Sequences, Functions and Graphs (F)

Intervention Booklet

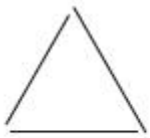
nth term

Things to remember:

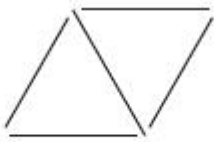
- The gap between the numbers is the number that goes in front of n e.g. 4n
- Then add on the zero term.
- If you're asked to write down terms of a sequence – use n=1, n=2, n=3 etc.

Questions:

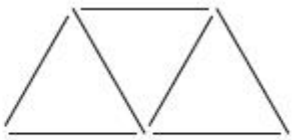
1. Here are some patterns made from sticks.



Pattern number 1



Pattern number 2



Pattern number 3

In the space below, draw Pattern number 4

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of sticks	3	5	7		

(1)

(c) How many sticks make Pattern number 15?

…….....

(1)

(Total for Question is 3 marks)

2. Here are the first four terms of a number sequence.

6 10 14 18

(2) Write down the next term in this sequence.

…….....

(1)

(b) Find the 10^{th} term in this sequence.

…….....

(1)

(c) The number 102 is **not** a term in this sequence. Explain why.

(1)
(Total for Question is 3 marks)

3. Here are the first four terms of a number sequence.
3 7 11 15
(2) Write down the next term of this sequence.

….....
(1)

The 50th term of this number sequence is 199
(b) Write down the 51st term of this sequence.

….....
(1)

The number 372 is **not** a term of this sequence.
(c) Explain why.

(1)
(Total for Question is 3 marks)

4. Here are the first 5 terms of an arithmetic sequence.
6, 11, 16, 21, 26
Find an expression, in terms of *n*, for the *n*th term of the sequence.

.....
(Total 2 marks)

5. Here are the first five terms of a number sequence.
3 7 11 15 19
(a) Work out the 8th term of the number sequence.

.....
(1)

(b) Write down an expression, in terms of *n*, for the *n*th term of the number sequence.

.....
(2)
(Total 3 marks)

6. The first five terms of an arithmetic sequence are
2 9 16 23 30
Find, in terms of *n*, an expression for the *n*th term of this sequence.

.....
(Total 2 marks)

7. Here are the first four terms of a number sequence.

2 7 12 17

(a) Write down the **6th** term of this number sequence.

.....

(1)

The *n*th term of a different number sequence is $4n + 5$

(b) Work out the first three terms of this number sequence.

....

(2)

(Total 3 marks)

8. The *n*th term of a number sequence is given by $3n + 1$

(a) Work out the first **two** terms of the number sequence.

.....

(1)

Here are the first four terms of another number sequence.

1 5 9 13

(b) Find, in terms of n, an expression for the nth term of this number sequence.

.....

(2)

(Total 3 marks)

Sketching Linear Graphs

Things to remember:

- Draw a table of values with x and y.
- Work out the value of y when x = 0, x = 1, x = 2, then use the pattern to work out the rest.
- Don't forget to connect the coordinates with a straight line.

