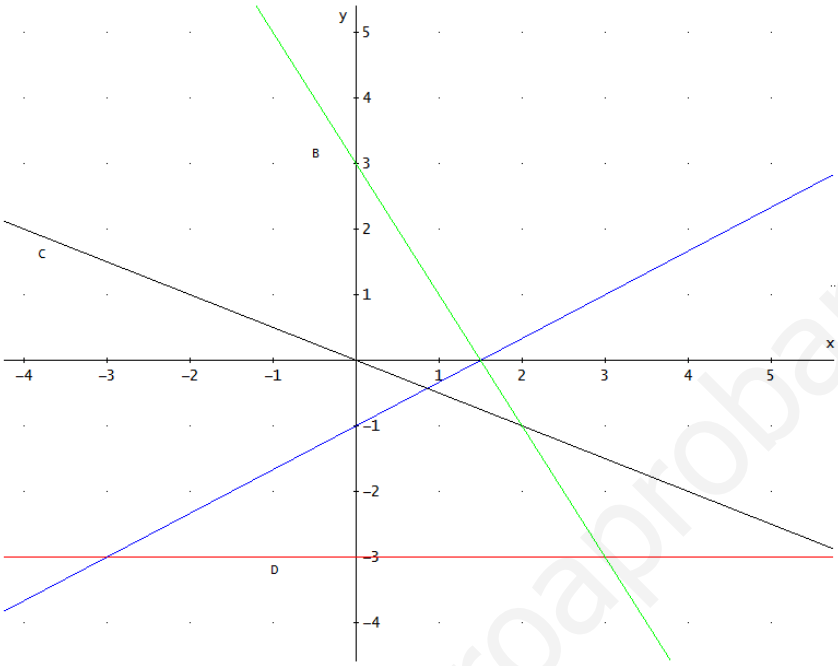
EXAM 3_1 (Functions)

1. Find the equations of the following lines. (1,5 points)



2. Jeff sets up his own business as a plumber. (2 points)

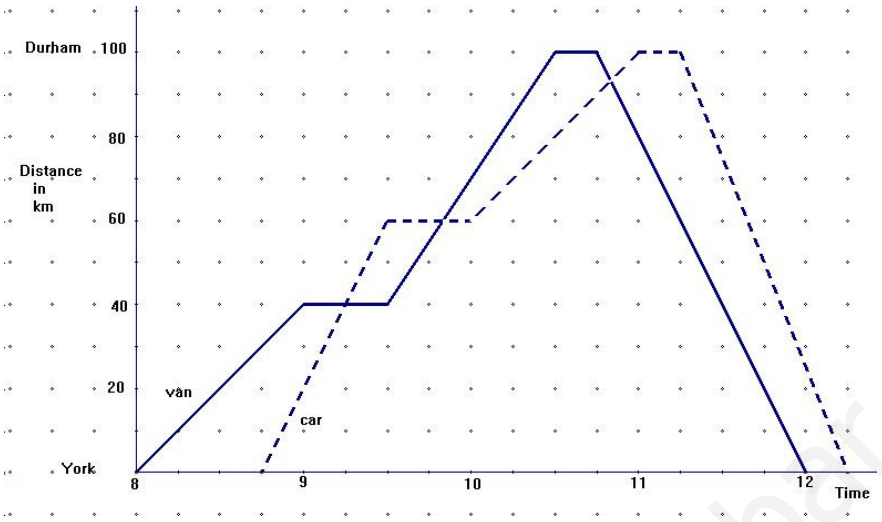
Copy and complete the table where C stands for this total charge and h stands for the number of hours he works.

Draw a graph with h across the page and C up the page.

a) Use your graph to find how long he worked if his charge was £ 55.50.

b) What is the equation connecting C and h?

3. The graph shows the journeys made by a van and a car starting at York, travelling to Durham and returning to York. (1,5 points)



a) For how long was the van stationary during the journey?
b) At what time did the car first overtake the van?
c) At what speed was the van travelling between 09:30 and 10:00?
d) What was the greatest speed attained by the car during the entire journey?
e) What was the average speed of the car over its entire journey?

