Firrhill High

Mathematics Department

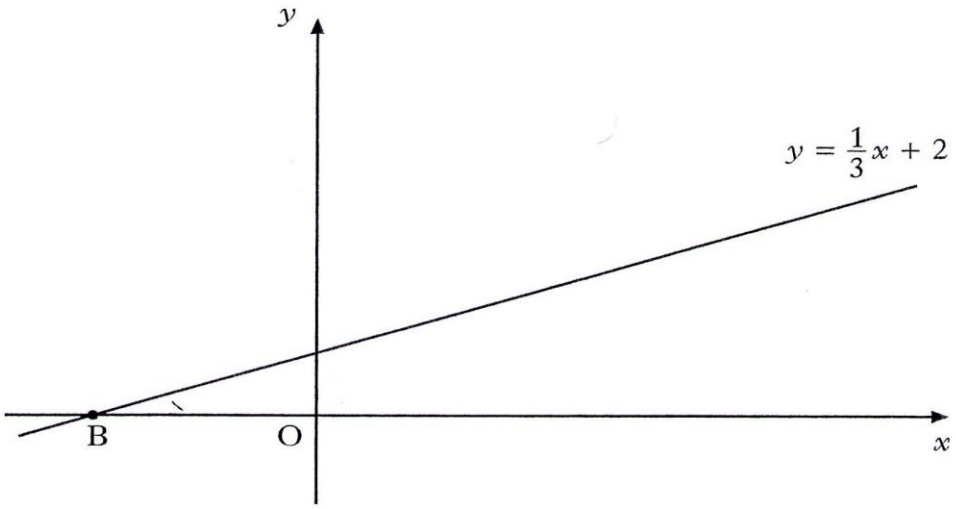
Level 5

Assessment Questions

1. 2010 paper 1 Q.9

KU	RI

Part of the graph of the straight line with equation $y = \frac{1}{3}x + 2$, is shown below.



(*a*) Find the coordinates of the point B. **2**

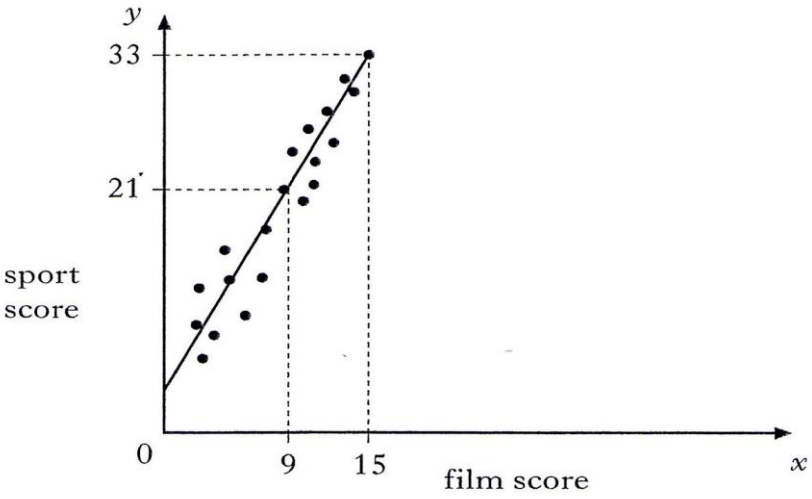
(*b*) For what values of x is $y < 0$? **1**

2. 2009 Paper 2 Q.6

KU	RE

Teams in a quiz answer questions on film and sport.

This scatter graph shows the scores of some of the teams.



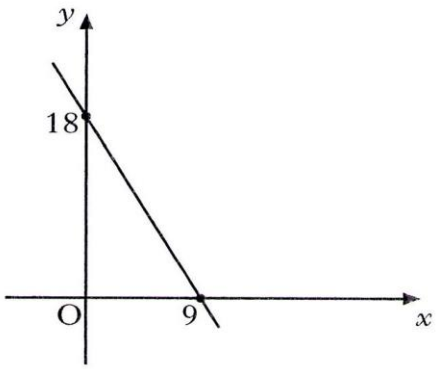
A line of best fit is drawn as shown above.

(*a*) Find the equation of this straight line. **4**

(*b*) Use this equation to estimate the sport score for a team with a film score of 20. **2**

3. 2008 Paper 1 Q.4

A straight line cuts the x-axis at the point (9, 0) and the y-axis at the point (0, 18) as shown.



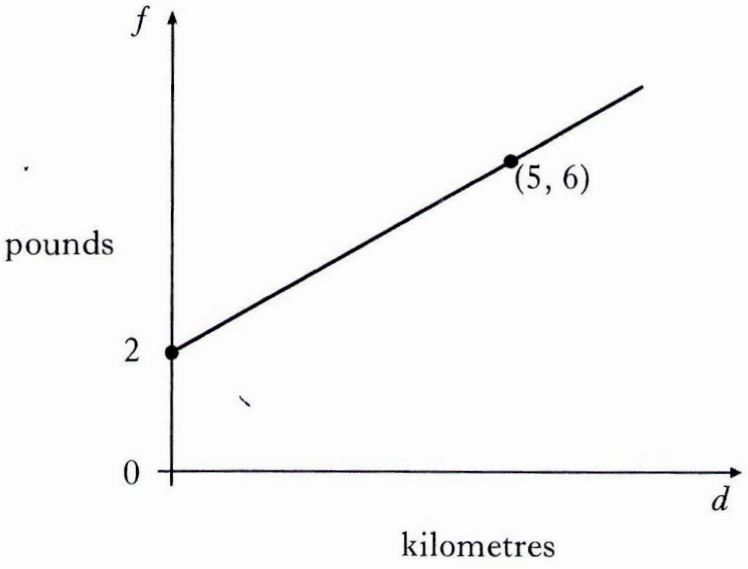
Find the equation of this line. **3**

4. 2007 Paper 1 Q.6

KU	RE

A taxi fare consists of a £2 "call-out" charge **plus** a fixed amount per kilometre.

