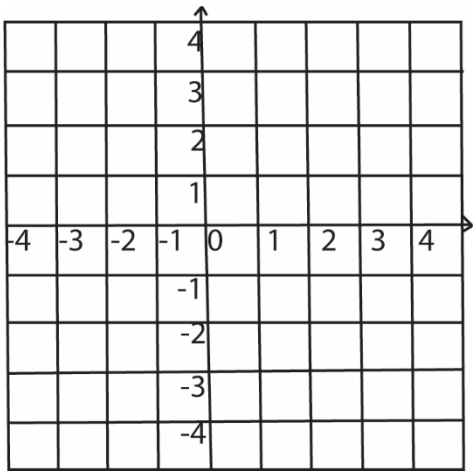
1. The graph below shows the daily attendance of pupils in a class of 40. Use it to answer the questions, which follow.



a) What percentage of pupils were present on Tuesday?

b) What was the average number of pupils who were absent during the five days?

Use the grid below for answering questions 2 and 3.



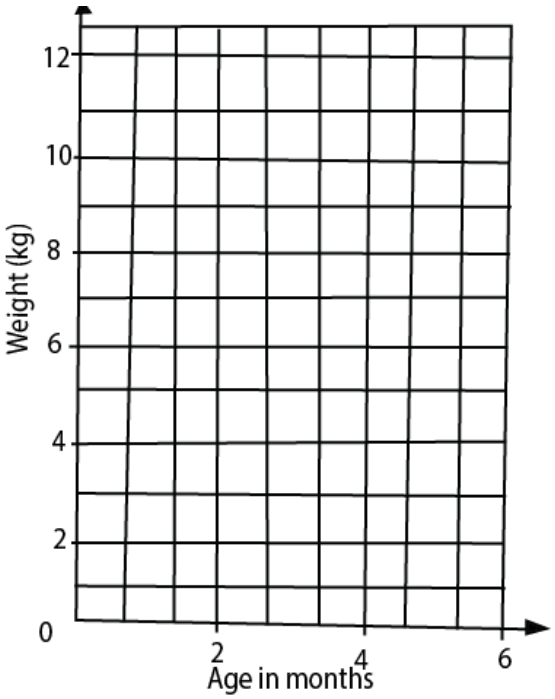
2. Mark the points P(-2, -1), Q(+2, -1) R(2, 2) and S(-2, 2) on the grid.

3. What is the length of PR.

4. The table below shows the weight of a baby measured during the first six months.

Age in month	0	1	2	3	4	5	6
Weight in kilogram	3	5	9	10	10	11	12

(a) Draw a graph of the baby's weight against age.



(b) During which months did the baby's weight remain the same?

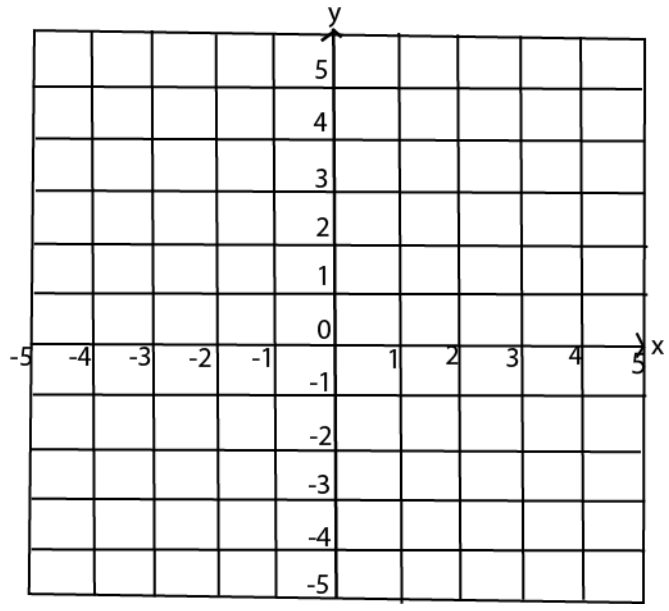
(c) During which month did the baby gain the most weight?

5. On the grid below:

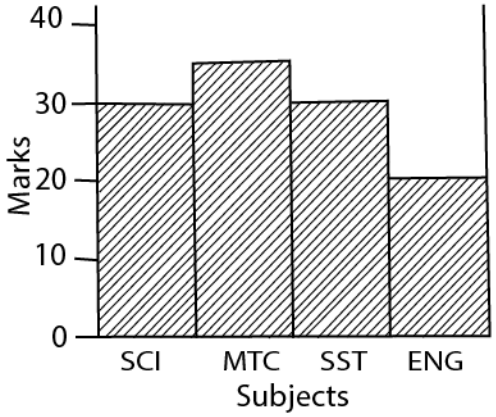
i) Plot the points A (0, 5), B (-2, 0), C (0, -3), D (2, 0)

ii) Join A to B, B to C, A to D.

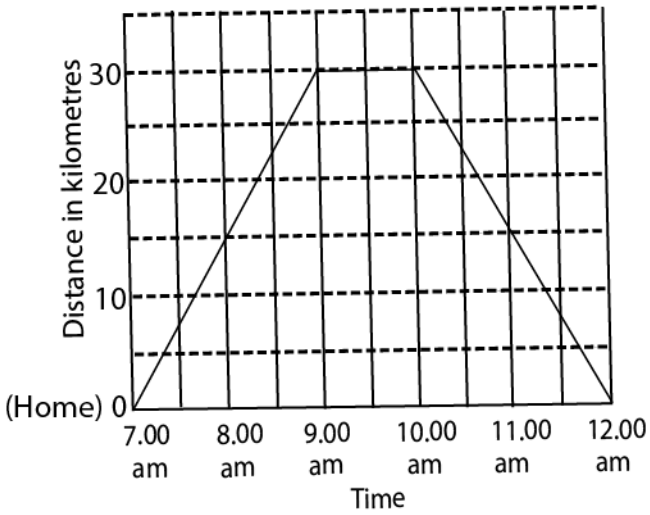
b) Name the polygon formed.



6. The graph below represents marks scored in the four subjects by a pupil in P.6. Which subject was done best?



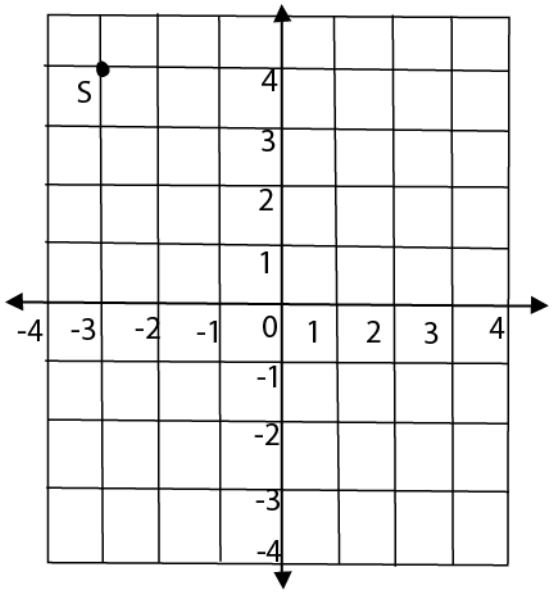
The graph shows Peter's journey from his home to town and back home Use it to answer questions 7 and 8.



7. How far is the town from Peter's home?

8. How many hours did peter spend out of his home?

Use the grid below to answer questions 9 and 10.



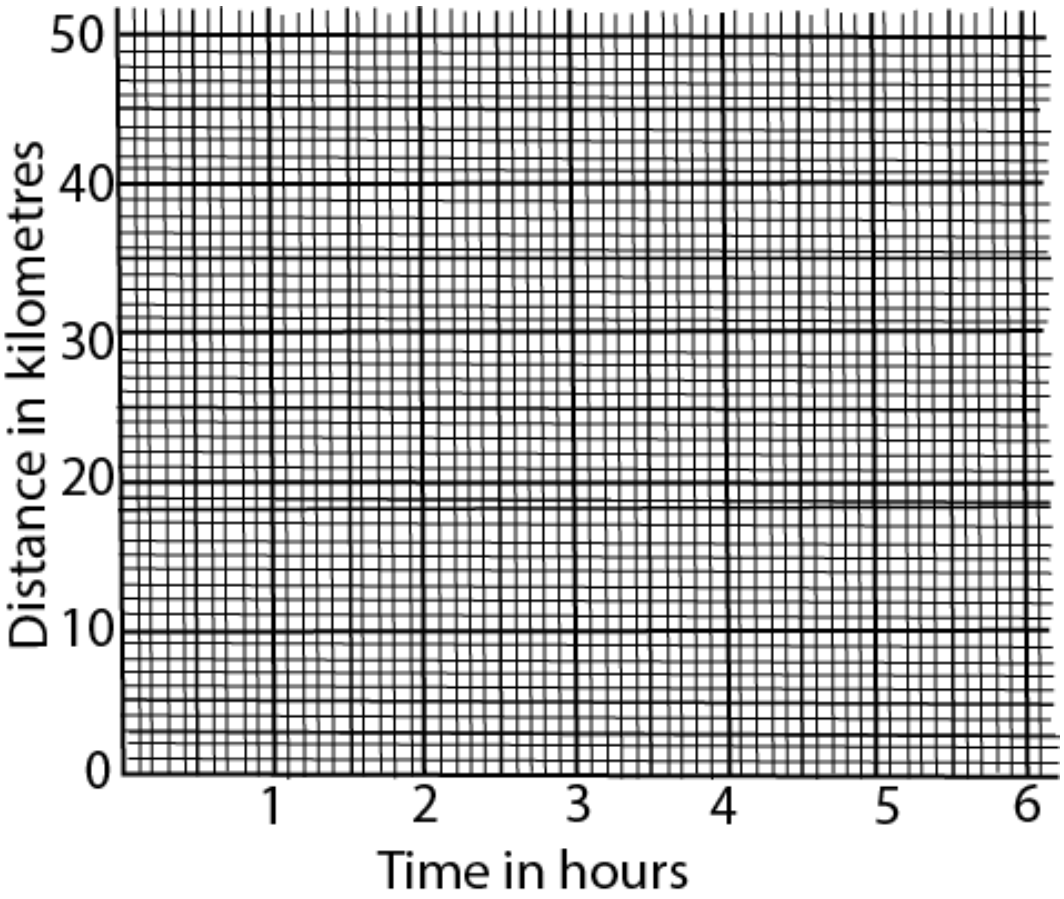
9. State co-ordinates of point S.

10. Mark point T(4, -2) on the grid

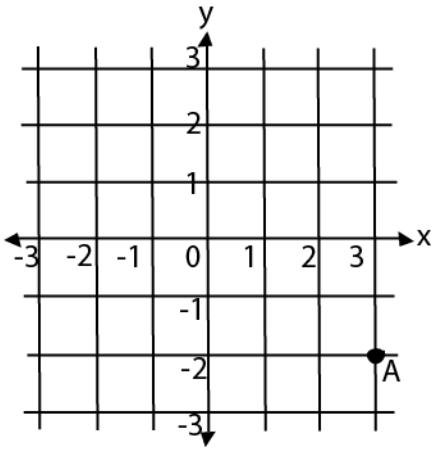
11. Kiyemba rode a bicycle from town A to town C through town B as follows:

He rode from A to B a distance of 30km for 3 hours and then rested for ½ an hour. From B, he rode to C a distance of 20Km in $2^1/_2$ hours.

On the graph given below, draw a line to show Kiyemba's movement. Also show towns B and C.