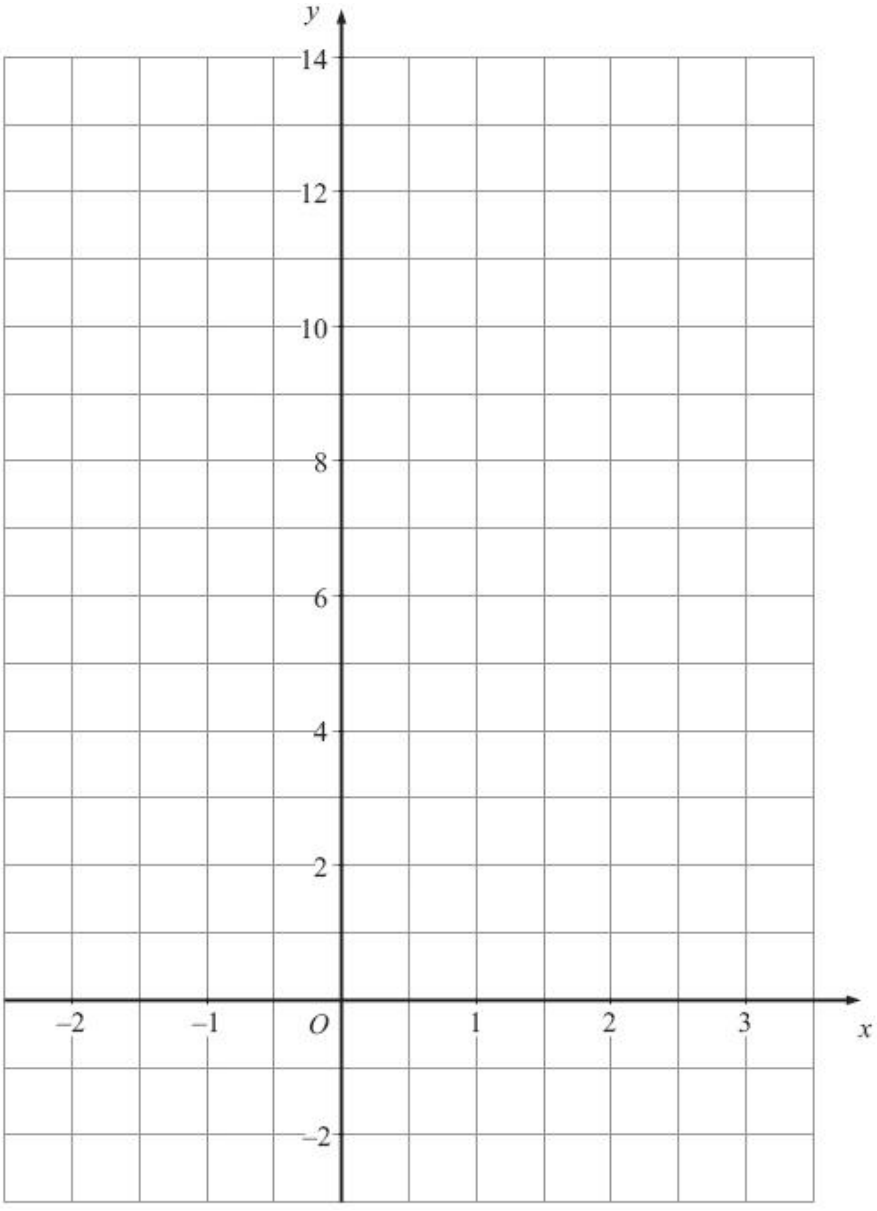
Questions:

1. (a) Complete the table of values for $y = 3x + 4$

x	–2	–1	0	1	2	3
y		1				13

(2)

(b) On the grid, draw the graph of $y = 3x + 4$



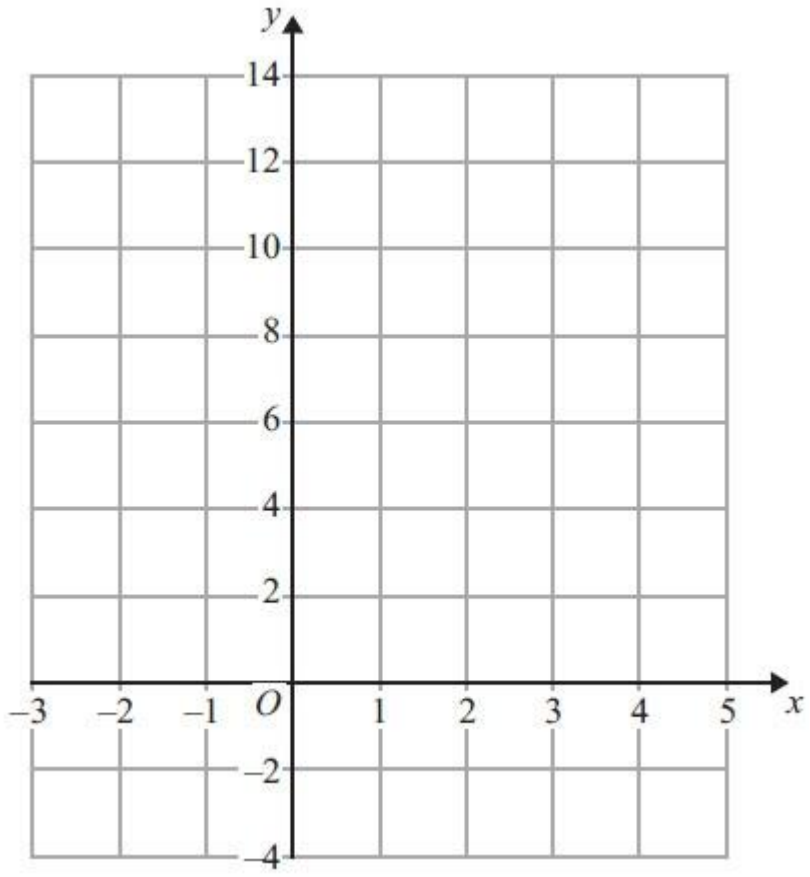
(2)