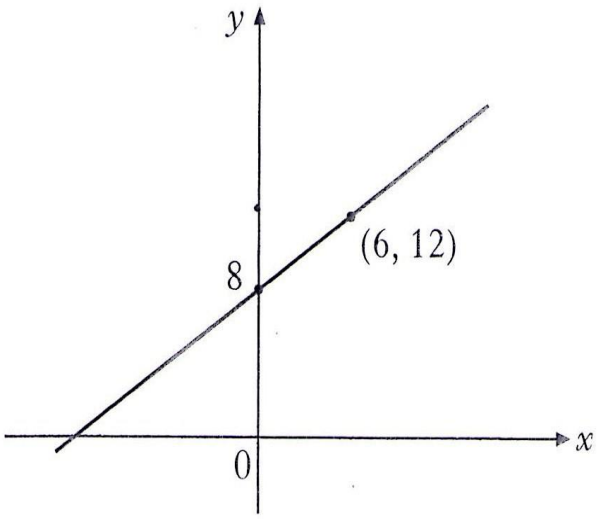
The graph shows the fare, f pounds for a journey of d kilometres.



The taxi fare for a 5 kilometre journey is £6.

Find the equation of the straight line in terms of d and f. **4**

5. 2006 Paper 1 Q.4



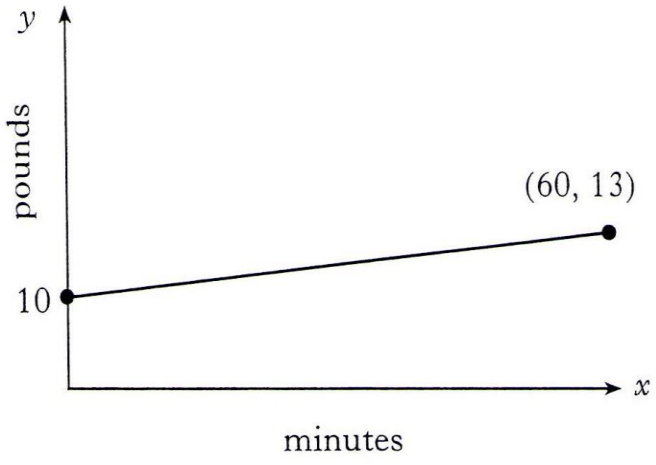
Find the equation of the given straight line. | 3 |

6. 2005 Paper 2 Q.9

KU	RE

The monthly bill for a mobile phone is made up of a fixed rental plus call charges. Call charges vary as the time used.

The relationship between the monthly bill, y (pounds), and the time used, x (minutes) is represented in the graph below.



(*a*) Write down the fixed rental. | | 1 |

(*b*) Find the call charge per minute. | | 3 |

7. 2004 paper 1 Q.10

KU	RE

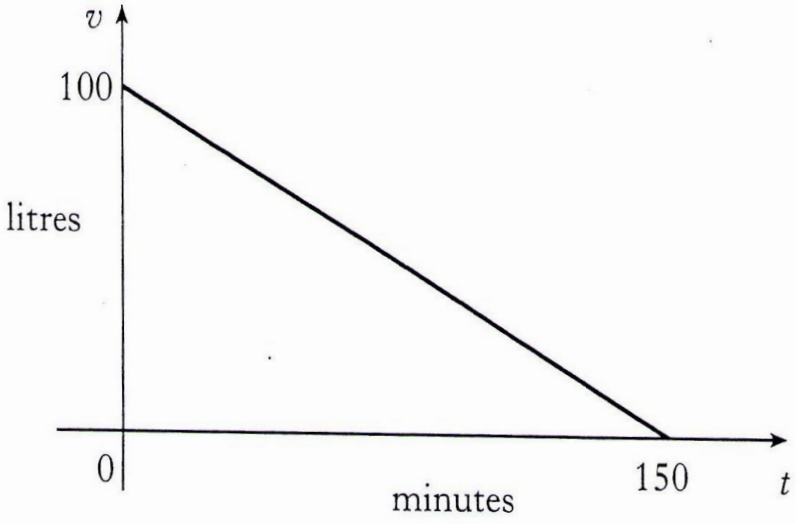
Two variables x and y are connected by the relationship $y = ax + b$.

Sketch a possible graph of y against x to illustrate this relationship when a and b are each less than zero. **3**

8. 2004 Paper 2 Q.2

A tank which holds 100 litres of water has a leak.

After 150 minutes, there is no water left in the tank.



The above graph represents the volume of water (v litres) against time (t minutes).

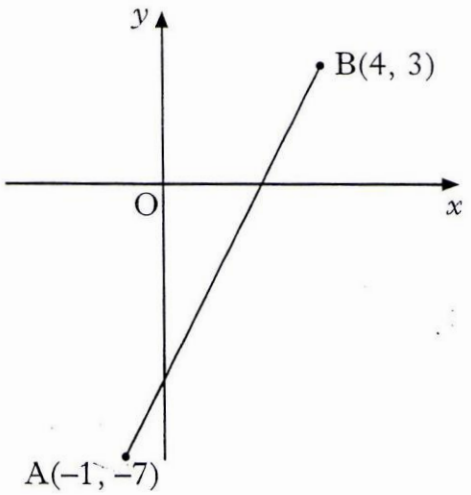
(*a*) Find the equation of the line in terms of v and t. **3**

(*b*) How many minutes does it take for the container to lose 30 litres of water? **3**

9. 2003 Paper 1 Q.6

KU	RE

In the diagram below, A is the point (–1, –7) and B is the point (4, 3).



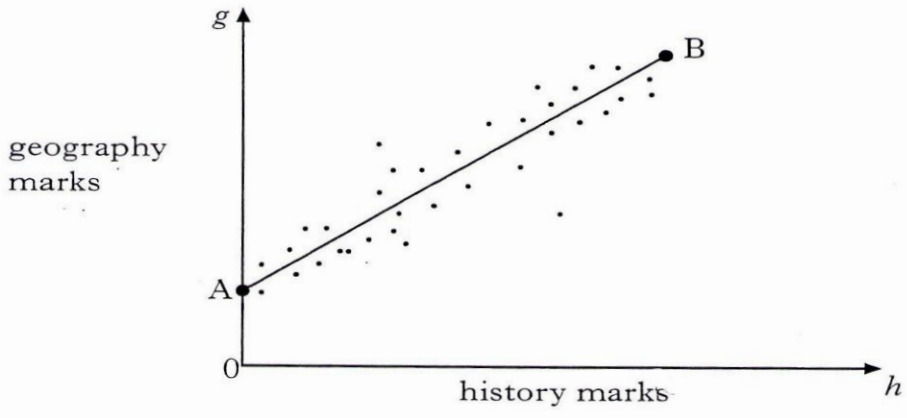
(*a*) Find the gradient of the line AB. **1**

(*b*) AB cuts the y-axis at the point (0, –5).
Write down the equation of the line AB. **1**

(*c*) The point $(3k, k)$ lies on AB.
Find the value of k. **2**

10. 2002 Paper 1 Q.12

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.