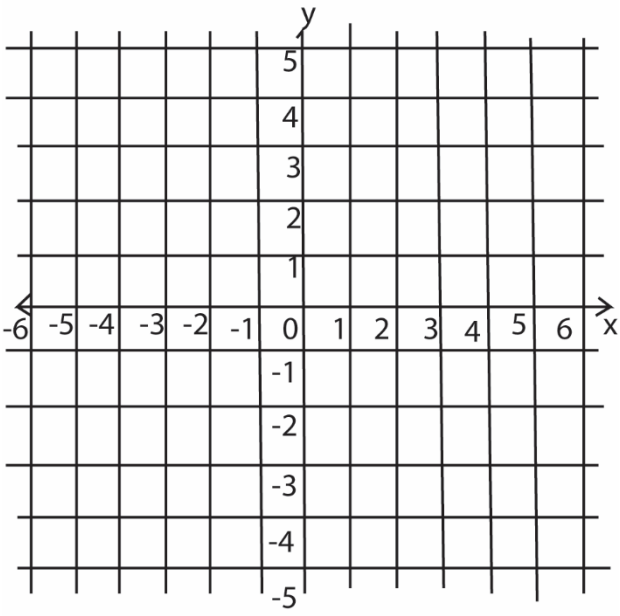


12. Use the graph to answer the question that follows:



Give the co-ordinates of *A = (3, -2)*

13. Study the graph below and answer the questions that follow.



One unit square = 1 cm^2

(a) Plot the points:

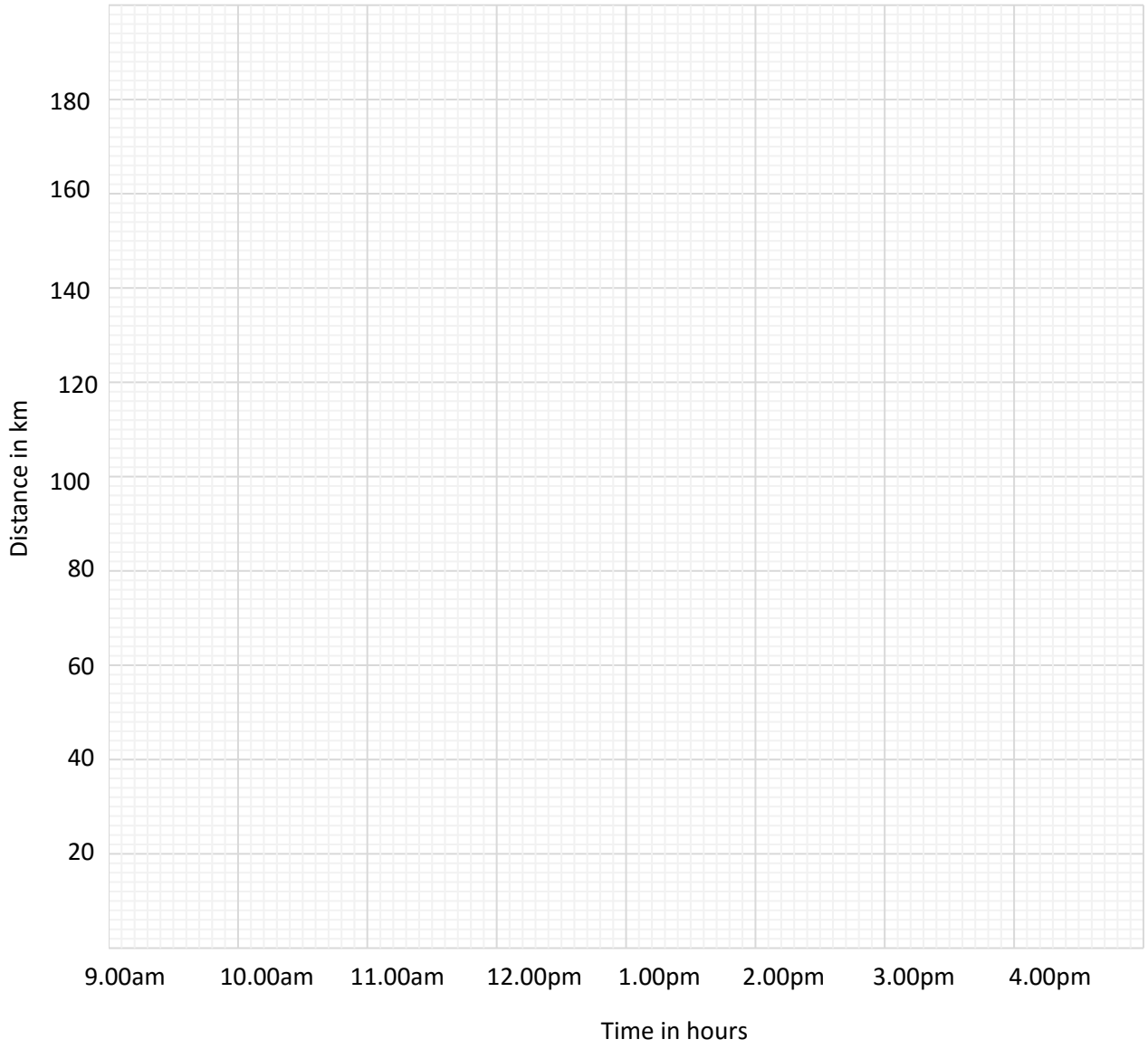
(b) Join the points A to B, B to C, C to D and D to A.

(c) Name the quadrilateral formed:

(d) Find the area of the quadrilateral in (c) above.

14. Bbosa left town P at 9.00am and drove at 55km per hour for 2 hours to town Q he rested for half an hour at town Q he left town Q and drove for $1\frac{1}{2}$ hours at 40km per hour to town R; he rested for half an hour at town R. He then left town R and drove back to town P 75 km per hour

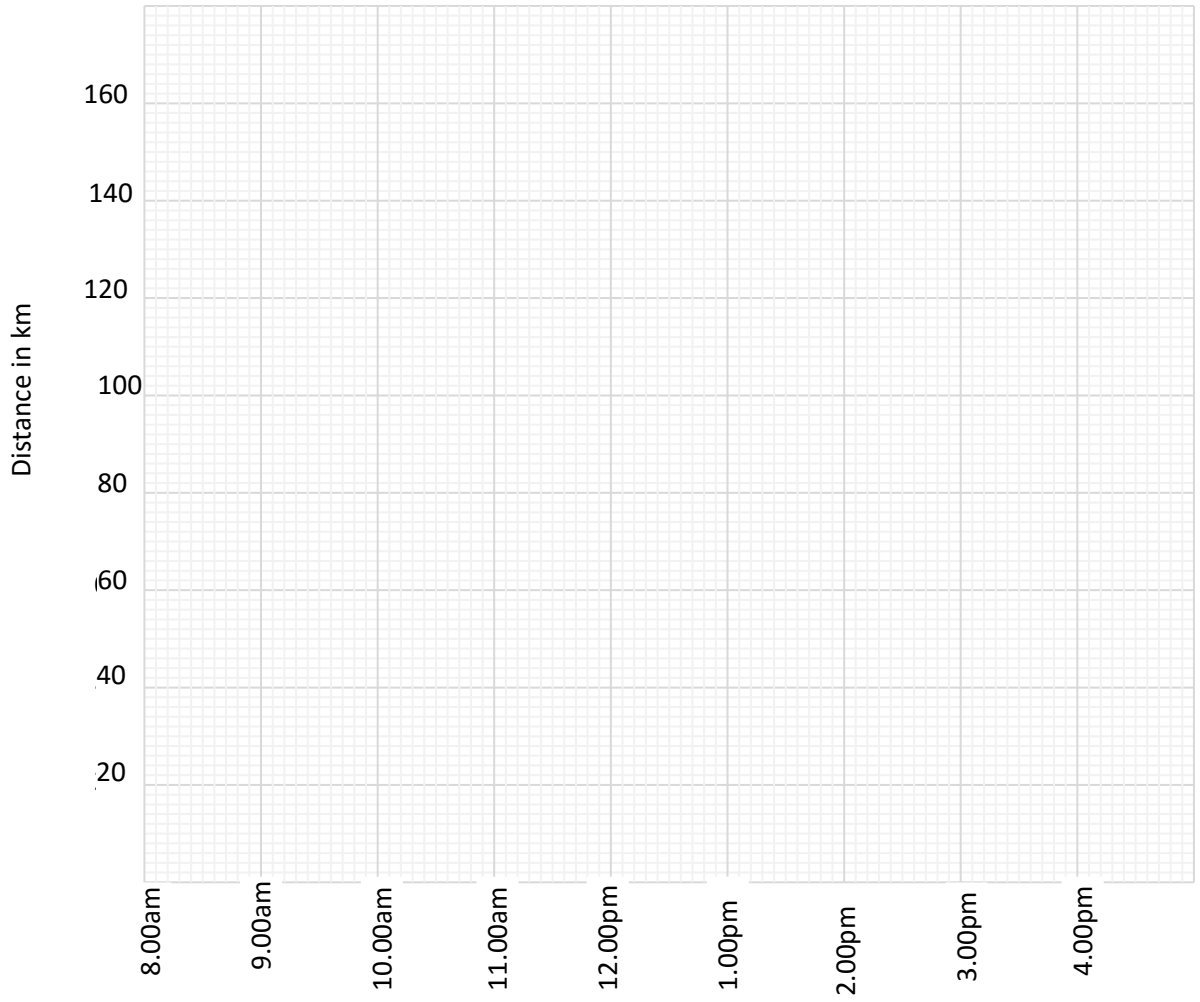
(a) Draw Bbosa`s journey on the graph provided



(b) Find the average speed for the whole journey.

15. Mutono left town X at 8.00 a.m and drove at 90km per hour for one hour to town Y. He rested for half an hour at town Y. He left town Y and drove for one hour at 70km per hour to town Z. He rested for half an hour at town Z .he then left town Z and drove to town X at a steady speed of 40 km per hour.

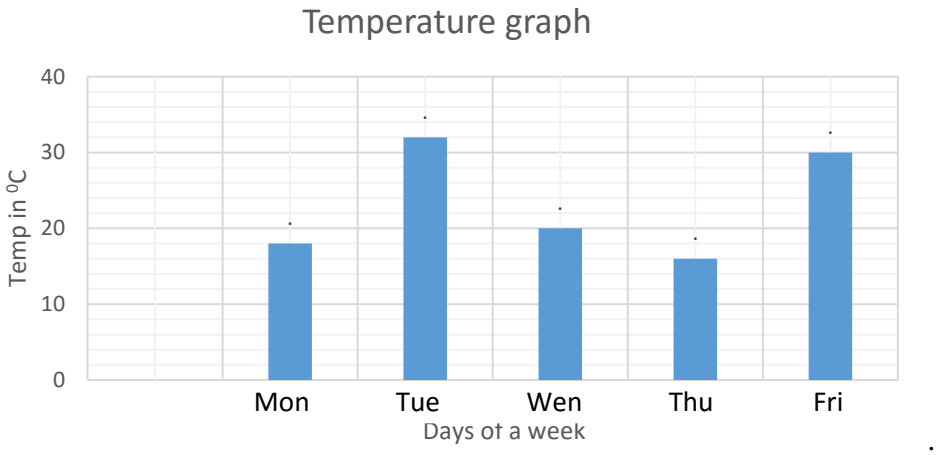
(a) Draw Mutono`s journey on the graph provided.



(b) Work out Mutono`s average speed for the whole journey (03 marks)

16. The line graph below shows the temperature of a certain place recorded over a week.

Study the graph and answer the question that follow



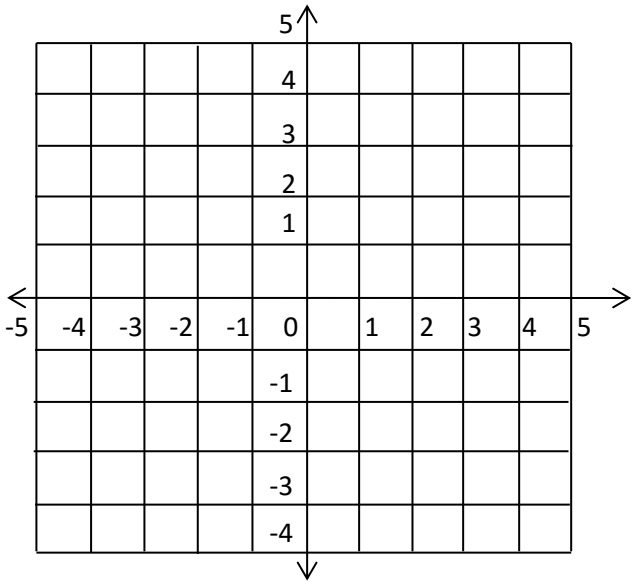
(a). On which day was the highest temperature recorded? (1mark)

(b). What was the lowest temperature recorded?