(Total for Question is 4 marks)

2. (a) Complete the table of values for $y = 2x + 2$

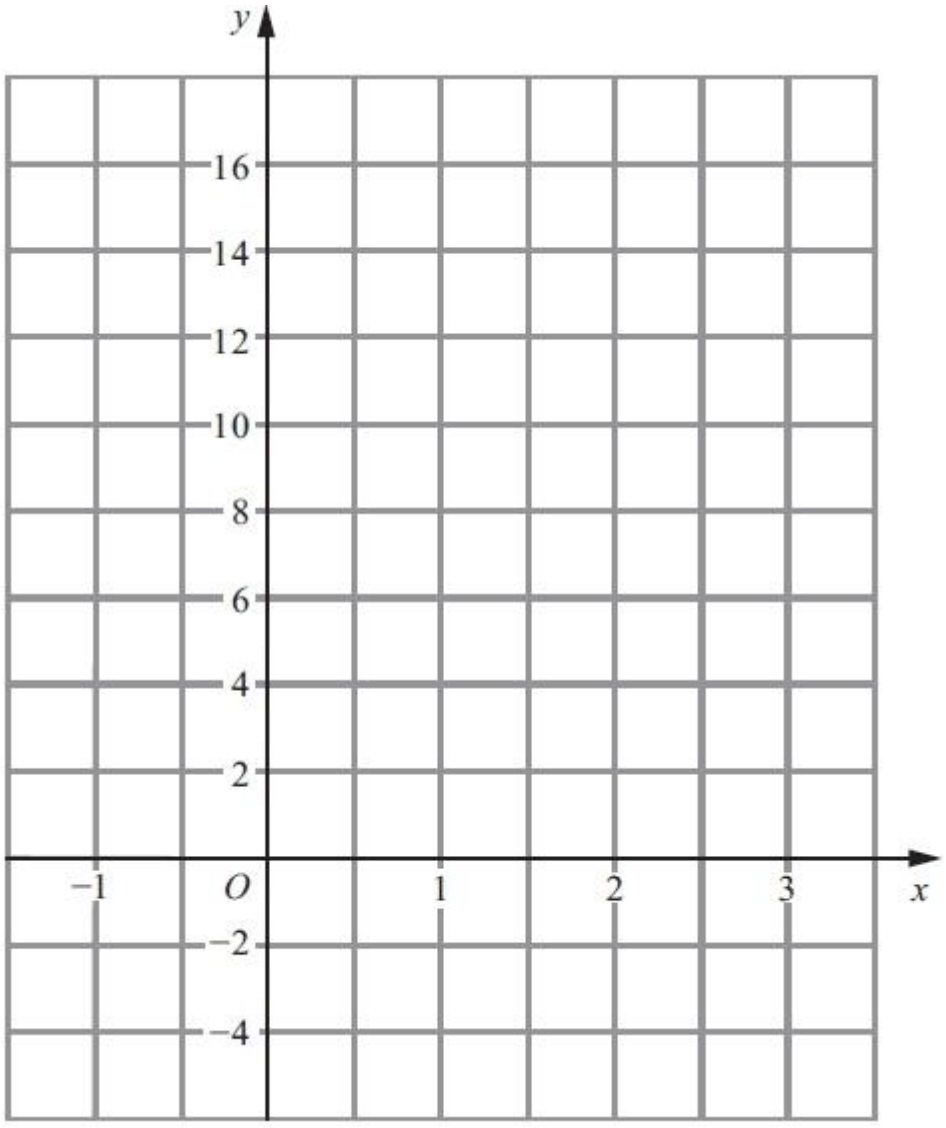
x	−2	−1	0	1	2	3	4