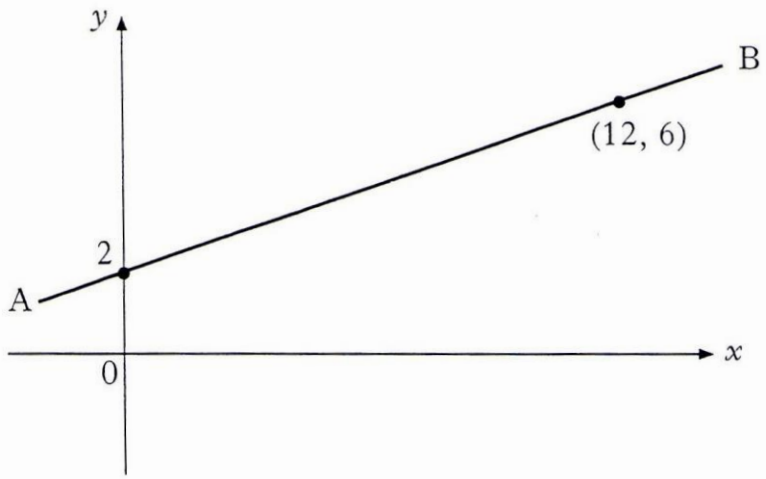
Find the equation of the straight line AB in terms of h and g. **4**

11. 2001 paper 2 Q.4

KU	RE

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 $3y - x = 6$. **3**

(*b*) An emergency outlet pipe has to be built across the main pipe. The line representing this outlet pipe has equation $4y + 5x = 46$.

Calculate the coordinates of the point on the diagram at which the outlet pipe will cut across the main water pipe. **4**

12. 2001 Paper 1 Q.6

KU	E

A is the point (a^2, a).

T is the point (t^2, t), $a \neq t$

Find the gradient of the line AT.

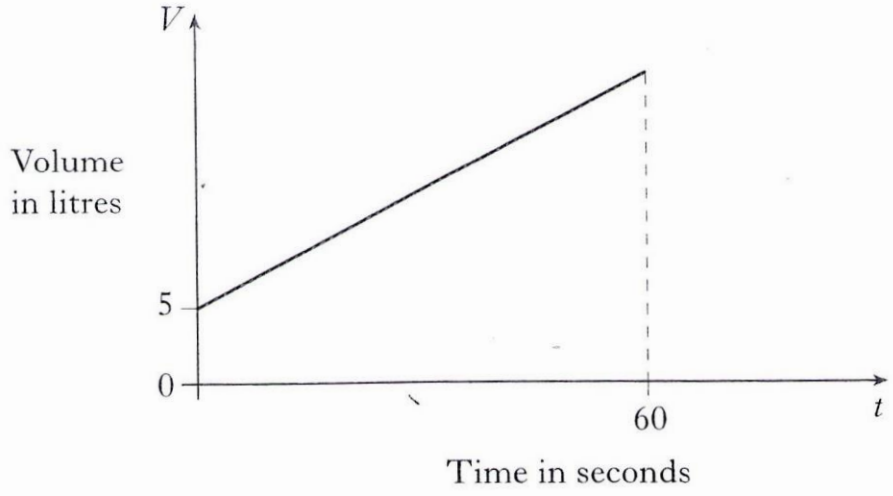
Give your answer in its simplest form. **3**

13. 2000 Paper 1 Q.10

KU	RE
4	

The tank of a car contains 5 litres of petrol.

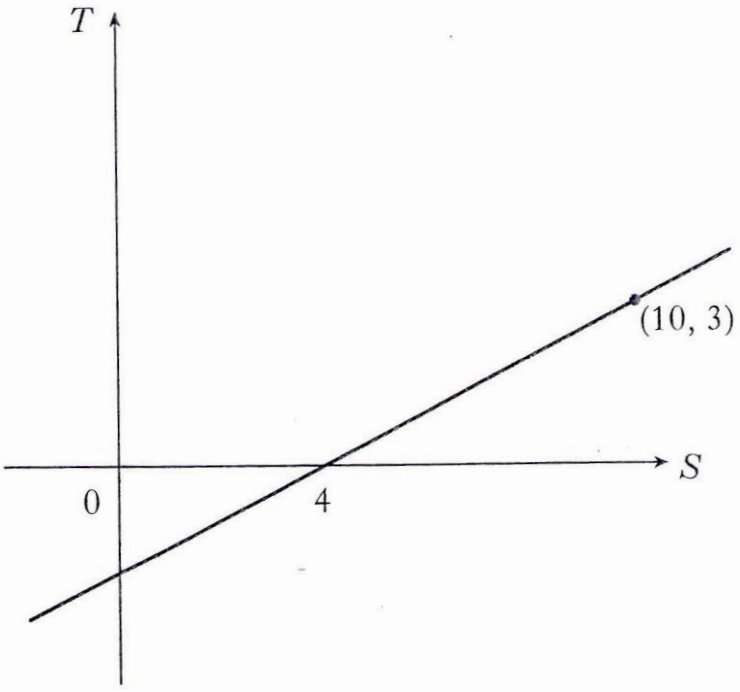
The graph below shows how the volume of petrol in this tank changes as a further 45 litres of petrol is pumped in at a steady rate for 60 seconds.