(1mark)

(c). Find the mean temperature of the given days(2marks)

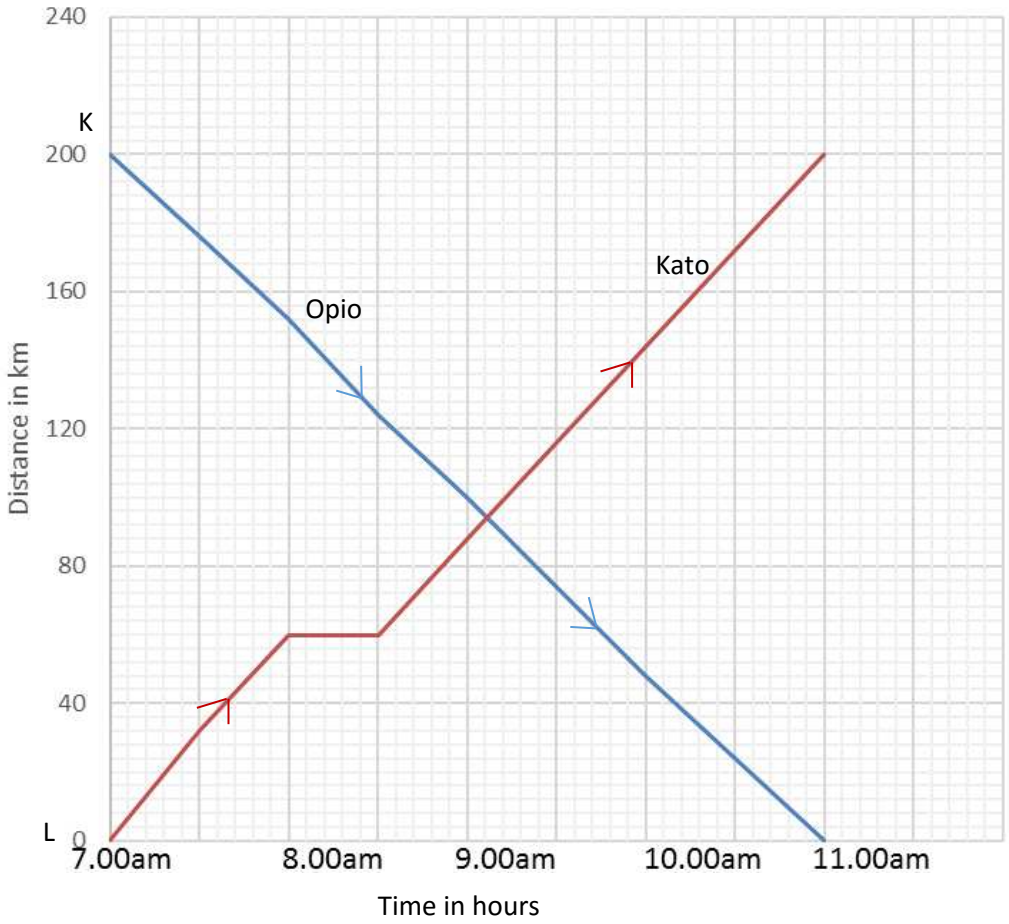
17. On the graph below, mark point M (-1, 4).



18. The graph below sows the journey made by Opio and Kato between towns K and L which are 2000 km apart.

Opio left town K at 7:00am and drove at steady speed of 50km/h to town L. Kato left town L at the same time and covered a distance of 60km at a steady speed in an hour. He then rested for an hour after which he which he drove for hours to town K

Use the graph to answer the question that follow.



a) At what time did Opio and Kato meet? (01 marks)

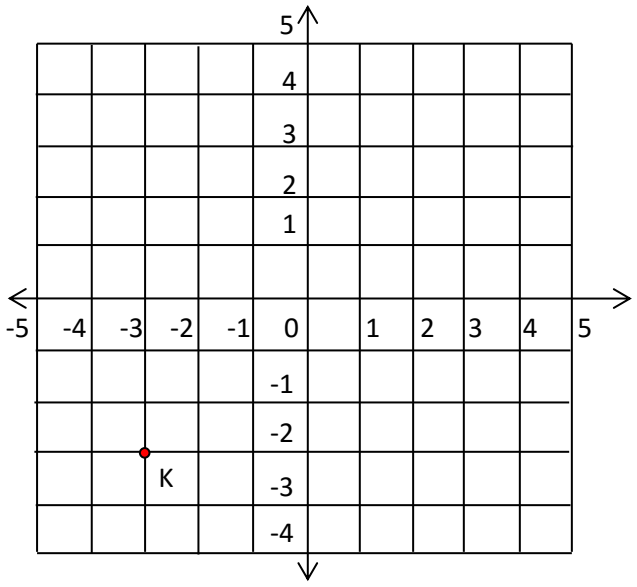
b) What distance had Opio covered by 9:00am? (01 marks)

c) How far from town L was Opio at 10:00a.m?

d) Work out Kato's average speed for the journey he covered after resting. (01 marks)

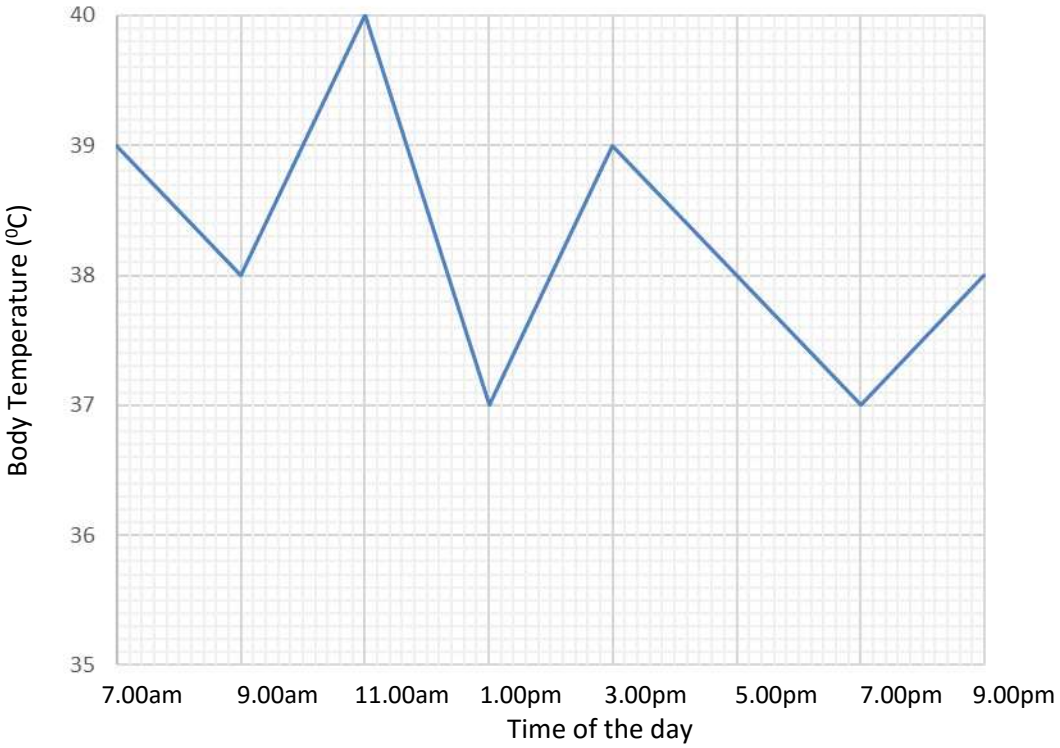
e) Find Kato`s average speed for his whole journey. (01 marks)

19. In the graph below, find the co-ordinates of point K.



20. The graph below shows the change in body temperature of a patient in a hospital recorded every two hours in a day.

Use it to answer the question that follow.

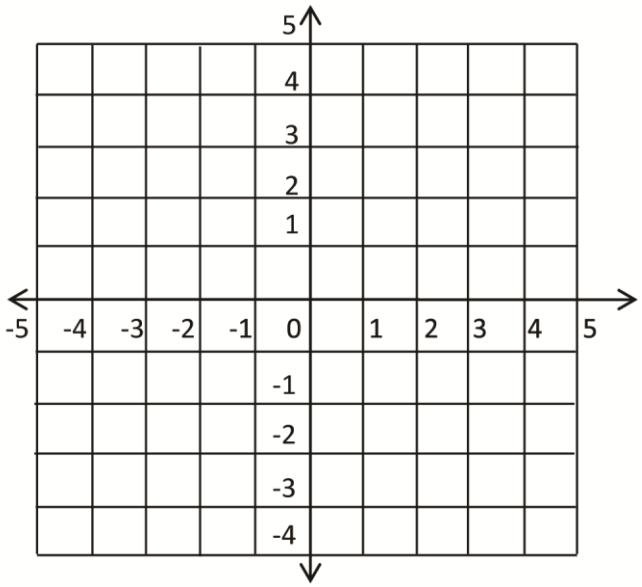


(a) What was the highest temperature recorded? (1mark)

(b) Find the range in the recorded body temperature. (1mark)

(c) Work out the average body temperature of the patient from 3.00pm to 9.00m (3marks)

21. (a) On the graph below, plot the points, A($^{-}$2, $^{+}$3); B($^{+}$5, $^{+}$3); C($^{-}$2, $^{-}$1) and D($^{+}$1, $^{-}$1) (04marks)

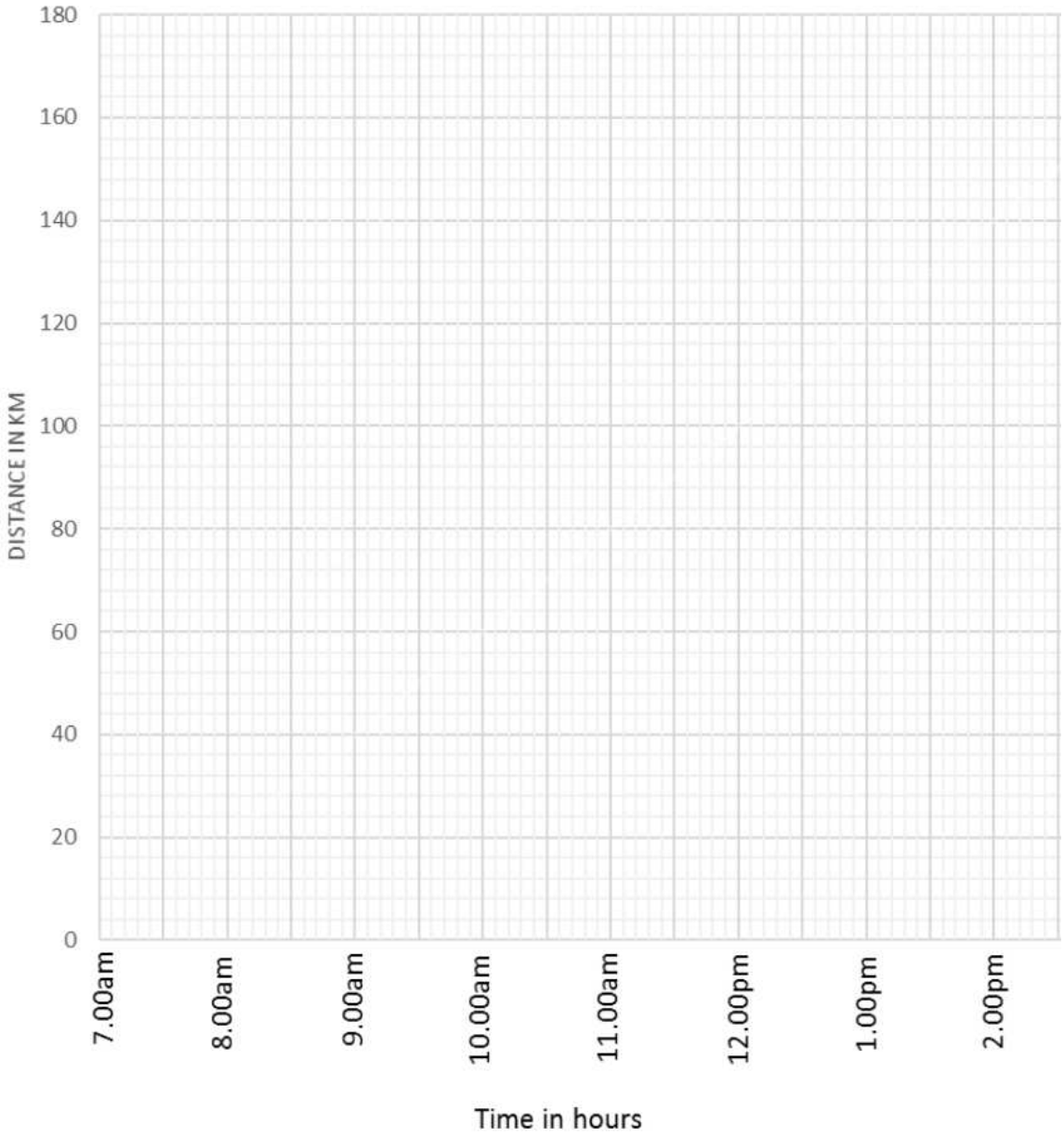


(b)Join A to B to D to C and C to A. (01mark)

(b)Name the quadrilateral formed after joining the points. (01mark)

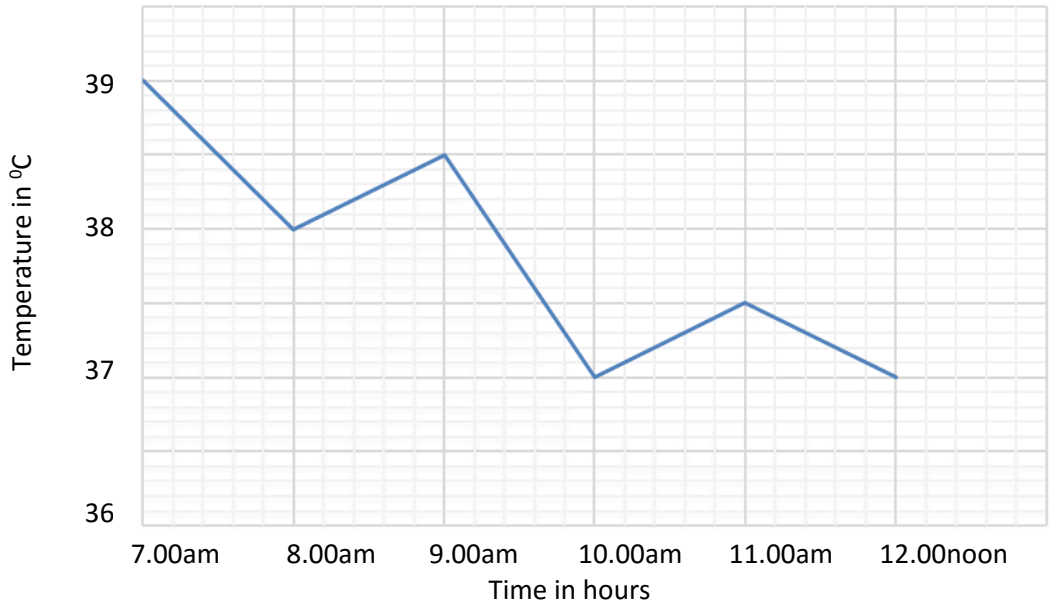
22. Okidi left Kampala at 7.00a.m. driving a lorry at an average speed of 40km/hr for 2hours to Jinja. He rested for one hour at Jinja, then continued to Tororo at an average speed of 50km/hr for another 2hours.