y	−2				6		

(b) On the grid, draw the graph of $y = 2x + 2$



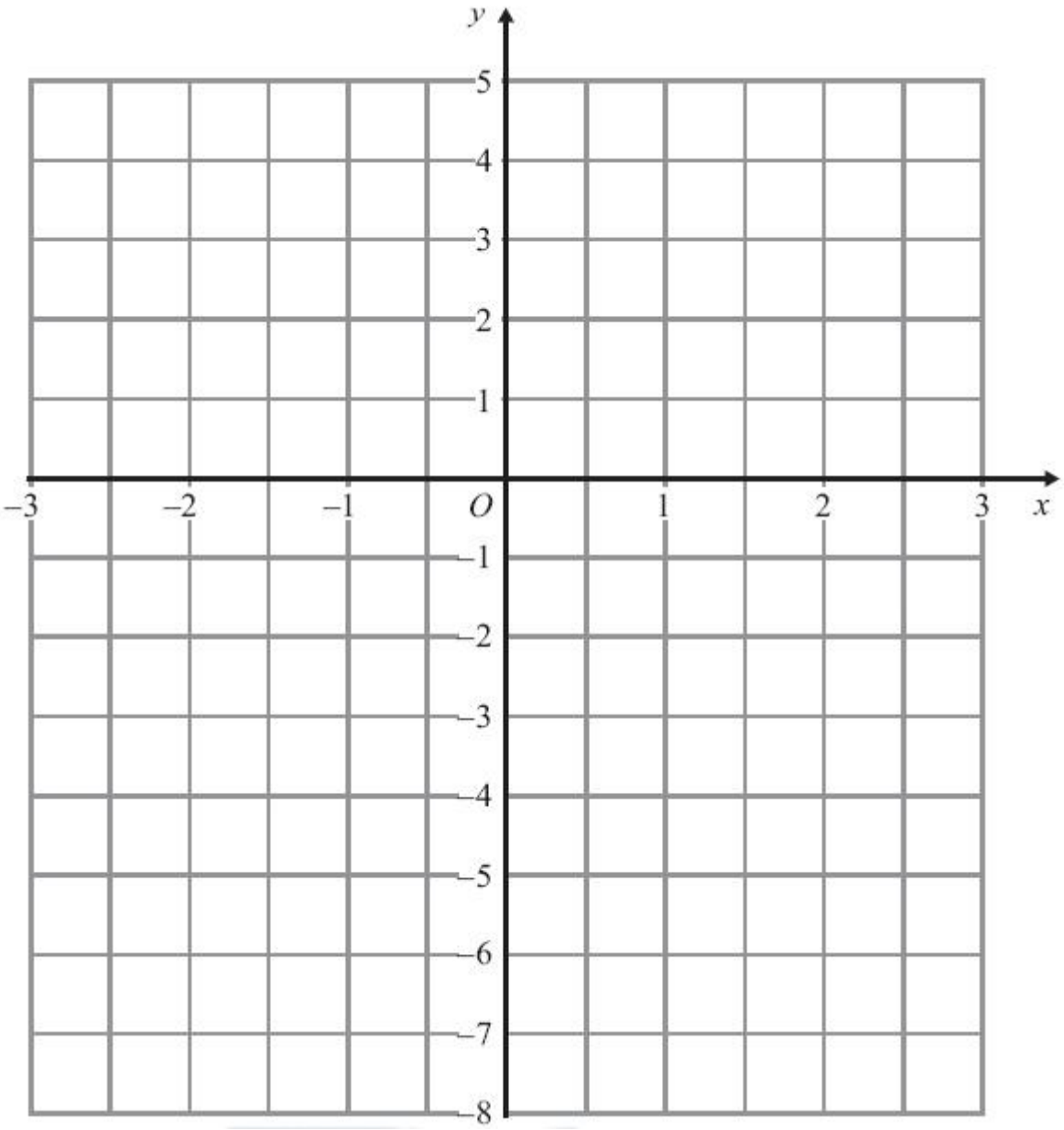
(2)
(Total for Question is 4 marks)