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

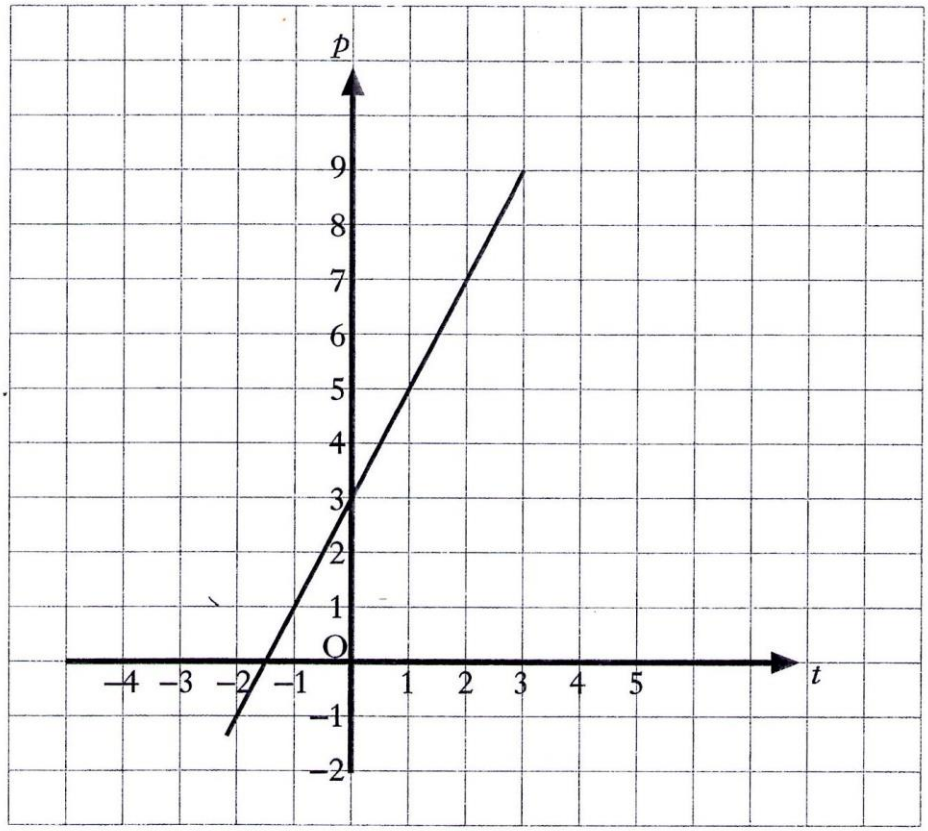
14. 1999 Paper 1 Q.6

KU	RE
4	



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

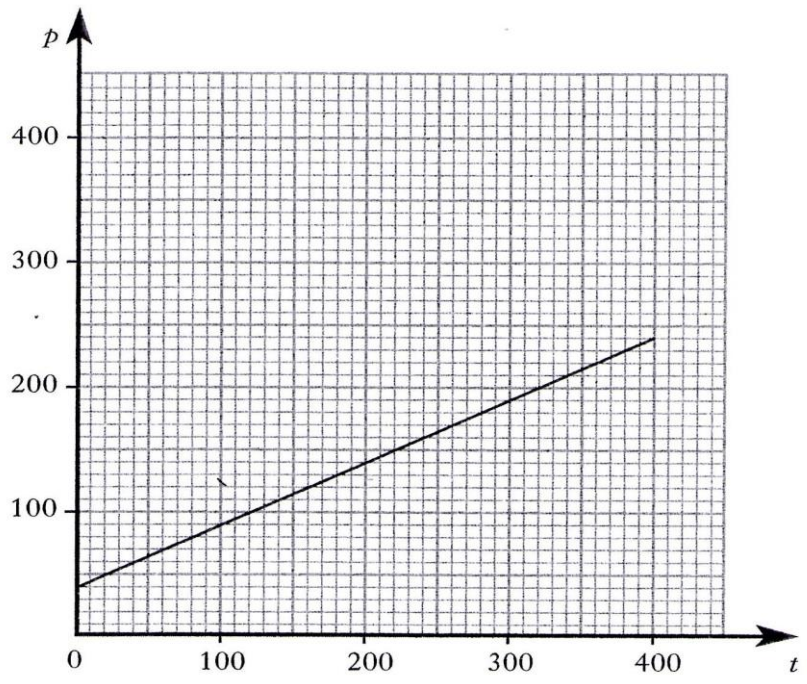
15. 1996 Q.8



KU	RA

Find the equation of the straight line in terms of p and t. **4**

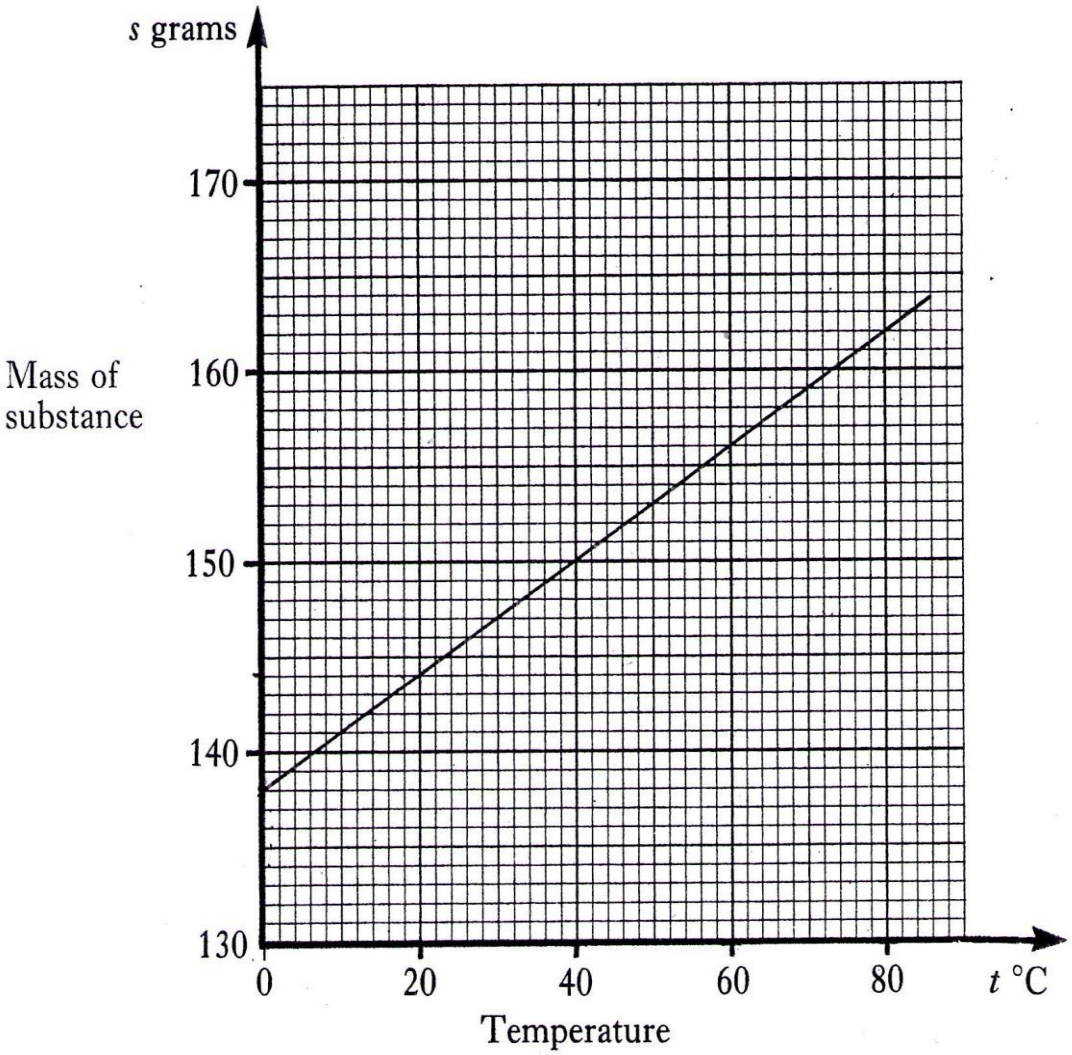
16. 1992 Paper 1 Q.8 (KU – you may use a calculator)