(a) Use the above information to show Okidi's Journey on the graph below. (03marks)



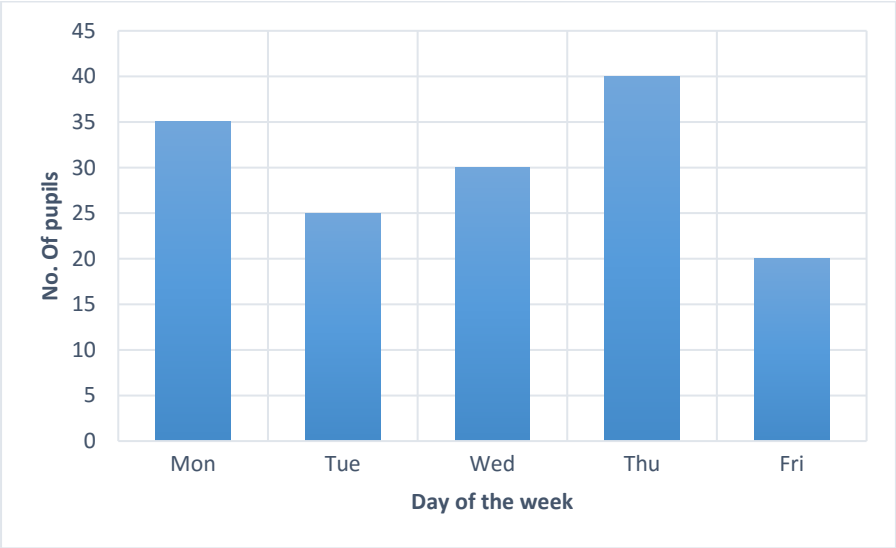
(b)Calculate Okidi's average speed for the whole journey. (02marks)

23. The graph below shows the temperature of a patient in a hospital from 7:00a.m. to 12:00noon in a day. Use it to answer the question the follow.



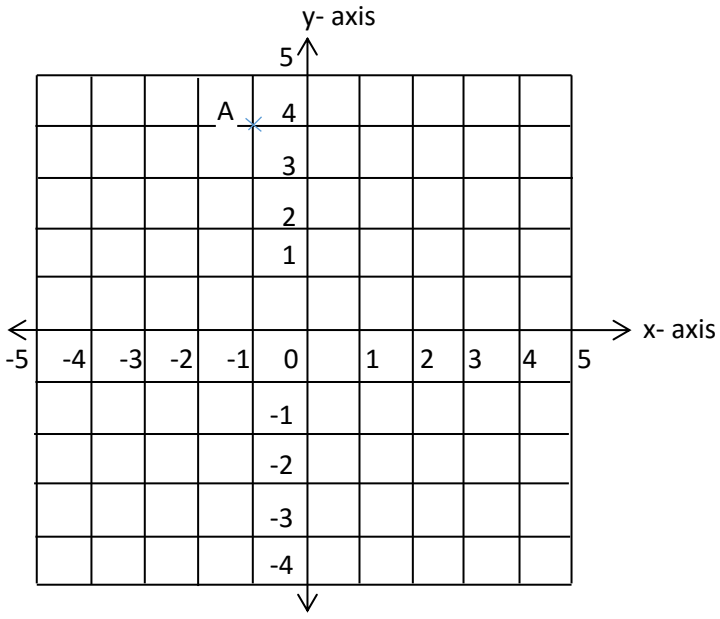
What times of the day was the temperature the patient the same?

24. The graph below shows the number of pupils present in a class of 40 pupils in a certain week. Study it and answer the questions that follows



Find the number of pupils who were absent on Tuesday.

25. Study the coordinate graph and use it to answer the questions that follow.



(a) Write the coordinates of point A (01mark)

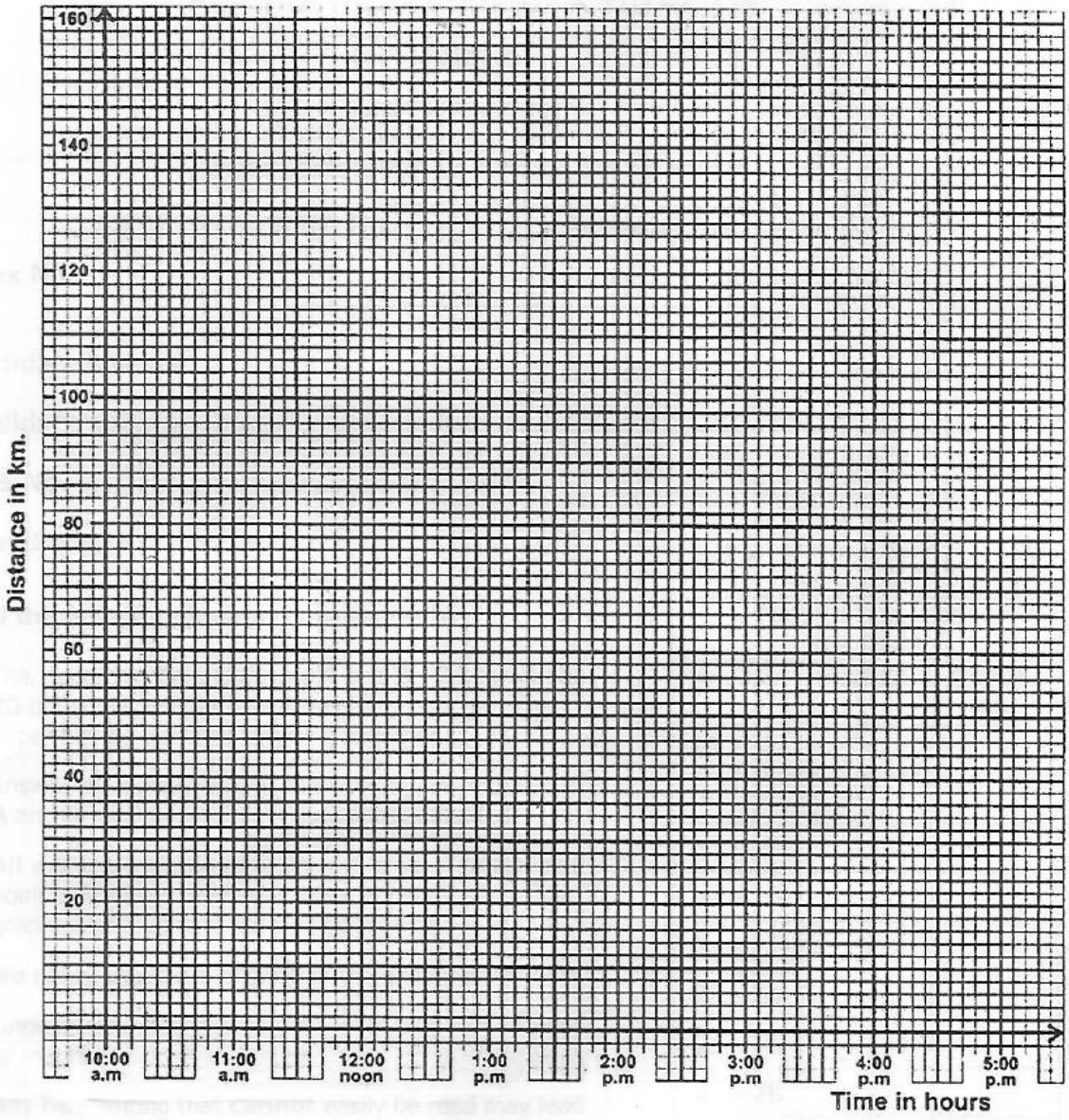
(b) Plot the points B($^{+}2$, $^{+}2$) and C($^{-}1$, $^{-}4$) on the graph. (02marks)

(c) Join points A to B to C, (01mark)

(d) Locate a point D on the graph, join it to A and C such that ABCD is a kite (01mark)

32. Town *M* is 150 km from town *G*. A motorcyclist started a journey from town *M* at 10:30 a.m. He was travelling at a speed of 25 km/h for 2 hours. He rested for 30 minutes and then continued at a speed of 50 km/h for the rest of the journey to town *G*.

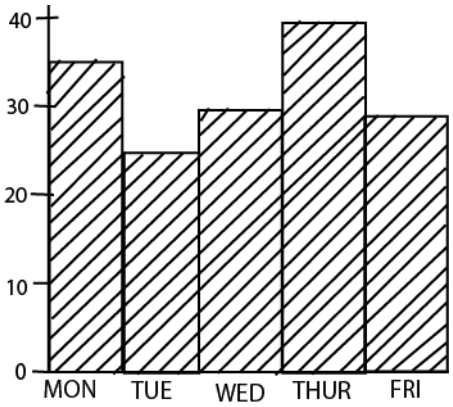
(a) Represent the motorcyclist's journey on the graph below. *(03 Marks)*



(b) At what time did the motorcyclist reach town *G*? *(01 Mark)*.

Suggested answers

1. The graph below shows the daily attendance of pupils in a class of 40. Use it to answer the questions, which follow.



c) What percentage of pupils were present on Tuesday?

Pupils that attended on Tuesday = 25

Percentage of pupil present on Tuesday = $\frac{numbe\ pupil\ present\ x\ 100\%}{total\ number\ of\ pupil\ in\ class}$

$= \frac{25}{40}\ x\ 100$

= 62.5%

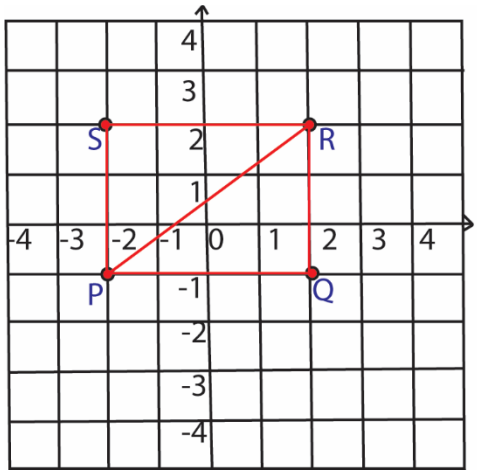
d) What was the average number of pupils who were absent during the five days?

Days	Number of pupils present out of 40	Number of pupils absent
Mon	35	40-35=5
Tue	25	40-25=15
Wed	30	40-30=10
Thur	40	40-40=0
Fri	30	40-30=10

Average number of pupils absent in the five days are = $\frac{(5+15+10+0+10)}{5}$

$= 8\ pupils$/day

Use the grid below for answering questions 2 and 3.



2. Mark the points P(-2, -1), Q(+2, -1) R(2, 2) and S(-2, 2) on the grid.

3. What is the length of PR.

$PR^2 = PQ^2 + QR^2$

$PR^2 = 4^2 + 3^2$

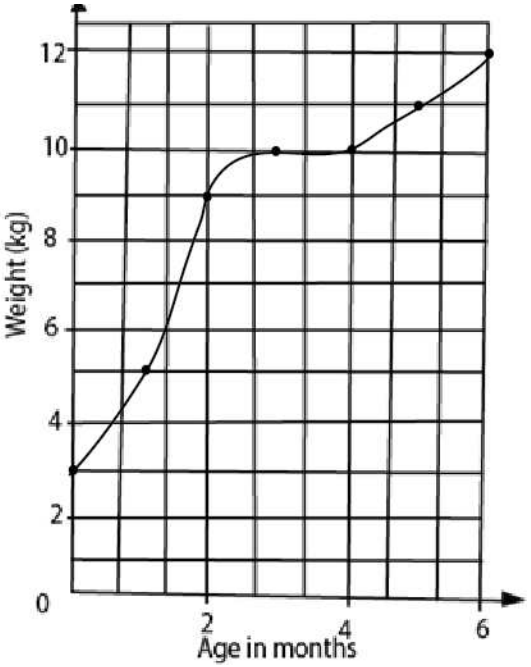
$PR^2 = 25$

$PR = \sqrt{25} = 5$

4. The table below shows the weight of a baby measured during the first six months.

Age in month	0	1	2	3	4	5	6
Weight in kilogram	3	5	9	10	10	11	12

(a) Draw a graph of the baby's weight against age.