3. On the grid, draw the graph of $y = 4x + 2$ from $x = -1$ to $x = 3$



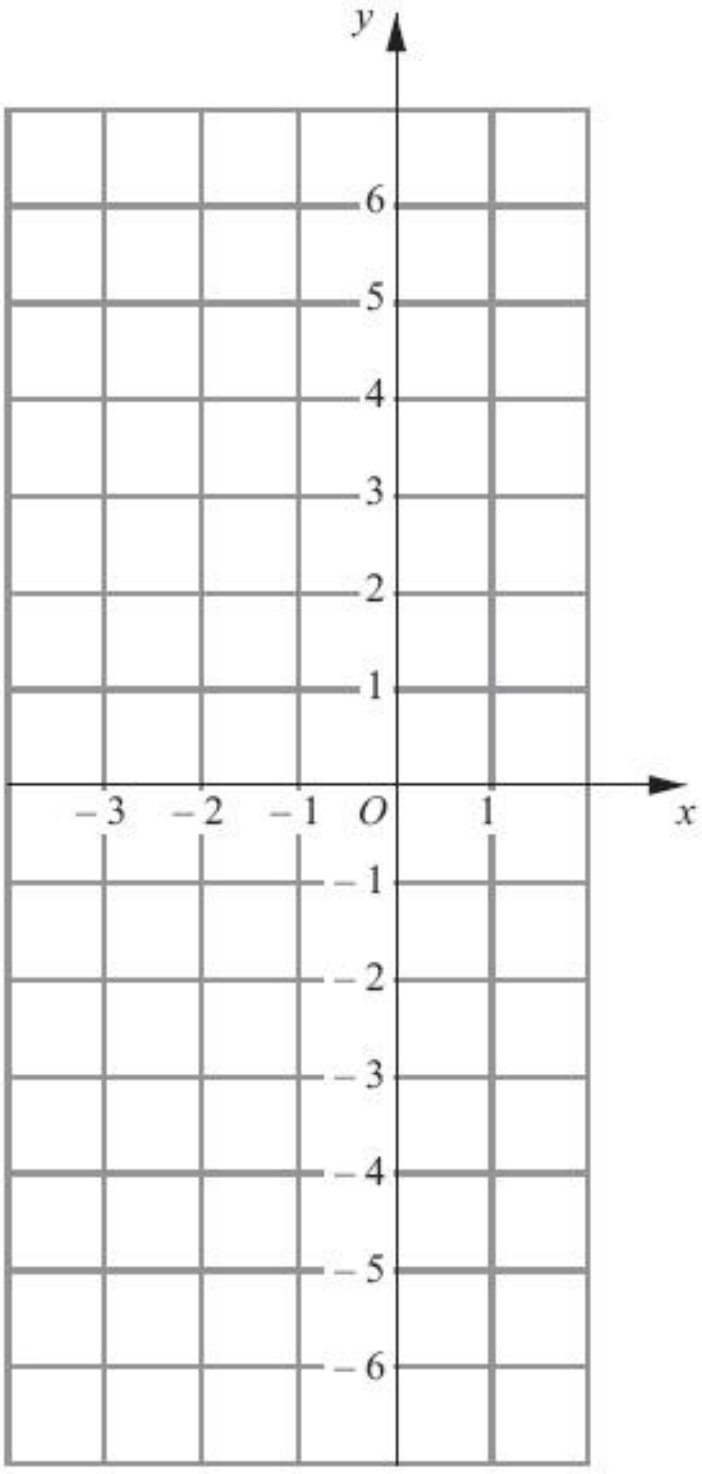
(Total for Question is 3 marks)

4. On the grid, draw the graph of $y = 2x - 3$ for values of x from –2 to 2



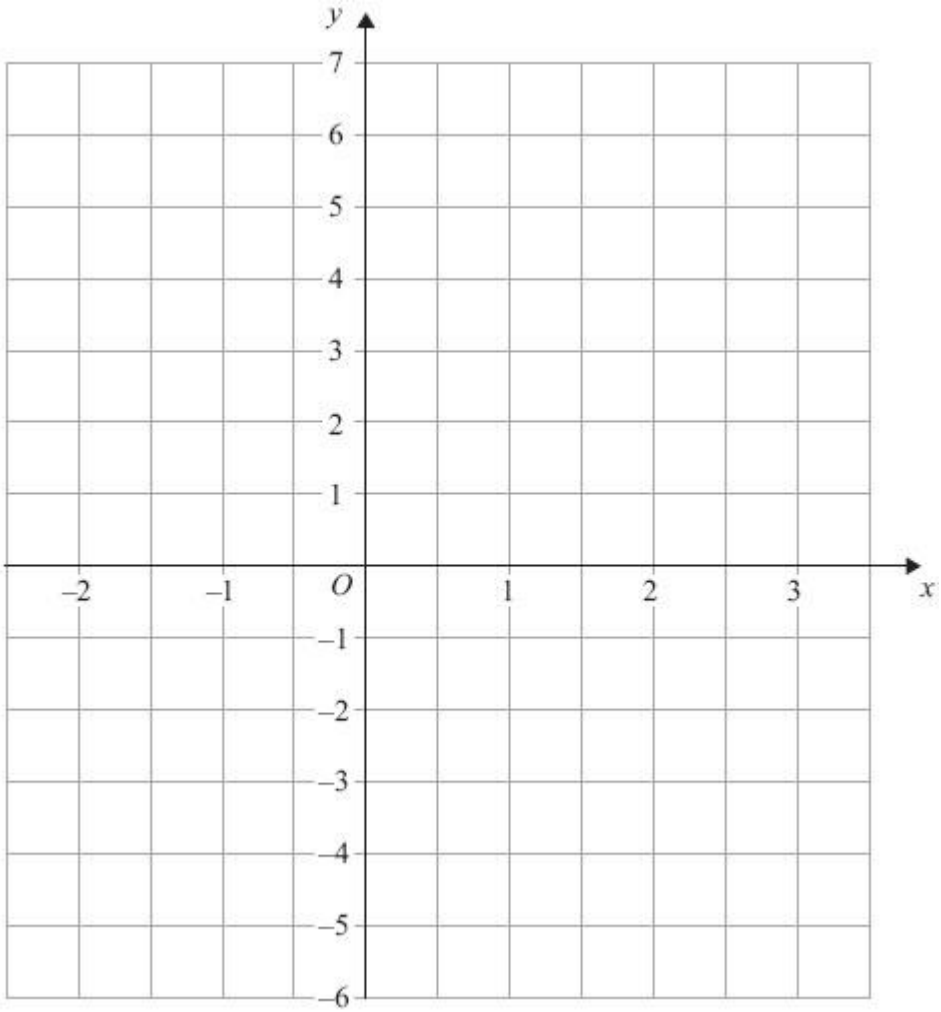
(Total for Question is 3 marks)