Marks

Find the equation of the straight line in terms of p and t. **(4)**

17. 1990 Paper 1 Q.9 (KU – you may use a calculator)



The graph above 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 °C.

Find the equation of this straight line in terms of s and t. **(4)**

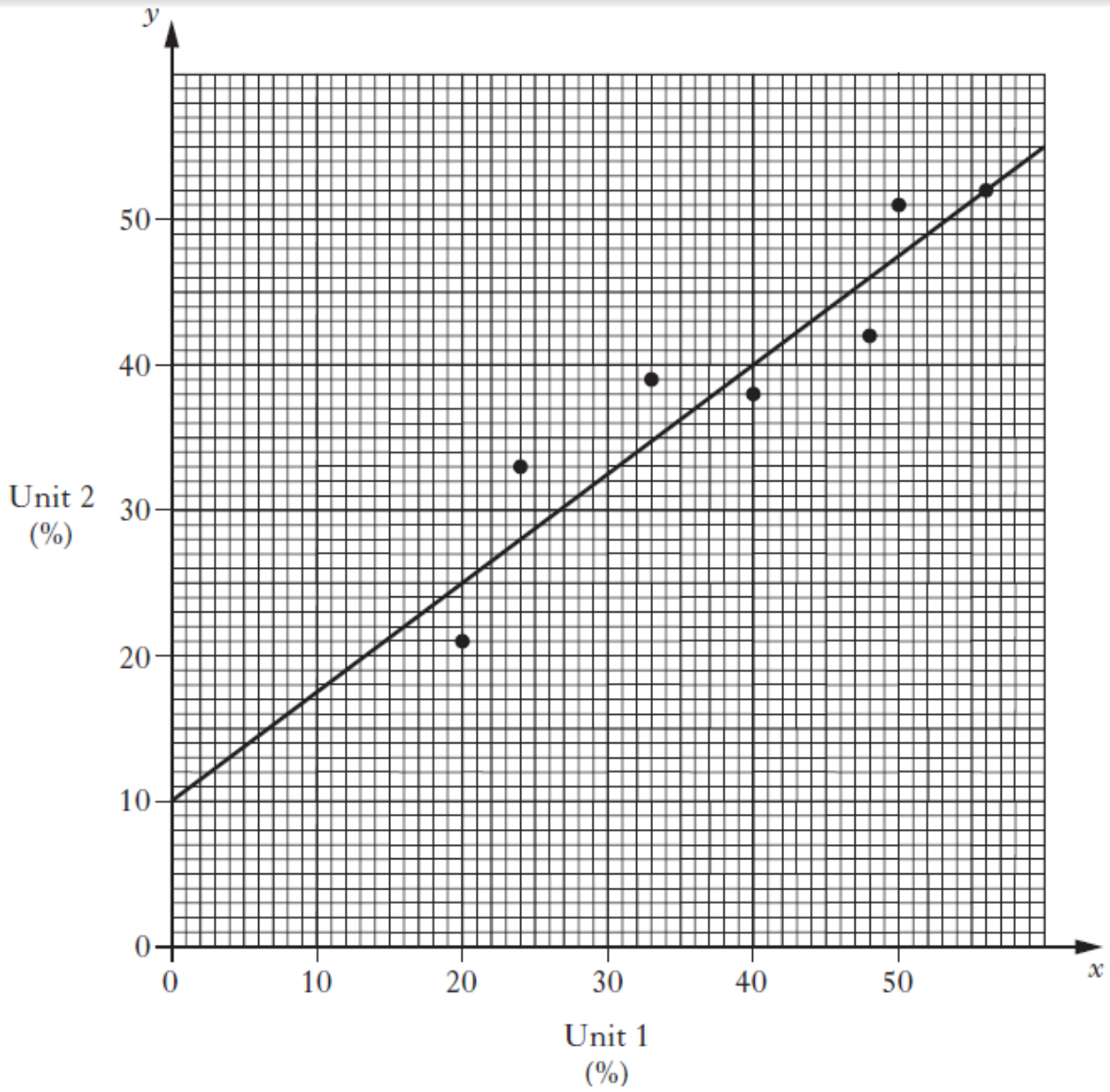
18. 2015 Int 2 Paper 1

11. A straight line is represented by the equation $y = mx + c$.

Sketch a possible straight line graph to illustrate this equation when $m < 0$ and $c > 0$. 2

19. 2015 Int 2 Paper 2

4. The marks of a group of students in the Unit 1 and Unit 2 tests of their Intermediate 2 Mathematics course are shown in the scattergraph below.
A line of best fit has been drawn.



