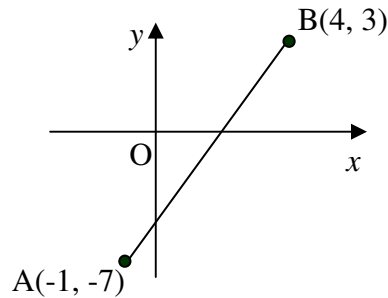


## Finding Equations

1. In the diagram, A is the point  $(-1, -7)$  and B is the point  $(4, 3)$ .
- Find the gradient of the line AB.
  - AB cuts the y-axis at the point  $(0, -5)$ . Write down the equation of the line AB.
  - The point  $(3k, k)$  lies on AB. Find the value of  $k$ .



1 KU

1 KU

2 RE

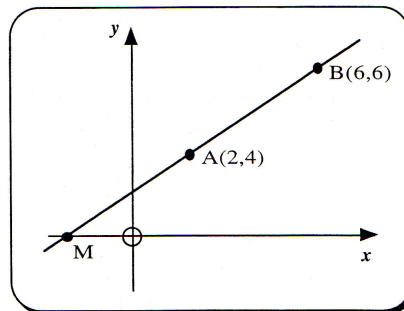
2. A is the point  $(a^2, a)$   
 T is the point  $(t^2, t)$   $a \neq t$   
 Find the gradient of the line AT  
 Give your answer in its simplest form.

3 KU

3. The straight line through the points  $A(2, 4)$  and  $B(6, 6)$  is shown in the diagram.

The point M is where the line AB cuts the x-axis.

- Find the equation of the straight line AB.
- Use this equation to find the coordinates of the point M.



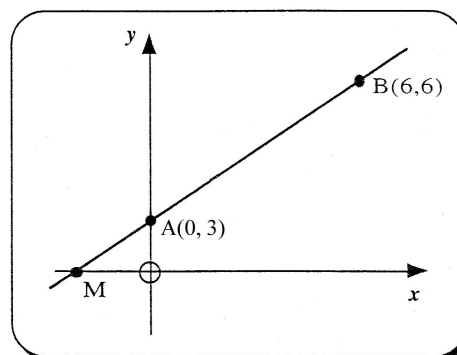
4 KU

2 RE

4. The straight line through the points  $A(0, 3)$  and  $B(6, 6)$  is shown in the diagram.

The point M is where the line AB cuts the x-axis.

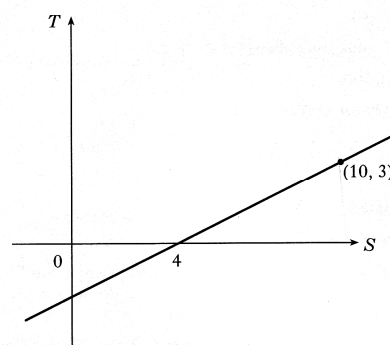
- Find the equation of the straight line AB.
- Use this equation to find the coordinates of the point M.



4 KU

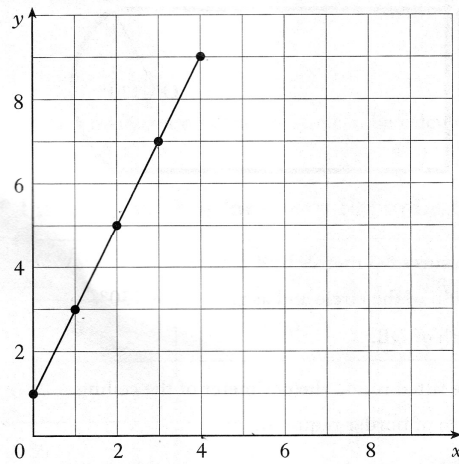
2 RE

5. Find the equation of the given straight line in terms of S and T.



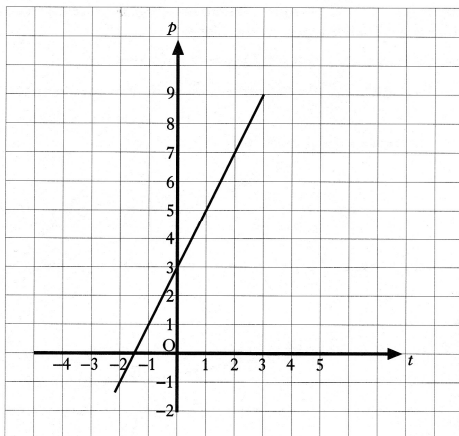
4 KU

6. Find the equation of the straight line.



3 KU

- 7.