5. On the grid, draw the graph of $y = 2x + 3$ for values of x from $x = -3$ to $x = 1$



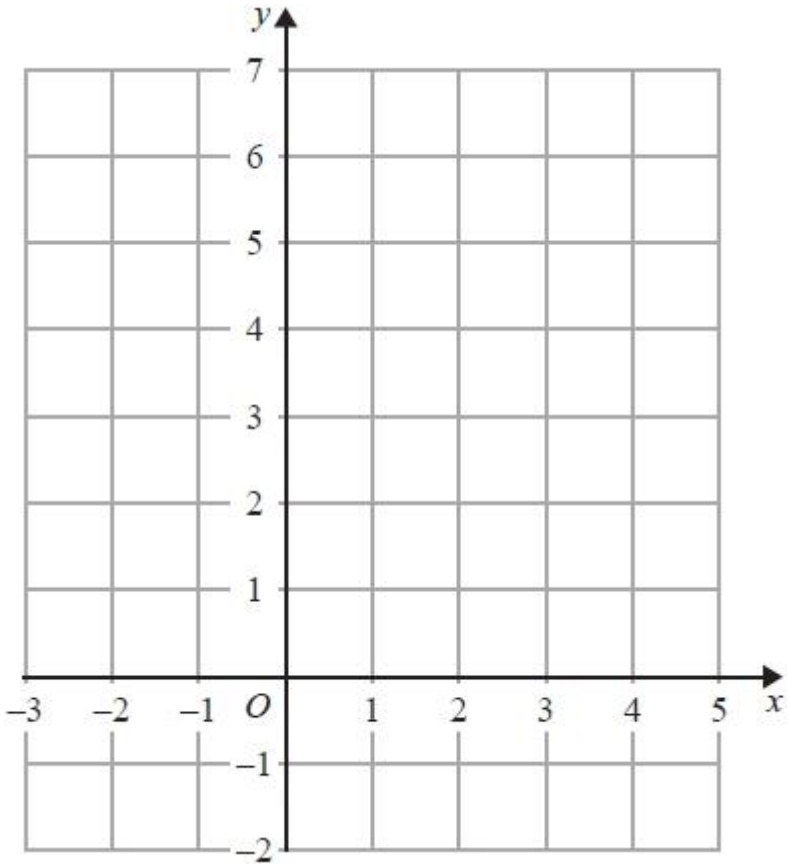
(Total for Question is 3 marks)