(*a*) Find the equation of this line of best fit. **3**

(*b*) Another student scored 80% in the Unit 1 test.
Use your answer to part (*a*) to predict her mark in the Unit 2 test. **1**

20 2015 Int 2 Paper 2

11. A straight line has equation $2y + 3x = 12$.

(*a*) Find the gradient of this line. **2**

(*b*) The line crosses the y-axis at $(0, c)$.
Find the value of c. **1**

21 2015 N5 Paper 1

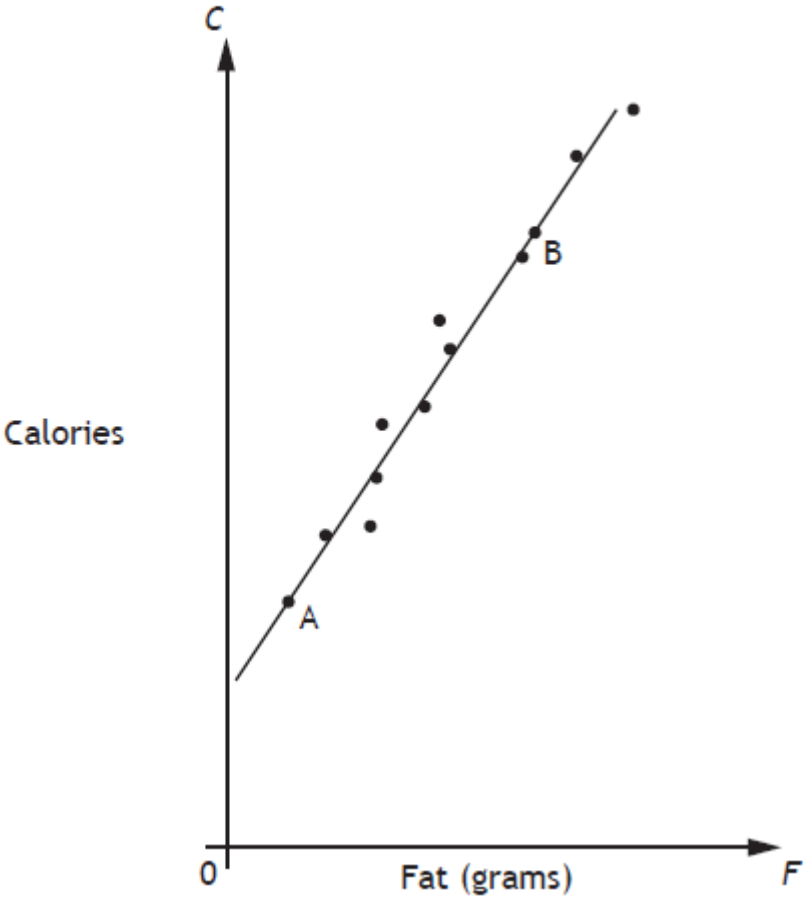
8. Find the equation of the line joining the points (−2, 5) and (3, 15).

   Give the equation in its simplest form. 3

22 2014 N5 Paper 1

6. McGregor's Burgers sells fast food.

   The graph shows the relationship between the amount of fat, F grams, and the number of calories, C, in some of their sandwiches.



A line of best fit has been drawn.

Point A represents a sandwich which has 5 grams of fat and 200 calories.

Point B represents a sandwich which has 25 grams of fat and 500 calories.

(a) Find the equation of the line of best fit in terms of F and C. 3

(b) A Super Deluxe sandwich contains 40 grams of fat.

Use your answer to part (a) to estimate the number of calories this sandwich contains.

Show your working. 1

23 2014 N5 Paper 1

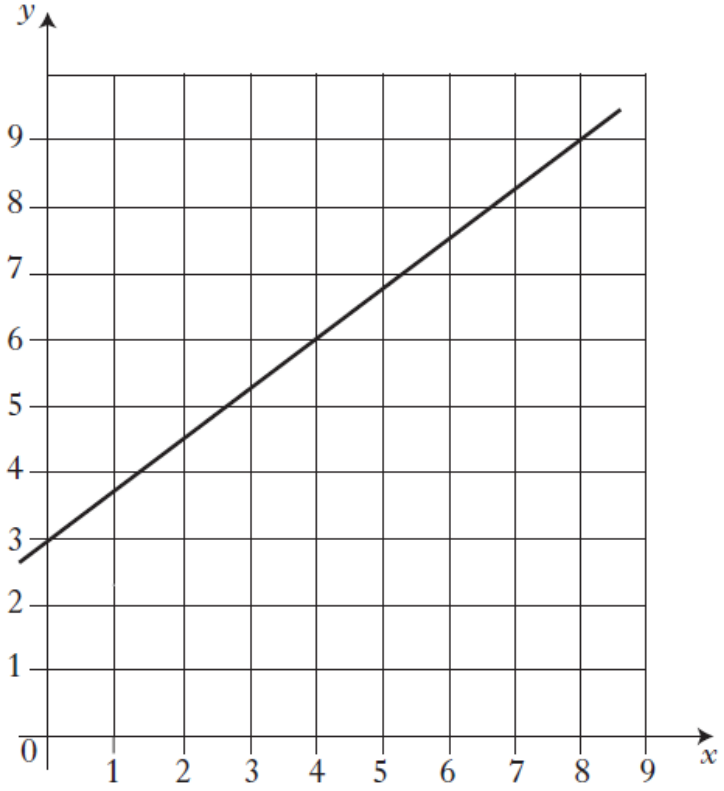
11. (a) A straight line has equation $4x+3y=12$.

Find the gradient of this line. 2

(b) Find the coordinates of the point where this line crosses the x-axis. 2

24 2014 Int 2 Paper 1

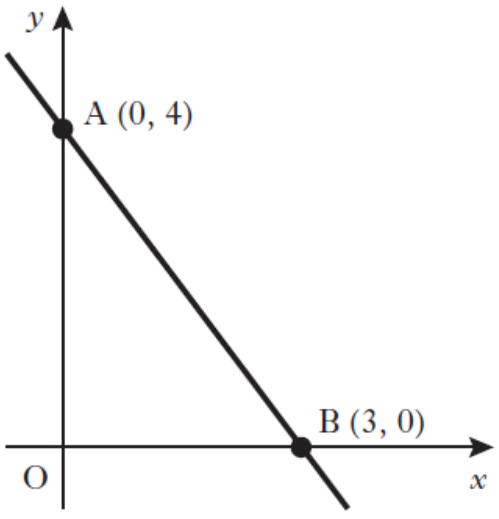
1.