(b) During which months did the baby's weight remain the same?

Between the 3rd and 4th month

(c) During which month did the baby gain the most weight?

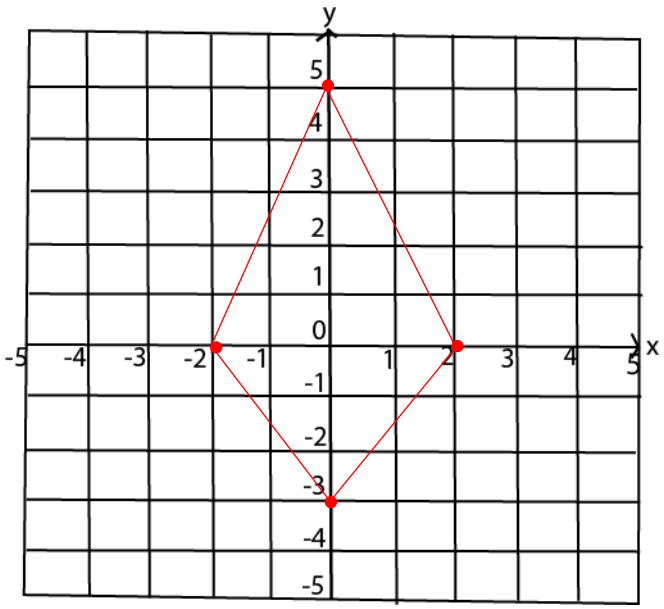
In the second month

5. On the grid below:

i) Plot the points A (0, 5), B (-2, 0), C (0, -3), D (2, 0)

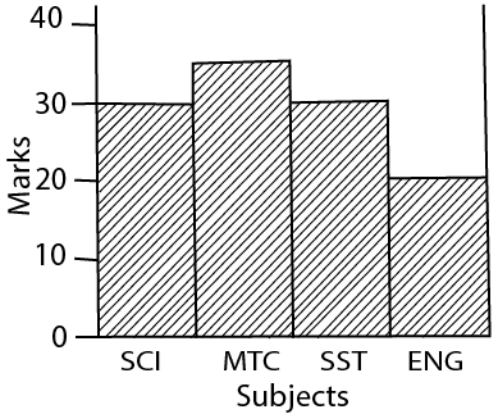
ii) Join A to B, B to C, A to D. b)

Name the polygon formed.



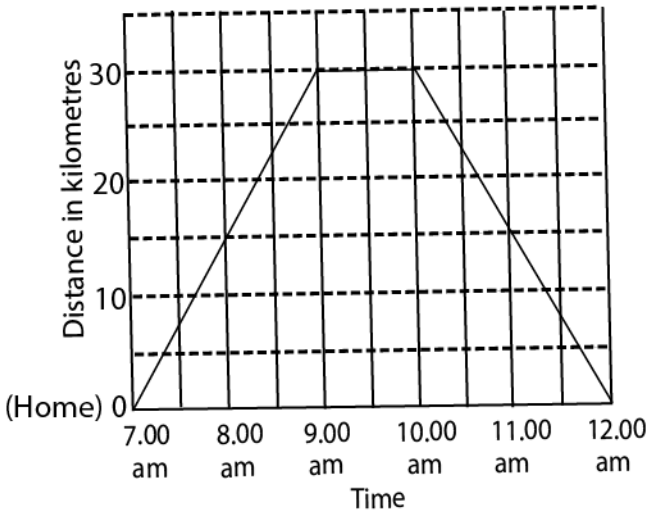
The shape formed is a kite

6. The graph below represents marks scored in the four subjects by a pupil in P.6. Which subject was done best?



Mathematics was done best

The graph shows Peter's journey from his home to town and back home Use it to answer questions 7 and 8.



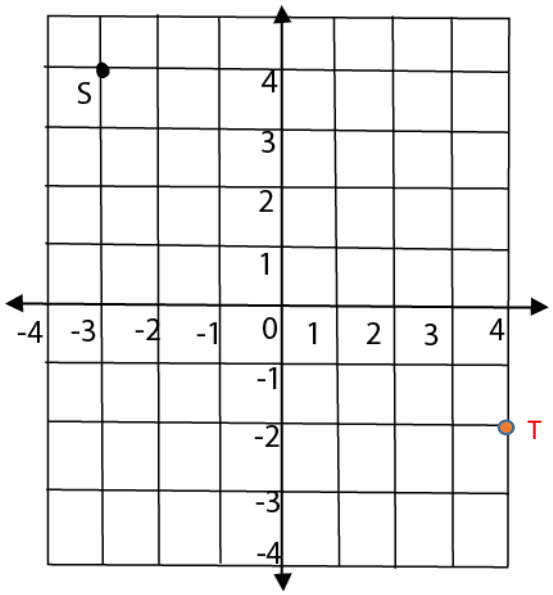
7. How far is the town from Peter's home?

30km

8. How many hours did peter spend out of his home?

12 -7 = 5 hours

Use the grid below to answer questions 19 and 20.



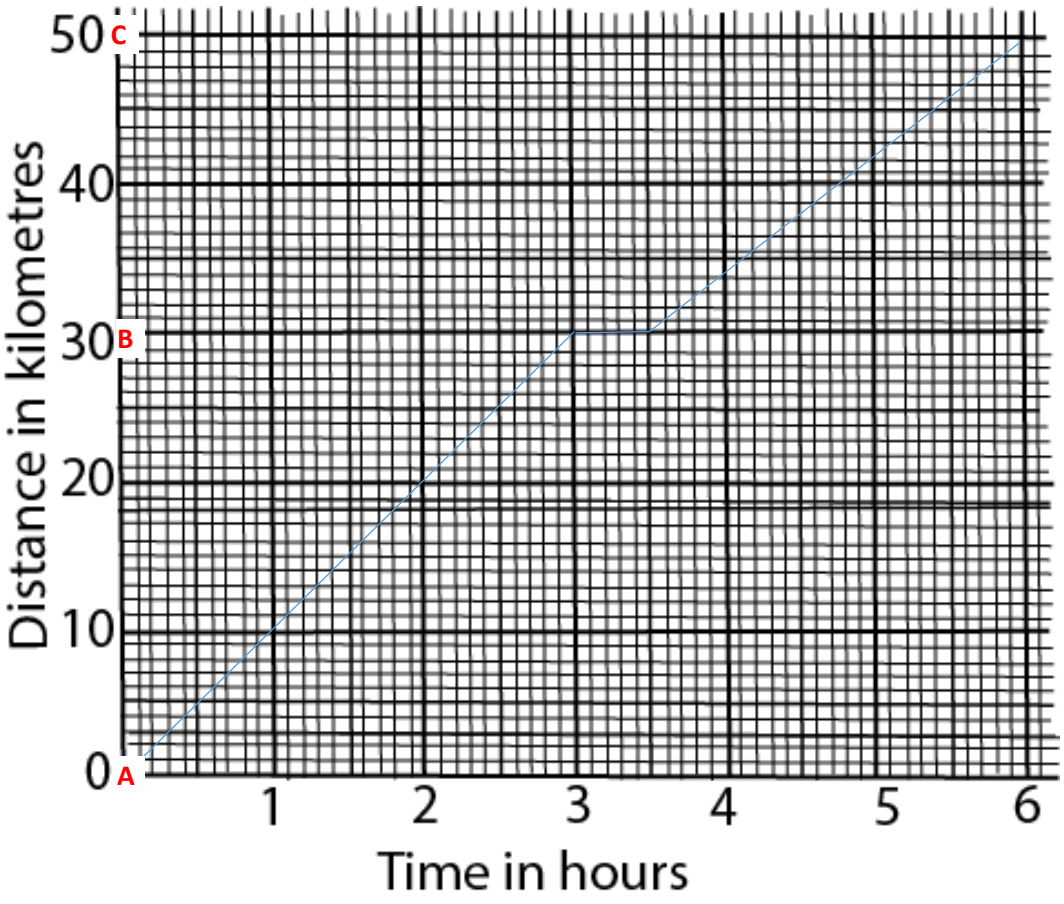
9. State co-ordinates of point S. (-3, 4)

10. Mark point T(4, -2) on the grid

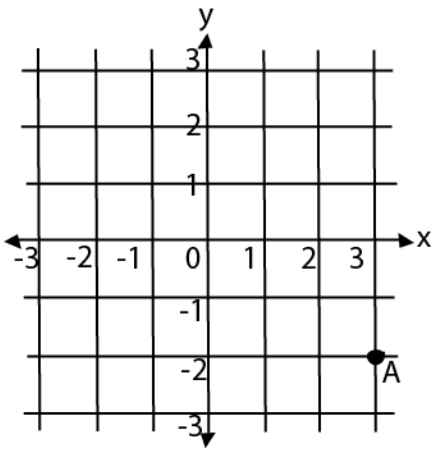
11. Kiyemba rode a bicycle from town A to town C through town B as follows:

He rode from A to B a distance of 30km for 3 hours and then rested for ½ an hour. From B, he rode to C a distance of 20Km in $2^1/_2$ hours.

On the graph given below, draw a line to show Kiyemba's movement. Also show towns B and C.

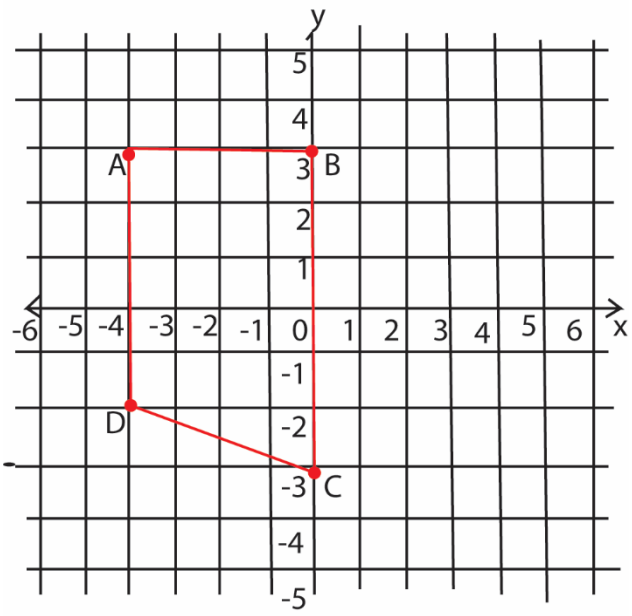


Use the graph to answer the question that follows:



12. Give the co-ordinates of *A =(3, -2)*

13. Study the graph below and answer the questions that follow.



One unit square = 1 cm^2

(a) Plot the points:

A (-4, 3), B(0,3), C (0,-3) D(-4,-l)

(e) Join the points A to B, B to C, C to D and D to A.

(f) Name the quadrilateral formed: trapezium

(g) Find the area of the quadrilateral in (c) above.