6. On the grid, draw the graph of $y = 2x - 1$ for values of x from –2 to 3



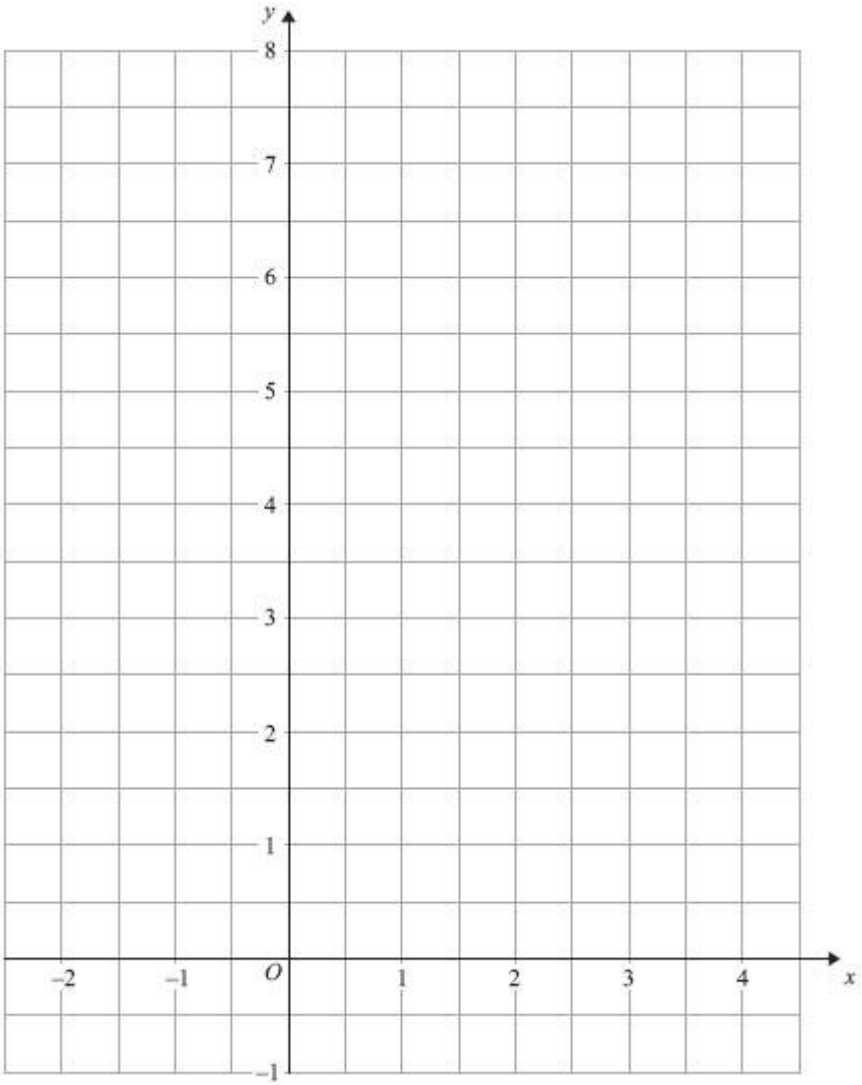
(Total for Question is 3 marks)

7. On the grid, draw the graph of $y = \frac{1}{2}x + 3$ for values of x from −2 to 4



(Total for question = 3 marks)

8. On the grid, draw the graph of $y = \frac{1}{2}x + 5$ for values of x from –2 to 4



(Total for Question is 3 marks)

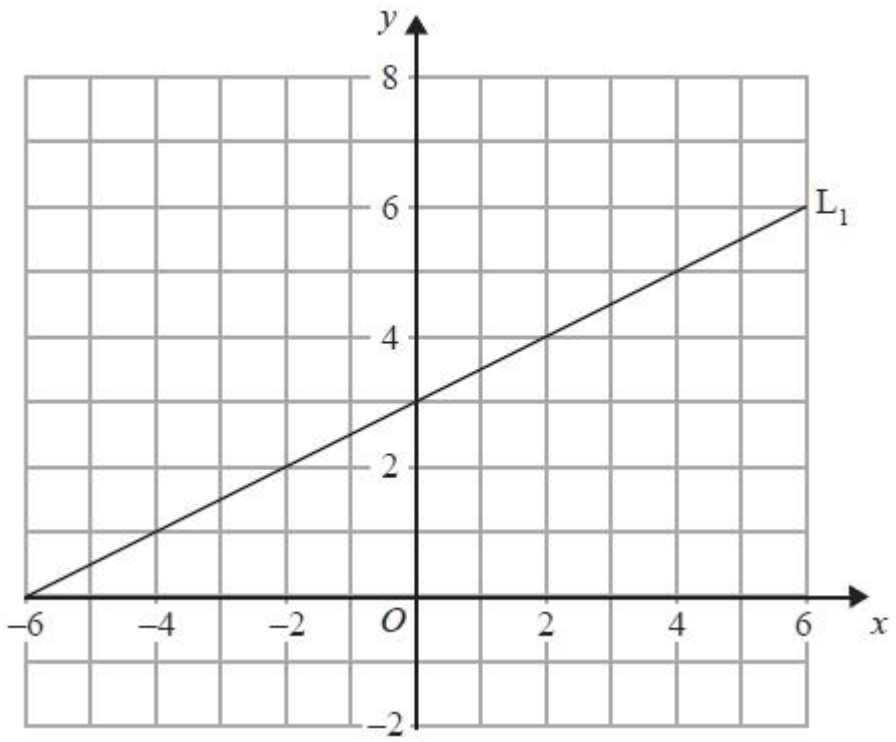
Parallel and Perpendicular Graphs

Things to remember:

- Equations of linear graphs are in the form y = mx + c, where m is the gradient and c is the y-intercept.
- Parallel graphs have the same gradient.
- Perpendicular gradients have a product of -1, eg. -2 x ½ = -1
- Once you have found the required gradient, substitute x, y (a coordinate) and m (the gradient) to calculate c (the y-intercept).