Find the equation of the straight line shown in the diagram above. 3

25 2013 Int 2 Paper 1

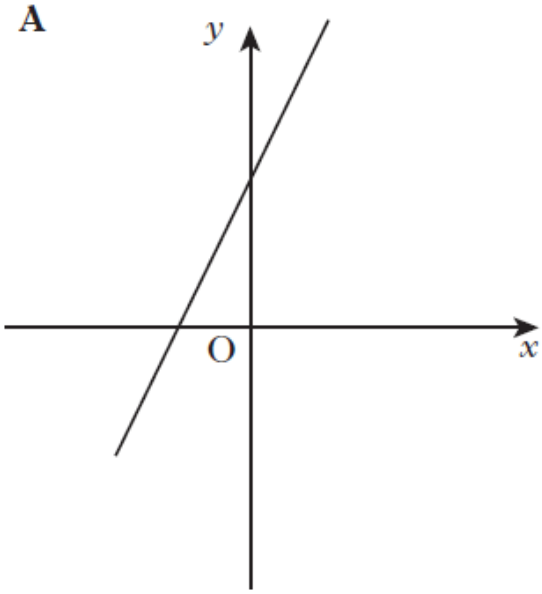
2.



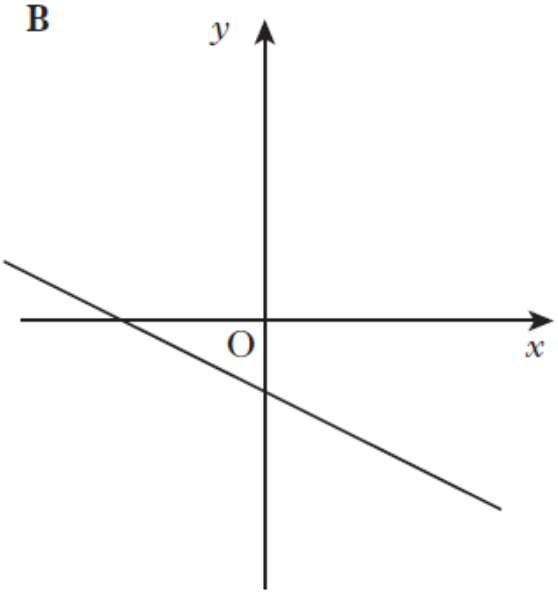
Find the equation of the straight line AB. 3

8. Four straight line graphs are shown below.

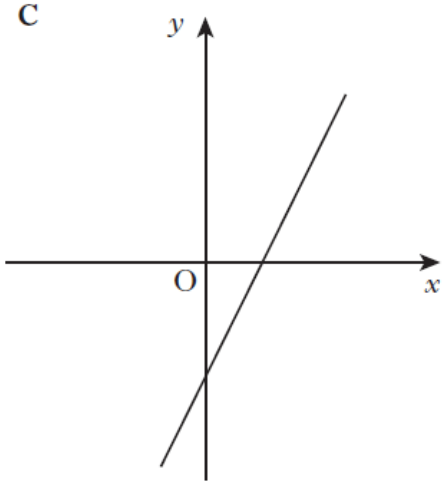
A



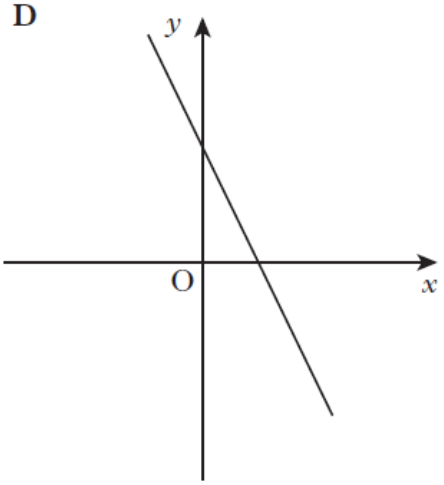
B



C



D



Which one of these above could represent the line with equation $2x + y = 3$?

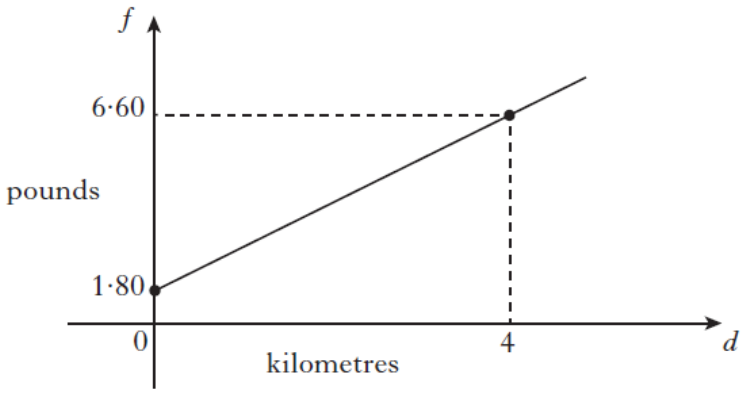
Give two reasons to justify your answer. 3

27 2012 Credit Paper 2

10. A taxi fare consists of a call-out charge of £1·80 **plus** a fixed cost per kilometre.

A journey of 4 kilometres costs £6·60.

The straight line graph shows the fare, f pounds, for a journey of d kilometres.