Area = $\frac{1}{2}(a+b)x\ h$

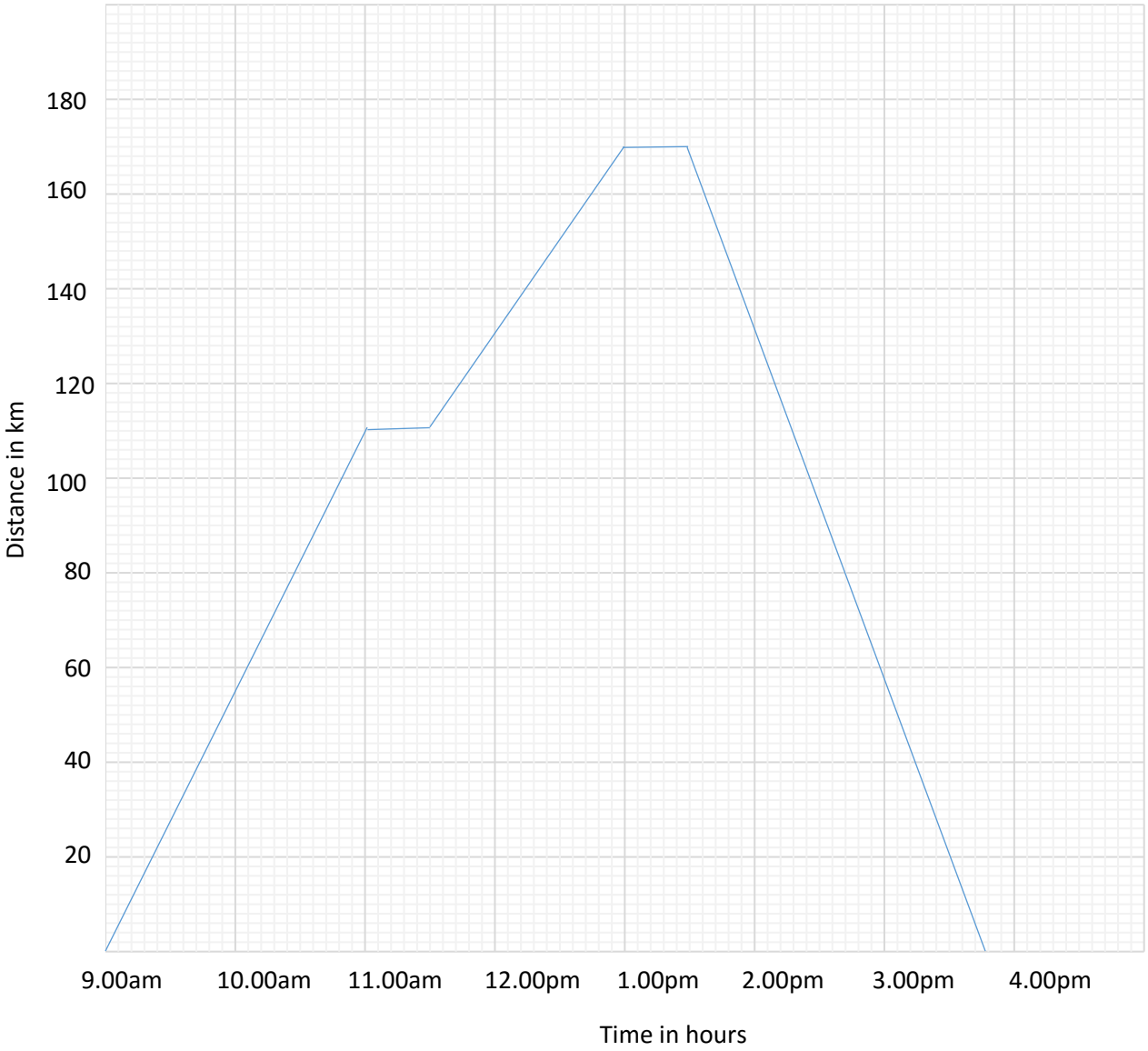
$= \frac{1}{2}(6+4)\ x\ 4$

$= 5\ x4$

$= 20cm^3$

14. Bbosa left town P at 9.00am and drove at 55km per hour for 2 hours to town Q he rested for half an hour at town Q he left town Q and drove for $1\frac{1}{2}$ hours at 40km per hour to town R; he rested for half an hour at town R. He then left town R and drove back to town P 75 km per hour

(c) Draw Bbosa`s journey on the graph provided



(d) Find the average speed for the whole journey.

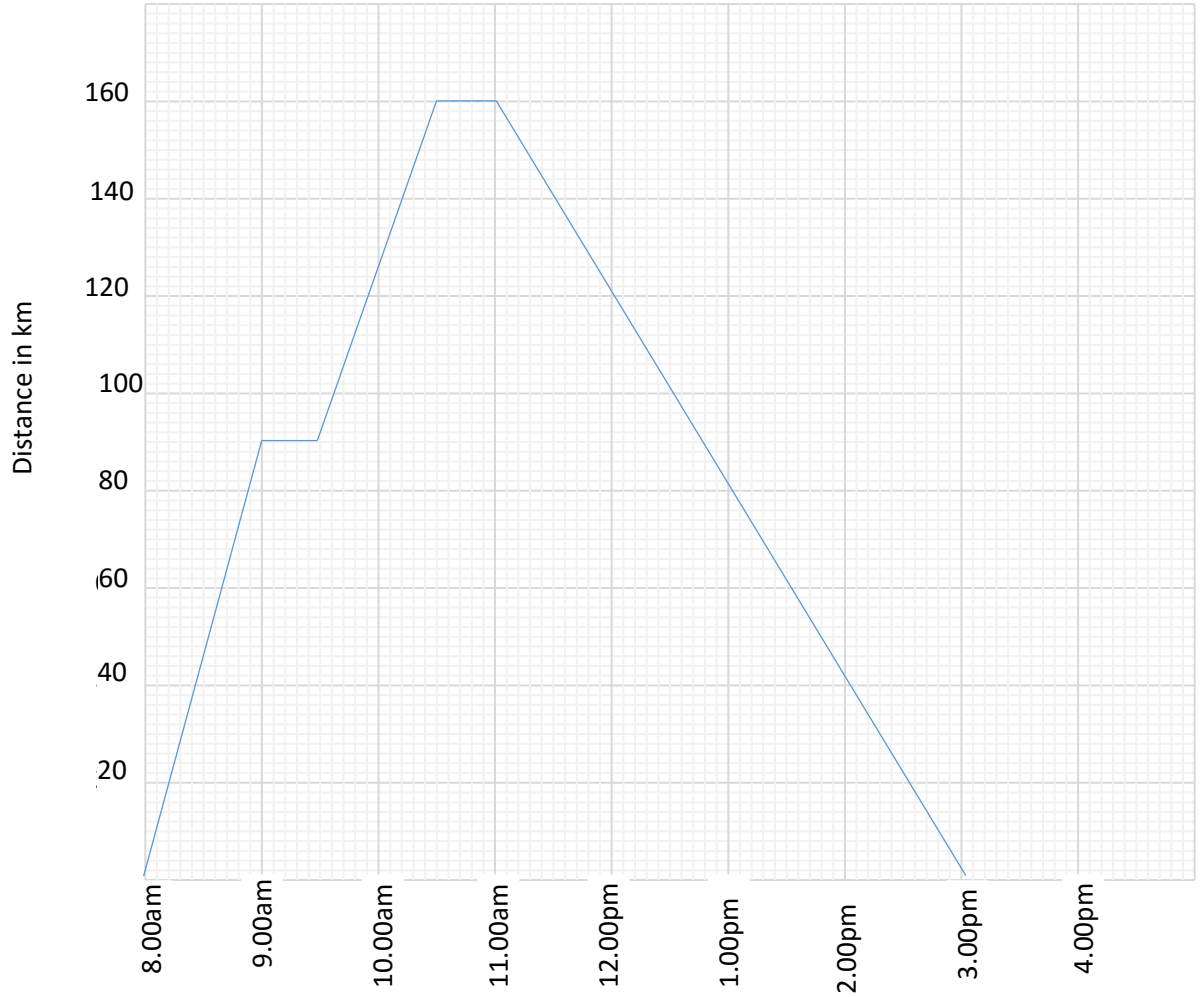
Total time = 6.7hours

Total distance = 170 x 2 = 340km

Speed = $\frac{distance}{time} = \frac{340}{6.7} = 51.5kmhr^{-1}$

15. Mutono left town X at 8.00 a.m and drove at 90km per hour for one hour to town Y. He rested for half an hour at town Y. He left town Y and drove for one hour at 70km per hour to town Z. He rested for half an hour at town Z .he then left town Z and drove to town X at a steady speed of 40 km per hour.

(a) Draw Mutono`s journey on the graph provided.

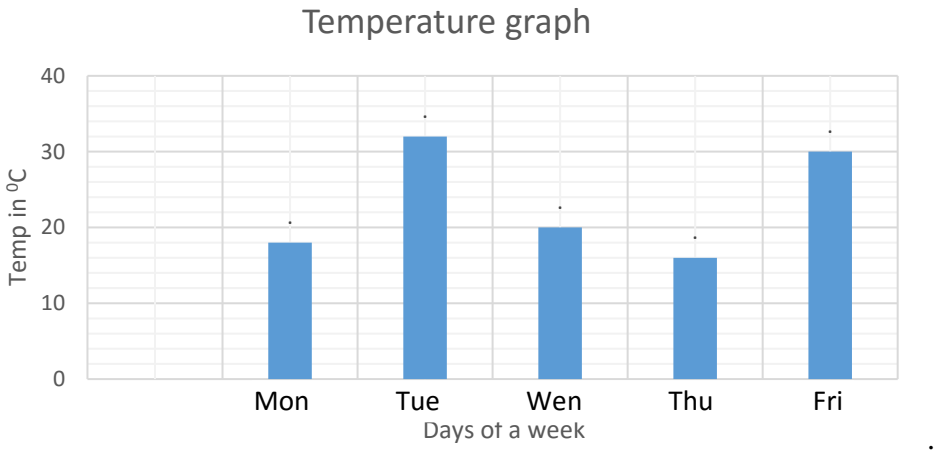


(b) Work out Mutono`s average speed for the whole journey (03 marks)

Speed = $\frac{distance}{time} = \frac{160\ x\ 2}{7} = 45\frac{5}{7}\ km/hr$

16. The line graph below shows the temperature of a certain place recorded over a week.

Study the graph and answer the question that follow



(a). On which day was the highest temperature recorded? (1mark)

Tuesday

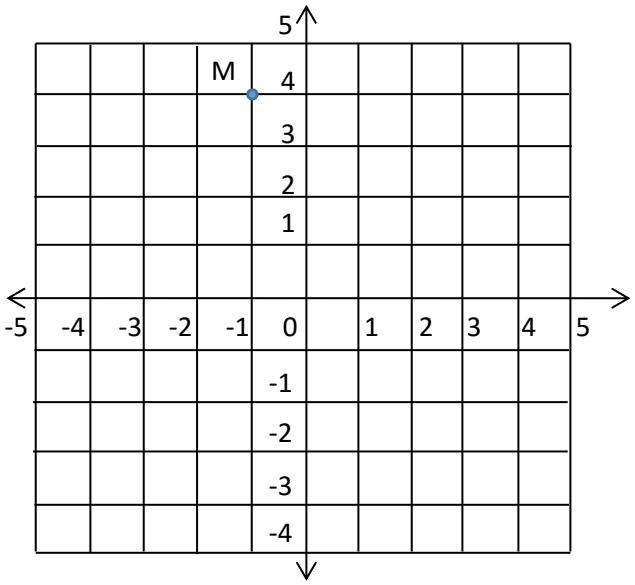
(b). What was the lowest temperature recorded?

15^0C (1mark)

(c). Find the mean temperature of the given days (2marks)

Mean temperature: $= \frac{18+32+20+15+30}{5} = 23\ ^0C$

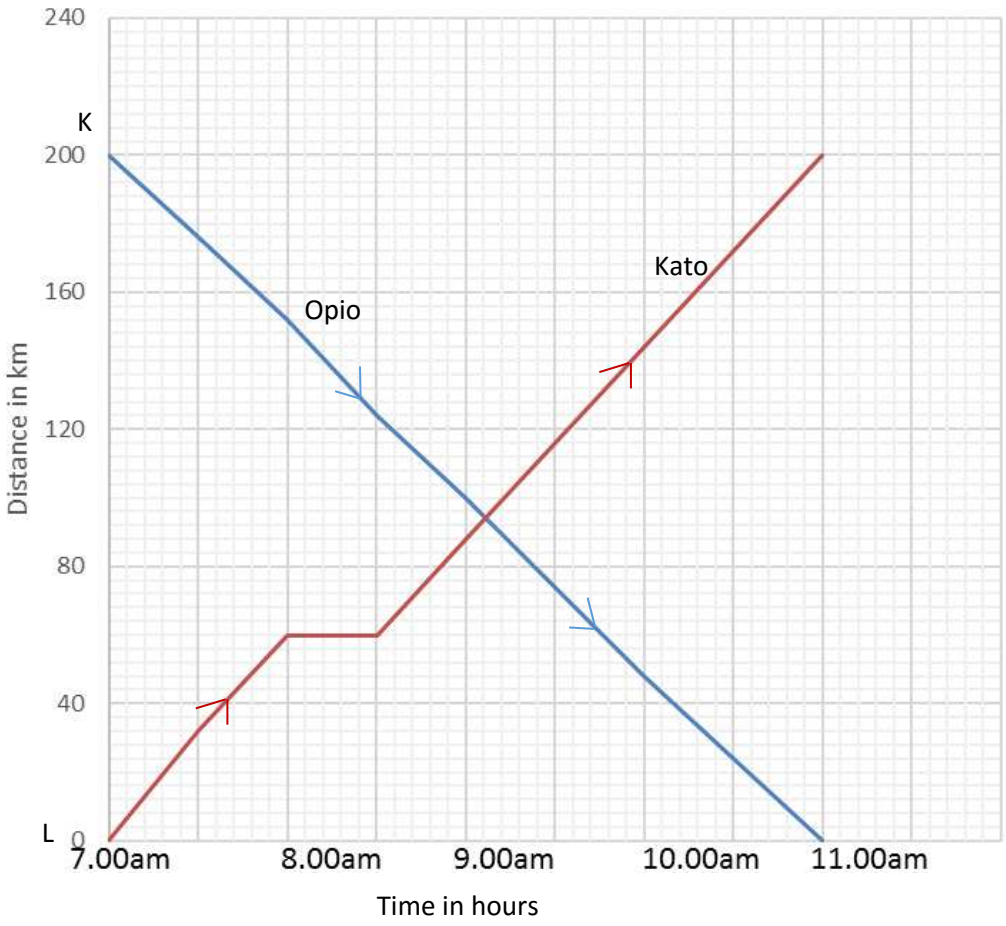
17. On the graph below, mark point M (-1, 4).