Questions:

1. The diagram shows a straight line, L_1, drawn on a grid.



A straight line, L_2, is parallel to the straight line L_1 and passes through the point (0, −5).
Find an equation of the straight line L_2.

.....

(Total for Question is 3 marks)

2. The straight line **L** has equation $y = 2x - 5$
Find an equation of the straight line parallel to **L** which passes through (−2, 3).

.....

(Total for Question is 3 marks)

3. Find an equation of the straight line that is parallel to the straight line $y = 3x - 5$ and that passes through the point (3, 7).

.....

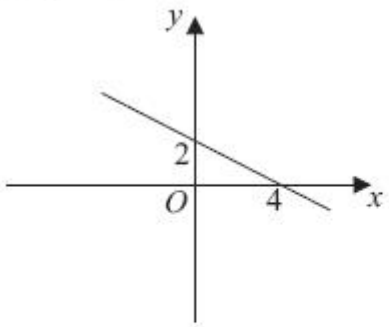
(Total for Question is 4 marks)

4. * **A** and **B** are straight lines.
Line **A** has equation $2y = 3x + 8$
Line **B** goes through the points (−1, 2) and (2, 8)
Do lines **A** and **B** intersect?
You must show all your working.

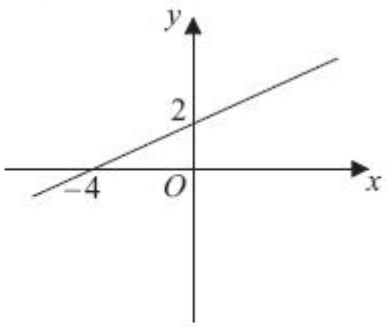
(Total for Question is 3 marks)

5. Here are the graphs of 6 straight lines.

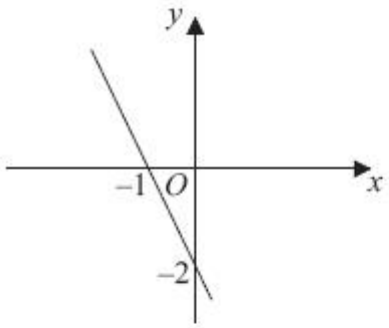
Graph **A**



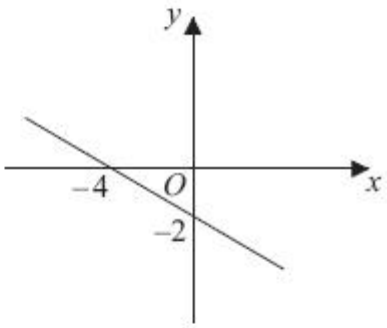
Graph **B**



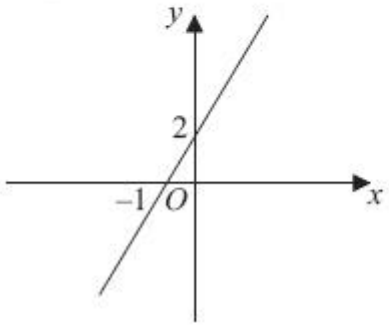
Graph **C**



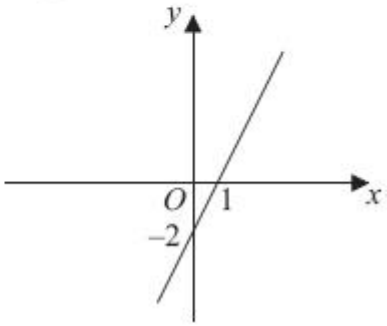
Graph **D**



Graph **E**



Graph **F**



Match each of the graphs **A**, **B**, **C**, **D**, **E** and **F** to the equations in the table.

Equation	y = ½x + 2	y = 2x - 2	y = -½x + 2	y = -2x - 2	y = 2x + 2	y = -½ - 2
Graph						

(Total for Question is 3 marks)