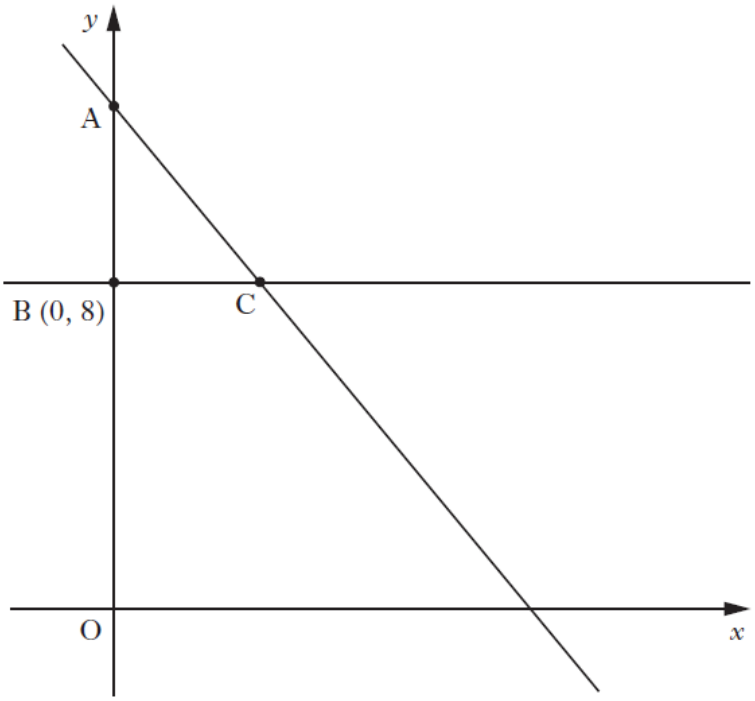


(*a*) Find the equation of the straight line. **3**

(*b*) Calculate the fare for a journey of 7 kilometres. **2**

28 2012 Int2 Paper 1

3. The straight line with equation $4x + 3y = 36$ cuts the y-axis at A.



(*a*) Find the coordinates of A. **1**

This line meets the line through B (0, 8), parallel to the x-axis, at C as shown above.

(*b*) Find the coordinates of C. **2**

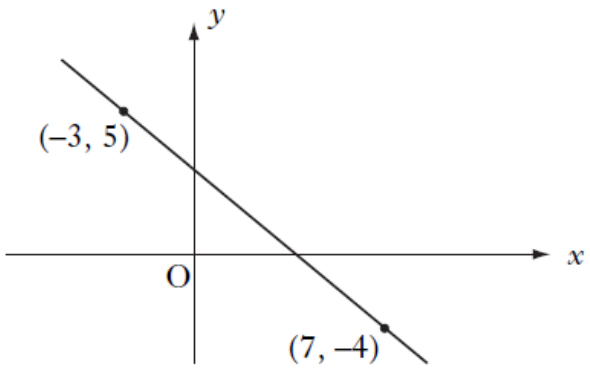
29 2011 Int2 Paper 1

8. A straight line is represented by the equation $y = mx + c$.

Sketch a possible straight line graph to illustrate this equation when $m > 0$ and $c < 0$. **2**

30 2011 Int2 Paper 2

1.

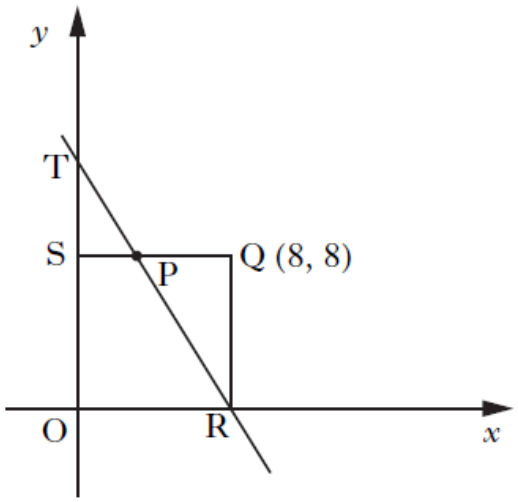


Calculate the gradient of the straight line passing through the points (–3, 5) and (7, –4). **1**

31 2011 Credit Paper 1

8. A square, OSQR, is shown below.

Q is the point (8, 8).



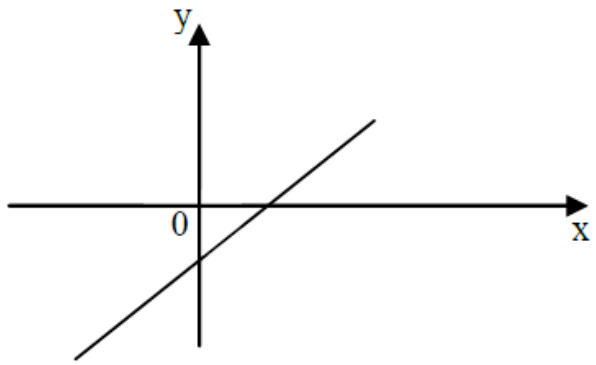
The straight line TR cuts the y-axis at T (0, 12) and the x-axis at R.

(a) Find the equation of the line TR. **3**

The line TR also cuts SQ at P.

(b) Find the coordinates of P. **4**

1. (a) B(-6,0) (b) $x < -6$
2. (a) $y = 2x + 3$ (b) sports score = 43
3. $Y = -2x + 18$
4. $F = {}^{4}/_{5}\, d + 2$
5. $Y = {}^{2}/_{3}\, x + 8$
6. (a) £10 (b) 5p
7. A sketch of a straight line, sloping downwards, cutting the y-axis below zero.
8. (a) $v = {}^{-2}/_{3}\, t + 100$ (b) t = 45 minutes
9. (a) m = 2 (b) $y = 2x - 5$ (c) k = -1
10. $G = {}^{7}/_{9}\, h + 12$
11. (a) c = 2, $m = {}^{1}/_{3}$..... (b) (6,4)
12. $1/(t + a)$
13. $V = \frac{3}{4}\, t + 5$
14. $T = \frac{1}{2}\, s - 2$
15. $P = 2t + 3$
16. $P = \frac{1}{2}\, t + 40$
17. $S = {}^{3}/_{10}\, t + 138$
18. Straight line sloping down from left to right crossing the y axis above the origin
19. a) $y=0.75x + 10$ b) 70%
20. a) -1.5 b) 6
21. $y = 2x + 9$
22. a) $C = 15F + 125$ b) a = 5
23. a) $m = -{}^{4}/_{3}$ b) (3,0)
24. $y = \frac{3}{4}\, x + 3$
25. $y = -{}^{4}/_{3} + 4$
26. D
27. a) $f = 1.2d + 1.8$ b) £10.20
28. a) A(0,12) b) C(3,8)
29.



30. $-{}^{9}/_{10}$
31. $y = -{}^{3}/_{2}x + 12$