18. The graph below sows the journey made by Opio and Kato between towns K and L which are 2000 km apart.

Opio left town K at 7:00am and drove at steady speed of 50km/h to town L. Kato left town L at the same time and covered a distance of 60km at a steady speed in an hour. He then rested for an hour after which he which he drove for hours to town K

Use the graph to answer the question that follow.



f) At what time did Opio and Kato meet? (01 marks)

At 9:06am

g) What distance had Opio covered by 9:00am? (01 marks)

Vertical scale each small square represent $\frac{40km}{10} = 4km$

Opio by 9.00am had covered 27 x 4 = 108 km

Alternatively opio by 9.00an had covered 200- 92 = 108km

h) How far from town L was Opio at 10:00a.m?

By 10.00am Opio was 12 x4 = 48km from L

i) Work out Kato's average speed for the journey he covered after resting. (01 marks)

Average speed = $\frac{total\ distance}{total\ time\ taken}$

Distance covered after resting = 200 – 60km = 140km

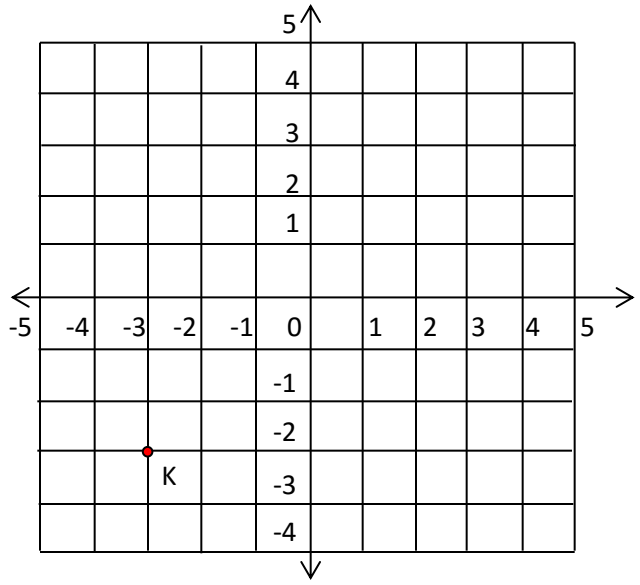
Time taken after resting = 11.00 – 8.30am = 2hour 30minutes = 2½ hours

∴ Average speed = $\frac{140}{2\frac{1}{2}}$ = 56kmhr^{-1}

j) Find Kato`s average speed for his whole journey. (01 marks)

Average speed = $\frac{total\ distance}{total\ time\ taken} = \frac{200}{(11.00am - 7.00am)} = \frac{200}{4} = 50kmhr^{-1}$

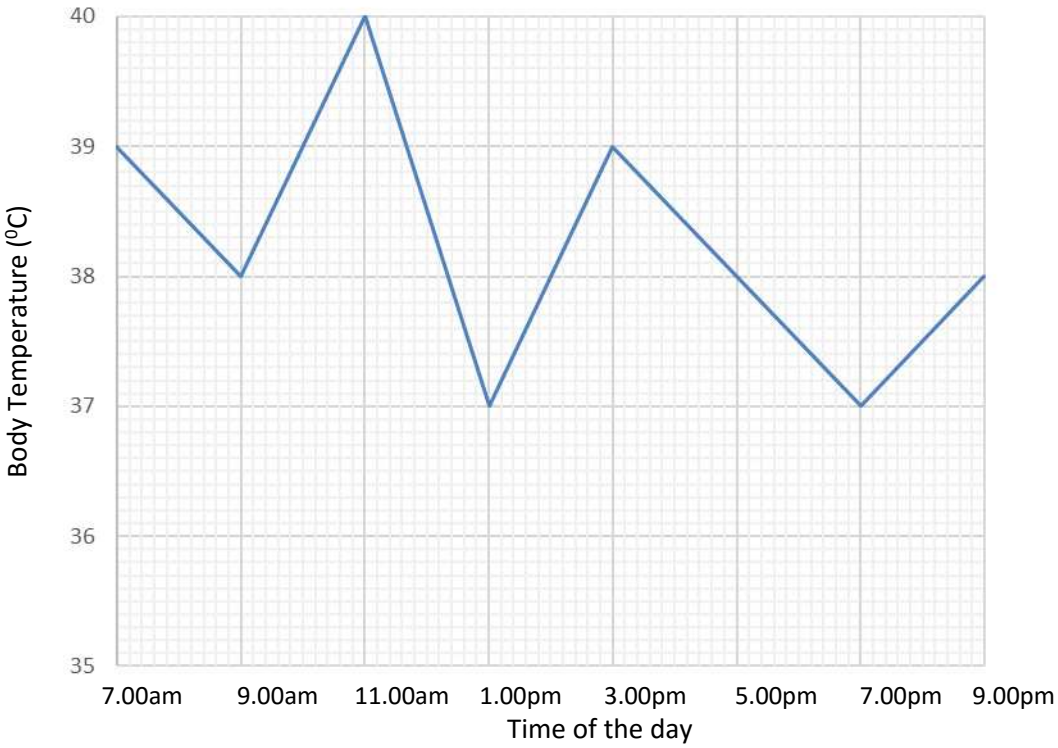
19. In the graph below, find the co-ordinates of point K.



Point K = (-3, -2)

20. The graph below shows the change in body temperature of a patient in a hospital recorded every two hours in a day.

Use it to answer the question that follow.



(d) What was the highest temperature recorded? 40^0C (1mark)

(e) Find the range in the recorded body temperature. (1mark)

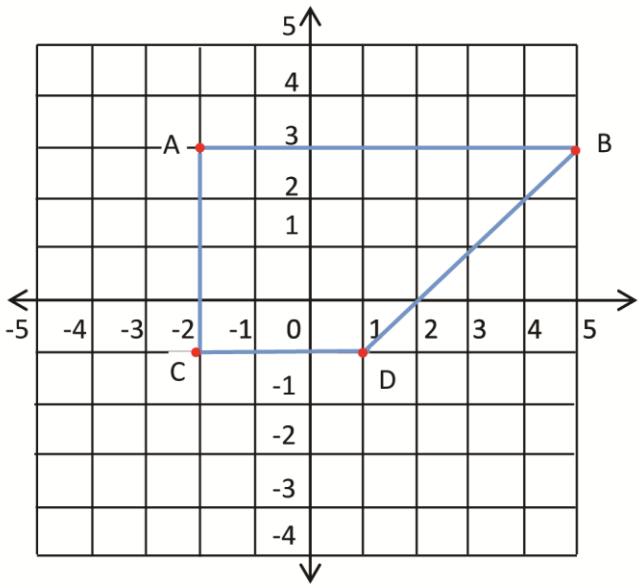
Range is highest – lowest

$= 40 - 37 = 3^0$C

(f) Work out the average body temperature of the patient from 3.00pm to 9.00m (3marks)

$$mean = \frac{sum}{number\ of\ item} = \frac{39+38+37+38}{4} = 38^0$$

21. 30 (a) On the graph below, plot the points, A($^{-}$2, $^{+}$3); B($^{+}$5, $^{+}$3); C($^{-}$2, $^{-}$1) and D($^{+}$1, $^{-}$1) (04marks)



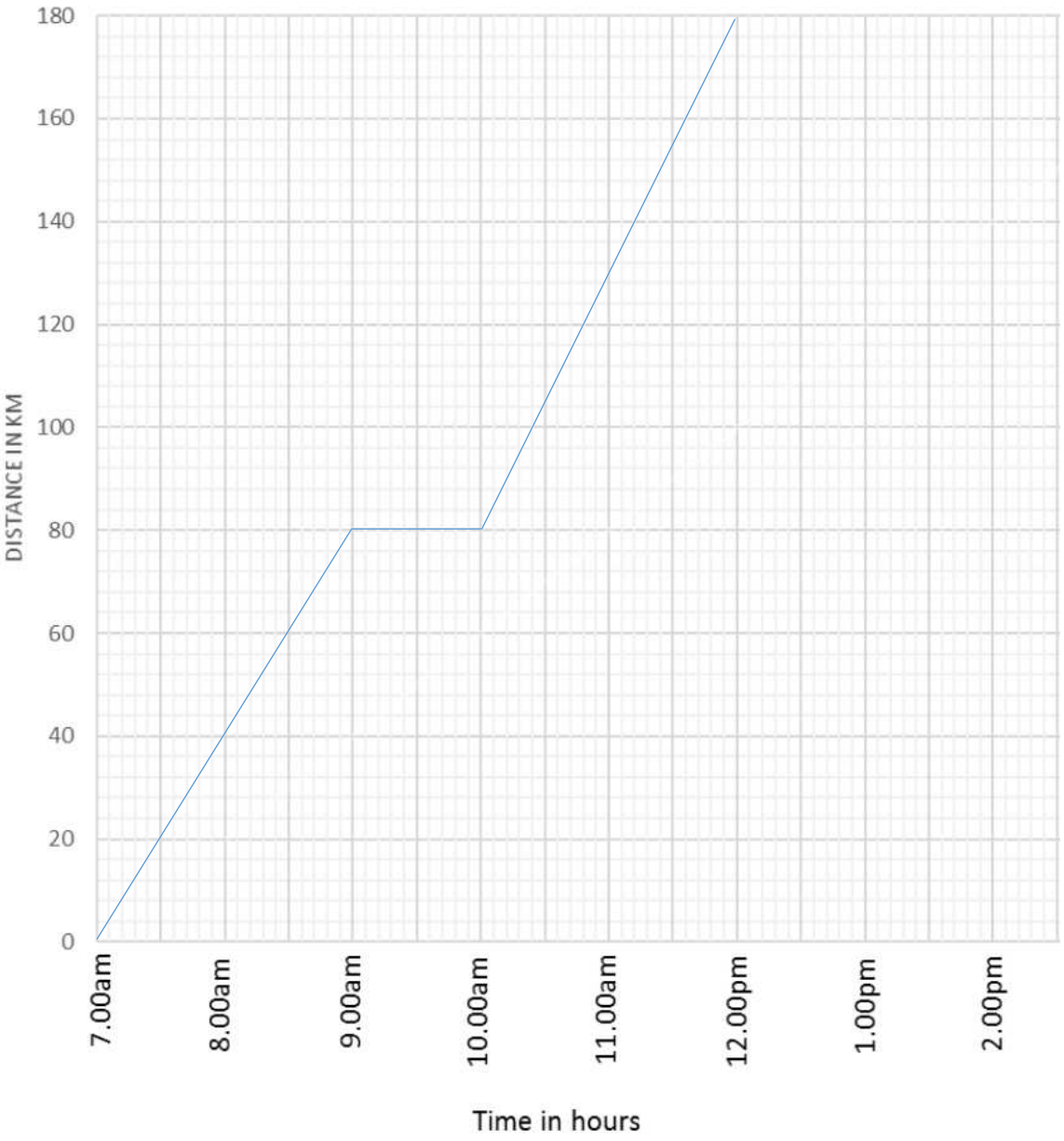
A(-2, +3); B(+5, +3); C(-2, -1) and D(+1, -1)

(b)Join A to B to D to C and C to A. (01mark)

(b)Name the quadrilateral formed after joining the points. Right angled trapezium (01mark)

22. Okidi left Kampala at 7.00a.m. driving a lorry at an average speed of 40km/hr for 2hours to Jinja. He rested for one hour at Jinja, then continued to Tororo at an average speed of 50km/hr for another 2hours.