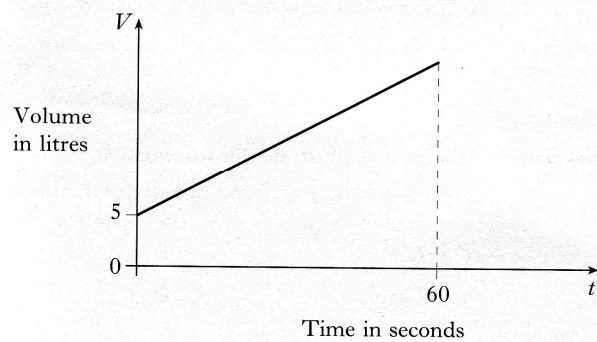


Find the equation of the straight line in terms of  $p$  and  $t$ .

4 KU

8. The tank of a car contains 5 litres of petrol.

The graph below shows how the volume of petrol in this tank changes as a further 45 litres of petrol is pumped in at a steady rate for 60 seconds.



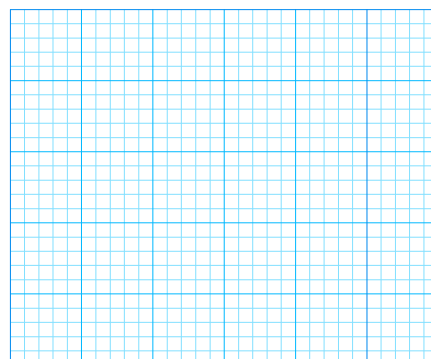
Find the equation of the straight line in terms of  $V$  and  $t$ .

4 KU

9. A tank contains 10 litres of water.  
A further 30 litres of water is poured into the tank at a steady rate of 5 litres per minute.

a) On the 2mm square ruled graph paper provided, draw a graph of the volume,  $V$  litres, of water in the tank against the time,  $t$  minutes.

b) Write down an equation connecting  $V$  and  $t$ .



4 KU

2 KU

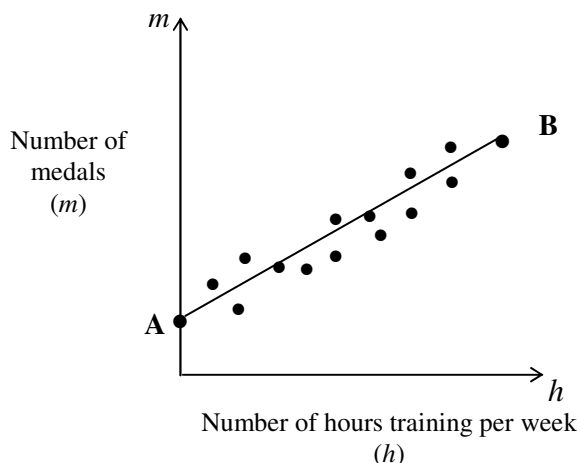
# Applications of the Equation of a Straight Line

1. The graph shows the relationship between the number of hours ( $h$ ) an athlete trains per week and the number of Championship medals ( $m$ ) they have won.

A best fitting straight line AB has been drawn.

Athlete A does not train but has won 4 medals this year.

Athlete B who trains for 12 hours per week has won 40 medals this year.



- (a) Find the equation of the straight line AB in terms of  $m$  and  $h$ .

4 RE

- (b) How many medals would you expect an athlete who trains 8 hours per week to have won ?

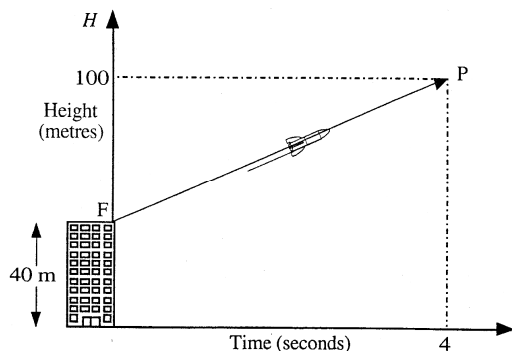
1 KU

2. A boy sets off a rocket from the top of a 40 metre high block of flats.

The diagram shows the path of the rocket over the first 4 seconds.

It is represented by the straight line in the graph.