4. Solve by graphing and using another method the simultaneous equation

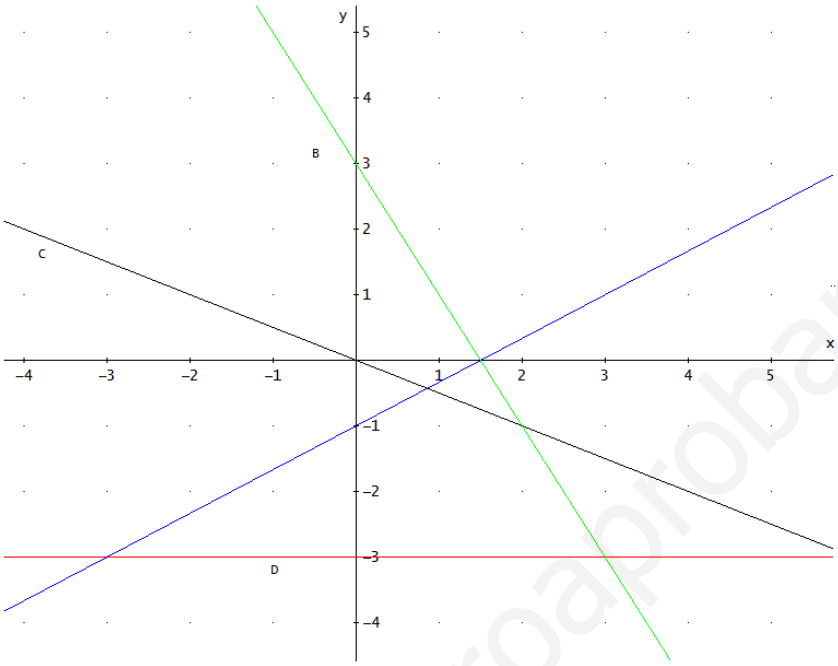
$$\left.\begin{aligned} y = 1 - 3(x+2) \\ 2x + y + 3 = 0 \end{aligned}\right\}$$

(2 points)

5. Work out the equations of the following lines and sketch them (3 points) :
   a) The line joining these points: A(-3,6), B(5,0).
   b) The line passes through (3,-1) and a slope of $-\frac{1}{3}$.
   c) The line passes through (2,-4) and cuts the y-axis in 2.
   d) The line parallel to the x-axis and passes through in the point (-2,-3).

SOLUTION

1. Find the equations of the following lines.



A) $y = \frac{2}{3}x - 1$

B) $y = -2x + 3$

C) $y = -\frac{1}{2}x$

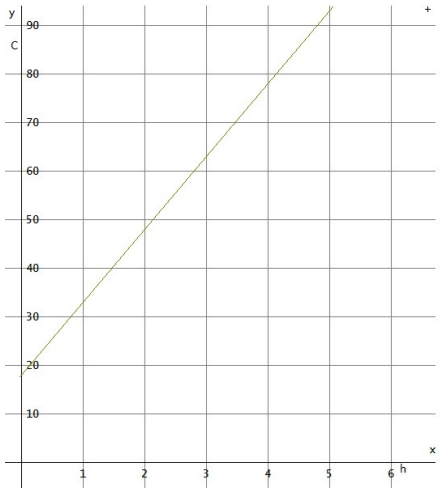
D) $y = -3$

2. Jeff sets up his own business as a plumber.

Copy and complete the table where C stands for this total charge and h stands for the number of hours he works.

h	1	2	3	4	5
C	33	48	63	78	93

Draw a graph with h across the page and C up the page.

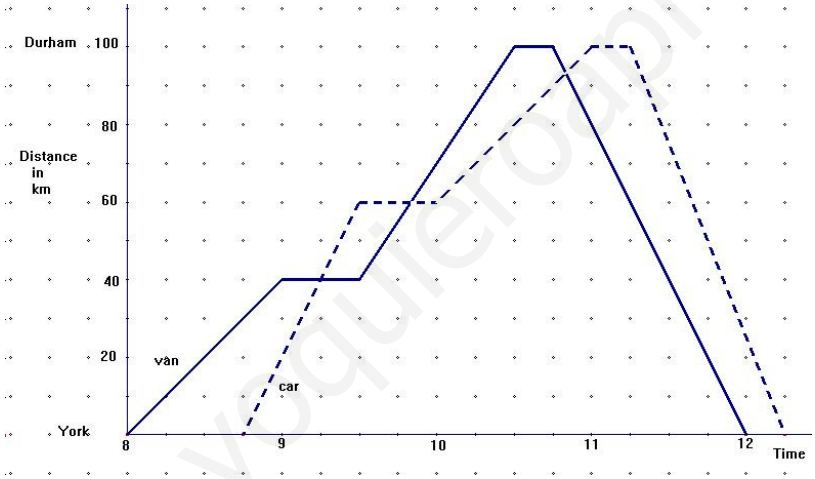


a) Use your graph to find how long he worked if his charge was £ 55.50. 2.5 hours

b) What is the equation connecting C and h?