(a) Use the above information to show Okidi's Journey on the graph below. (03marks)



(b)Calculate Okidi's average speed for the whole journey. (02marks)

Distance from Kampala – Jinja = speed x time = 40 x 2 = 80km

Distance from Jinja to Tororo = 50 x 2 = 100km

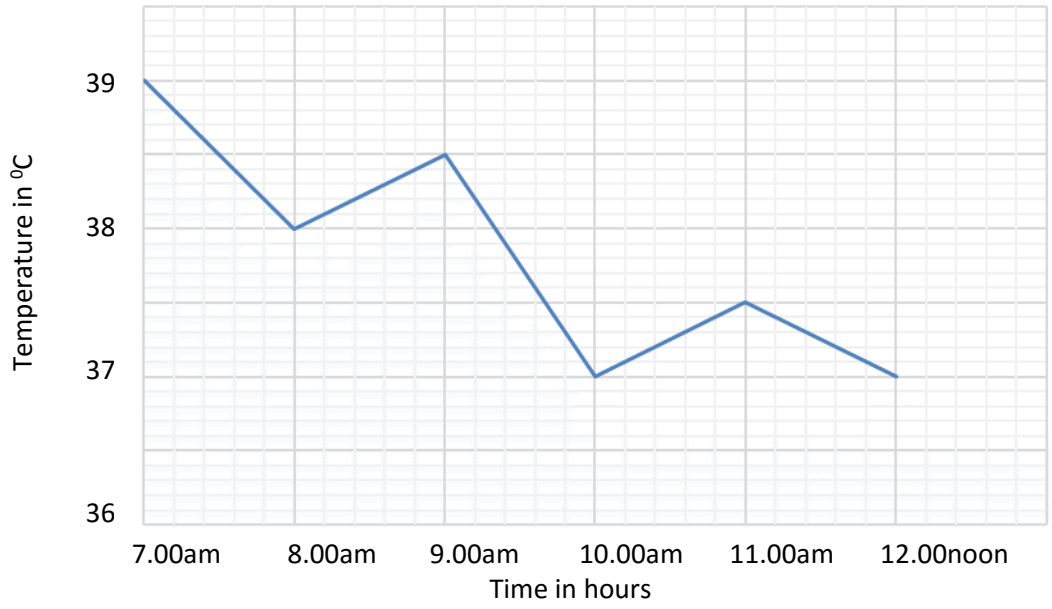
Total distance = 80 + 100 km = 180km.

Total time = Time ending – starting time

= 12:00 = 07:00 = 5hours

Speed = $\frac{Distance}{time} = \frac{180}{5} = 36kmhr^{-1}$

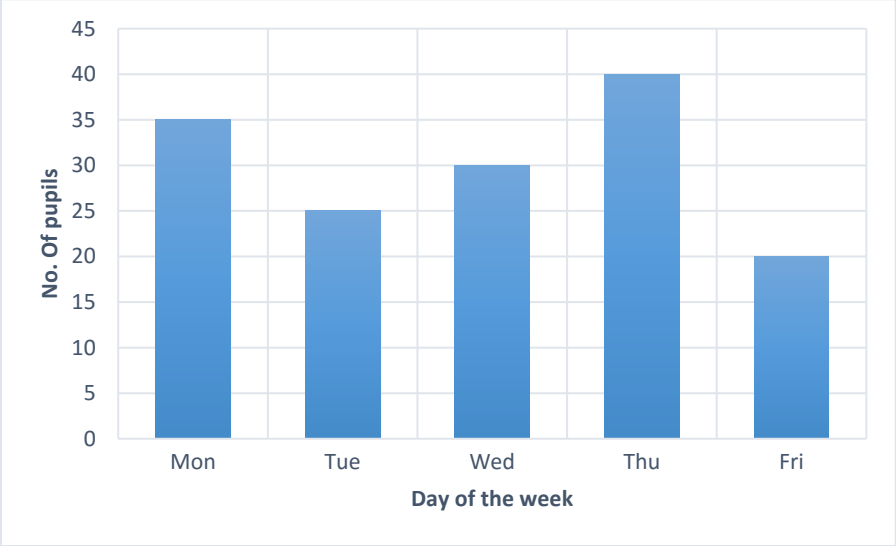
23. The graph below shows the temperature of a patient in a hospital from 7:00a.m. to 12:00noon in a day. Use it to answer the question the follow.



What times of the day was the temperature the patient the same?

At 10.00am and 12.00noon (the temperature is 37^0)

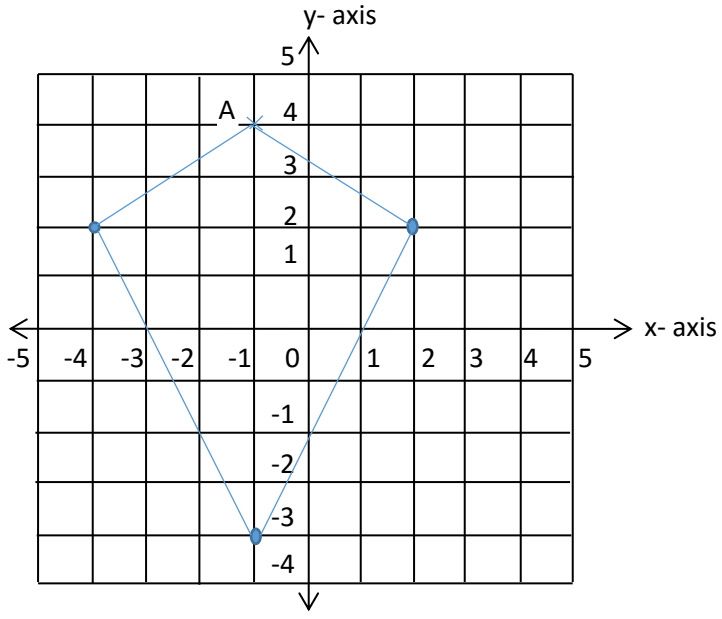
24. The graph below shows the number of pupils present in a class of 40 pupils in a certain week. Study it and answer the questions that follows



Find the number of pupils who were absent on Tuesday.

Total number of pupils in class	40
Number of pupils that attended on Tuesday	- 25
Number of pupils that were absent on Tuesday	15

25. Study the coordinate graph and use it to answer the questions that follow.



(e) Write the coordinates of point A (01mark)

Coordinates of A are (-1, 4)

(f) Plot the points B($^{+}2$, $^{+}2$) and C($^{-}1$, $^{-}4$) on the graph. (02marks)

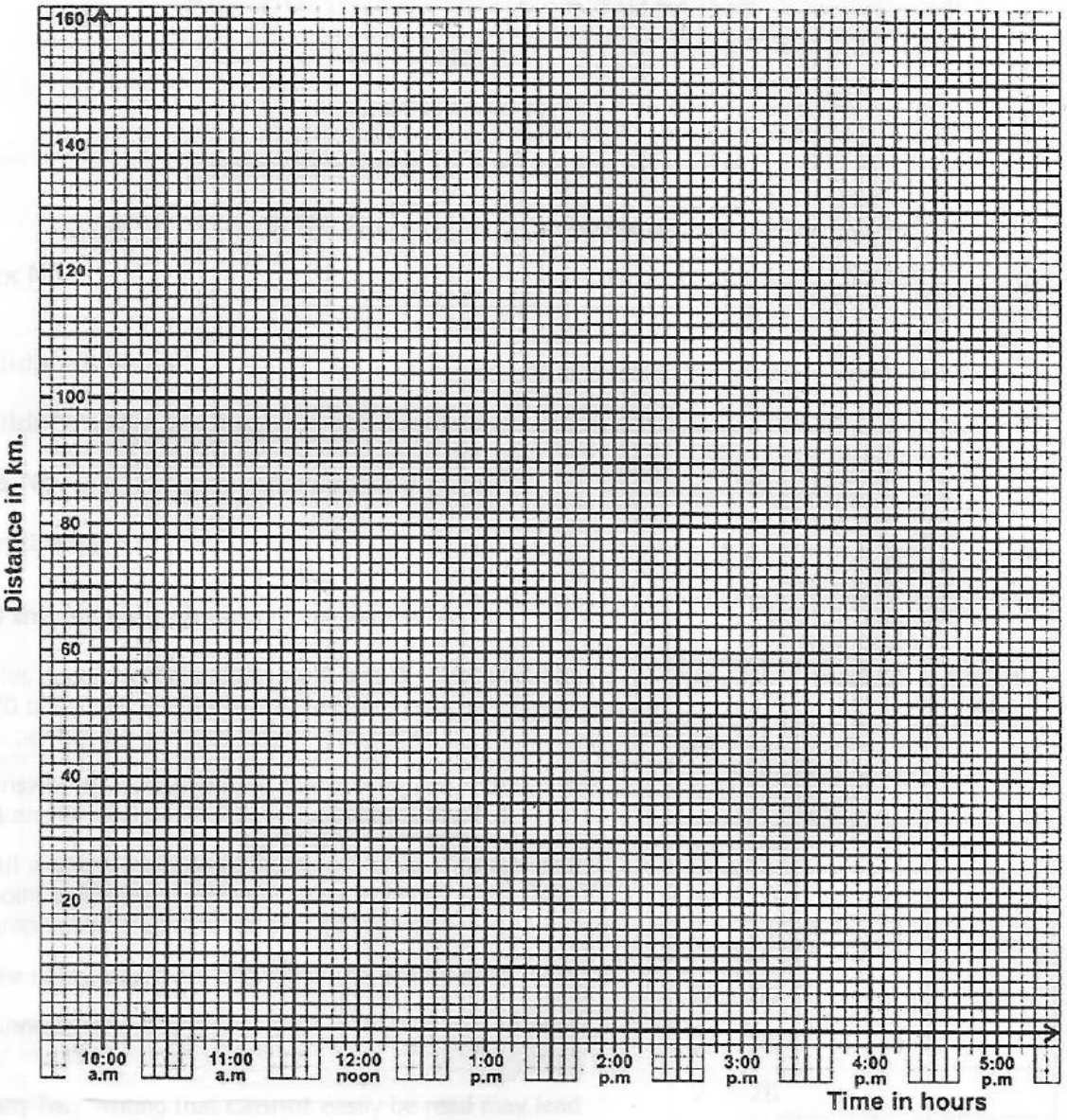
(g) Join points A to B to C, (01mark)

(h) Locate a point D on the graph, join it to A and C such that ABCD is a kite (01mark)

The coordinates of D, are (-4, 2)

32. Town *M* is 150 km from town *G*. A motorcyclist started a journey from town *M* at 10:30 a.m. He was travelling at a speed of 25 km/h for 2 hours. He rested for 30 minutes and then continued at a speed of 50 km/h for the rest of the journey to town *G*.

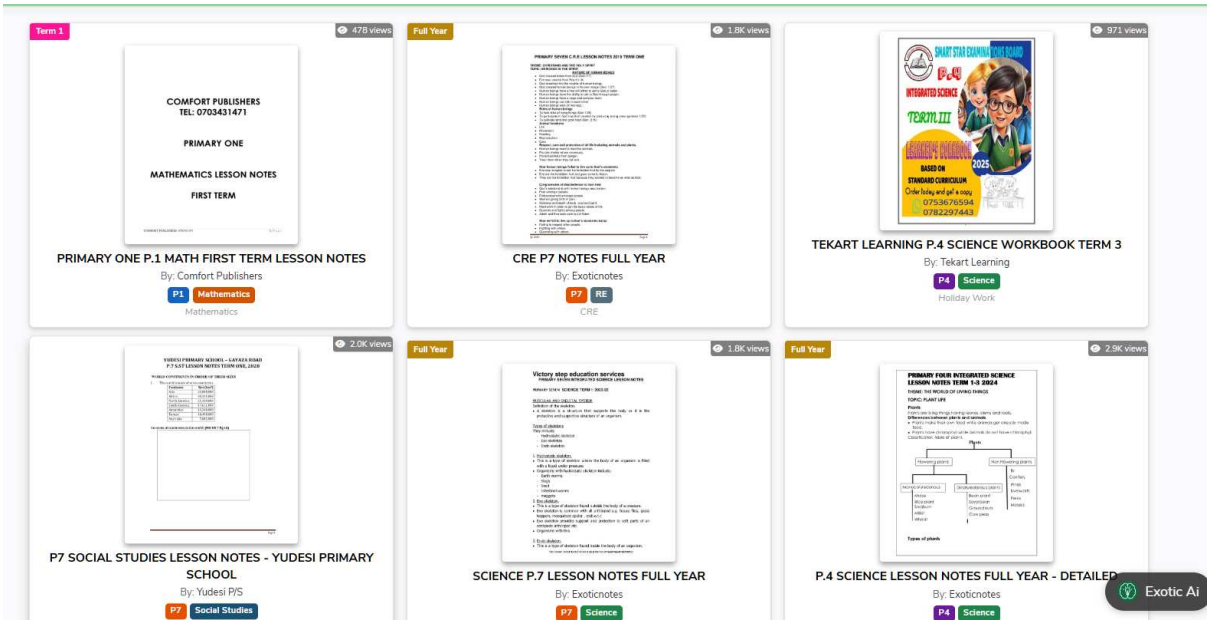
(a) Represent the motorcyclist's journey on the graph below. *(03 Marks)*



(b) At what time did the motorcyclist reach town *G*? *(01 Mark)*.

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