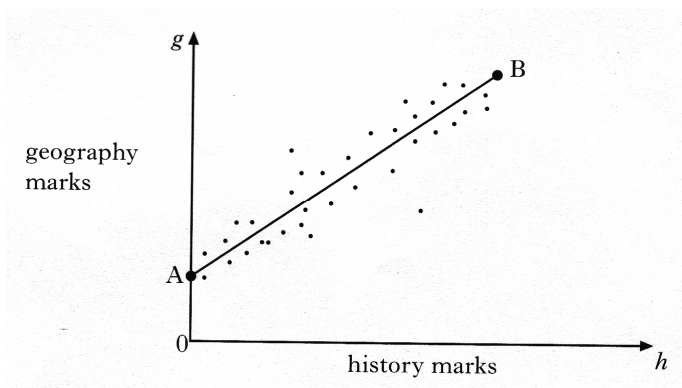
After 4 seconds, the rocket has reached a point 100 metres above the ground.



Find the equation of the straight line FP in terms of  $H$  and  $t$ .

4 RE

3. The graph below shows the relationship between the history and geography marks of a class of students



A best fitting straight line, AB has been drawn.

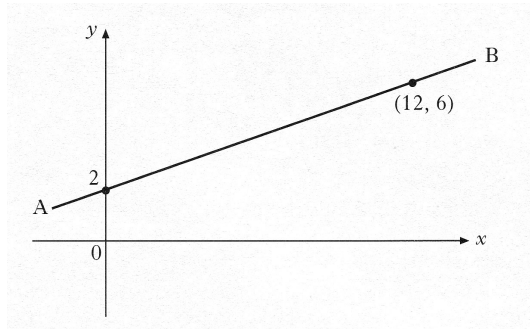
Point A represents 0 marks for history and 12 marks for geography.

Point B represents 90 marks for history and 82 marks for geography.

Find the equation of the straight line AB in terms of  $h$  and  $g$ .

4 RE

4. A water pipe runs between two buildings. These are represented by the points A and B in the diagram below.



- a) Using the information in the diagram, show that the equation of the line AB is  $3y - x = 6$ .
- b) An emergency outlet pipe has to be built across the main pipe. The line representing this outlet pipe has equation  $4y + 5x = 46$

3 KU

Calculate the coordinates of the point on the diagram at which the outlet pipe will cut across the main water pipe.

4 RE

5. When a patient's blood pressure (B.P.), is taken, two measurements are made.

For example, in "160 over 70" ( or  $\frac{160}{70}$  ),

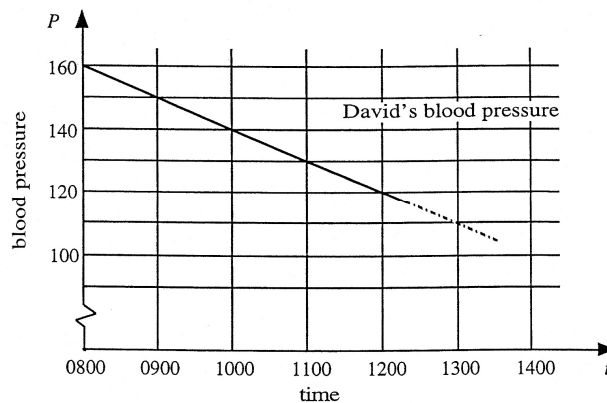
⇒ the 160 is the reading when the heart is pumping.

⇒ the 70 is the reading when the heart is at rest.



David has a heart problem, and has his blood pressure taken every hour.

The first number of these two measurements is monitored very carefully and the nurse plots a graph, showing the changes from 8 am.



- a) Find the gradient of the line shown above.
- b) Write down the equation of the line in the form  $P = \dots\dots\dots$
- c) It is known that if the blood pressure drops below 70, the patient will be in danger of losing consciousness.

2 KU

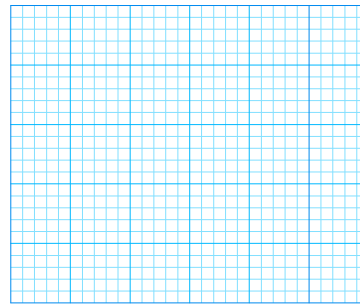
2 KU

If David's blood pressure continues to drop in the way indicated, when might he be expected to become unconscious.

3 RE

6. A tank contains 240 litres of water.  
When the tap is opened, water flows from the tank at a steady rate of 20 litres per minute.

a) On the 2mm square-ruled paper provided, draw a graph of the volume  $V$  litres, of water in the tank against the time,  $t$  minutes.



3 KU

b) Write down an equation connecting  $V$  and  $t$ .

2 KU

7. The graph below shows the number of grams,  $s$ , of a substance that can be dissolved in a fixed quantity of water when the temperature of the water is  $t^\circ\text{C}$ .

Find the equation of this straight line in terms of  $s$  and  $t$ .

4 KU