$C = 18 + 15h \rightarrow y = 15x + 18$

3. The graph shows the journeys made by a van and a car starting at York, travelling to Durham and returning to York.



a) For how long was the van stationary during the journey? 45 minutes

b) At what time did the car first overtake the van? At 9:15

c) At what speed was the van travelling between 09:30 and 10:00? 60km/h

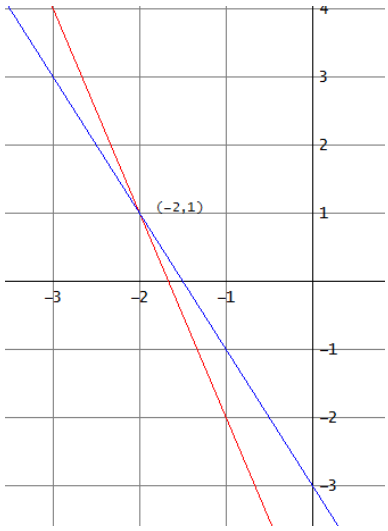
d) What was the greatest speed attained by the car during the entire journey? 100 km/h

e) What was the average speed of the car over its entire journey? 73,3km/h

4. Solve by graphing and using another method the simultaneous equation

$$\left.\begin{array}{l} y = 1 - 3(x + 2) \\ 2x + y + 3 = 0 \end{array}\right\}$$ By graphing: $$\begin{cases} y = -3x - 5 \\ y = -2x - 3 \end{cases}$$

By substitution:



$$\begin{cases} y = -3x - 5 \\ y = -2x - 3 \end{cases} \rightarrow -3x - 5 = -2x - 3$$

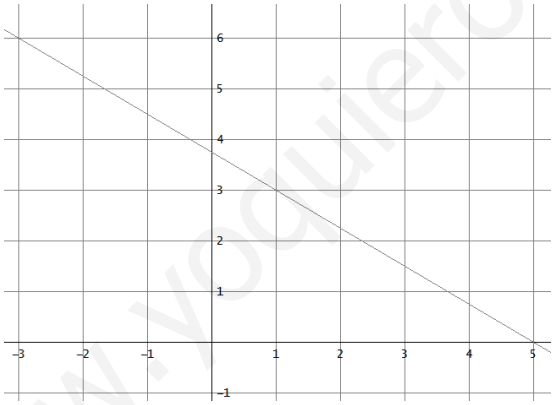
$$-3x + 2x = -3 + 5 \rightarrow -x = 2 \rightarrow x = -2$$

$$x = -2 \rightarrow y = 1 \rightarrow \text{Solution : } (-2,1)$$

5. Work out the equations of the following lines and sketch them :

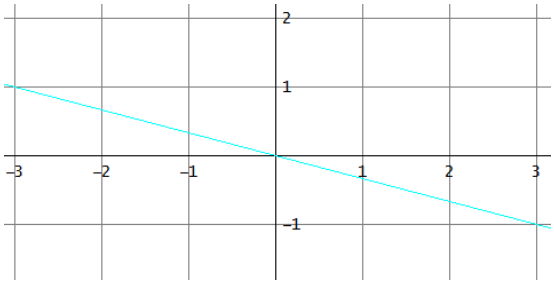
a) The line joining these points: A(-3,6), B(5,0).

$$m = \frac{0-6}{5+3} = -\frac{3}{4} \rightarrow y - 0 = -\frac{3}{4}(x-5) \rightarrow y = -\frac{3}{4}x + \frac{15}{4}$$



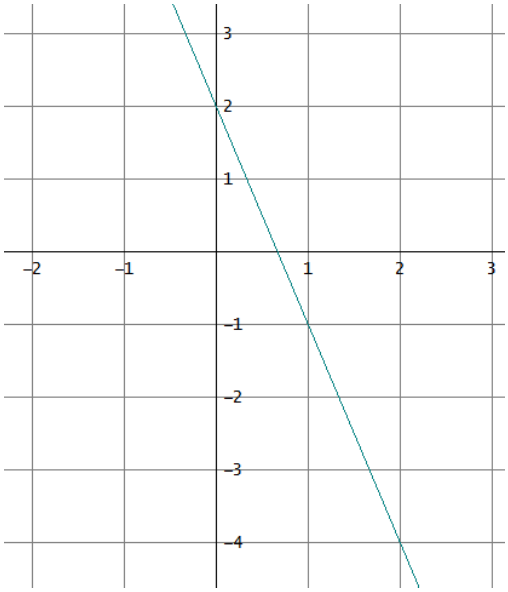
b) The line passes through (3,-1) and a slope of $-\frac{1}{3}$.

$$y + 1 = -\frac{1}{3}(x-3) \rightarrow y = -\frac{1}{3}x + 1 - 1 \rightarrow y = -\frac{1}{3}x$$



c) The line passes through (2,-4) and cuts the y-axis in 2.

$$n = 2 \rightarrow y = mx + 2 \rightarrow -4 = 2m + 2 \rightarrow m = -3 \rightarrow y = -3x + 2$$



d) The line parallel to the x-axis and passes through in the point (-2,-3).

$m = 0 \rightarrow y = -3$