Core Maths
Starter for 12

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Task 1: Find an interesting use of mathematics in a newspaper article that we can critically analyse after the summer.

Task 2: Complete the following maths worksheets.

Sketching Functions

1)   a) Sketch the graph of $y = 3x - 4$ on the axes, showing clearly where it crosses the y-axis.

     b) Sketch the graph of $y = -2x + 3$ on the axes, showing clearly where it crosses the y-axis.
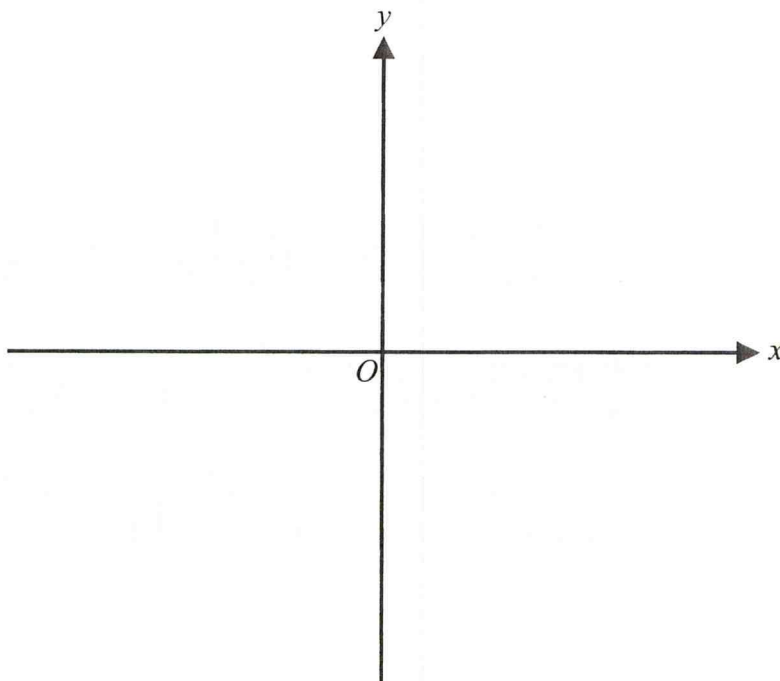
2)   a) Sketch the graph of $y = x^2 + 2$ on the axes, showing clearly where it crosses the y-axis.

     b) Sketch the graph of $y = -x^2 - 1$ on the axes, showing clearly where it crosses the y-axis.

Solving Equations and Linear Inequalities
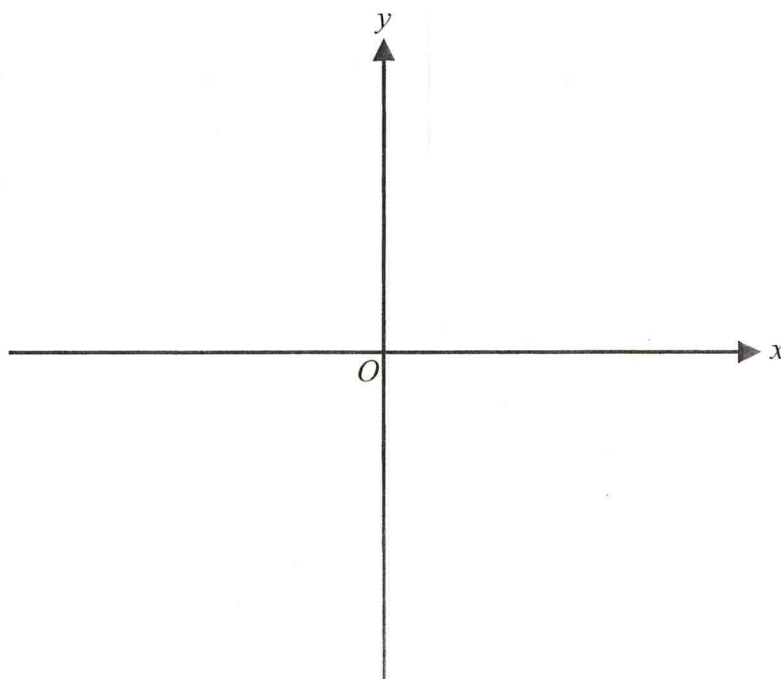
1) Solve the inequality $6x - 3 < 9$

2) Solve $4x + 1 = 2x + 12$

3) a) Solve the inequality $3t + 1 < t + 13$

   b) If $2t^2 = 72$ find a value of t

4) Solve $3(x + 2) = 8$

5) Solve the inequality $6y \geqslant y + 10$

6) Solve $4(2x - 3) = 5x + 7$

7) $h = 5t^2 + 3$
   Work out the value of t when $h = 48$

8) Solve $3(2p - 4) = 2p + 12$

9) Solve the equation $4x + 1 = 19$

10) Solve $\dfrac{29 - x}{3} = x + 5$

11) Solve $3x - 10 = x + 30$

12) Solve the inequality $3x - 2 > x + 7$
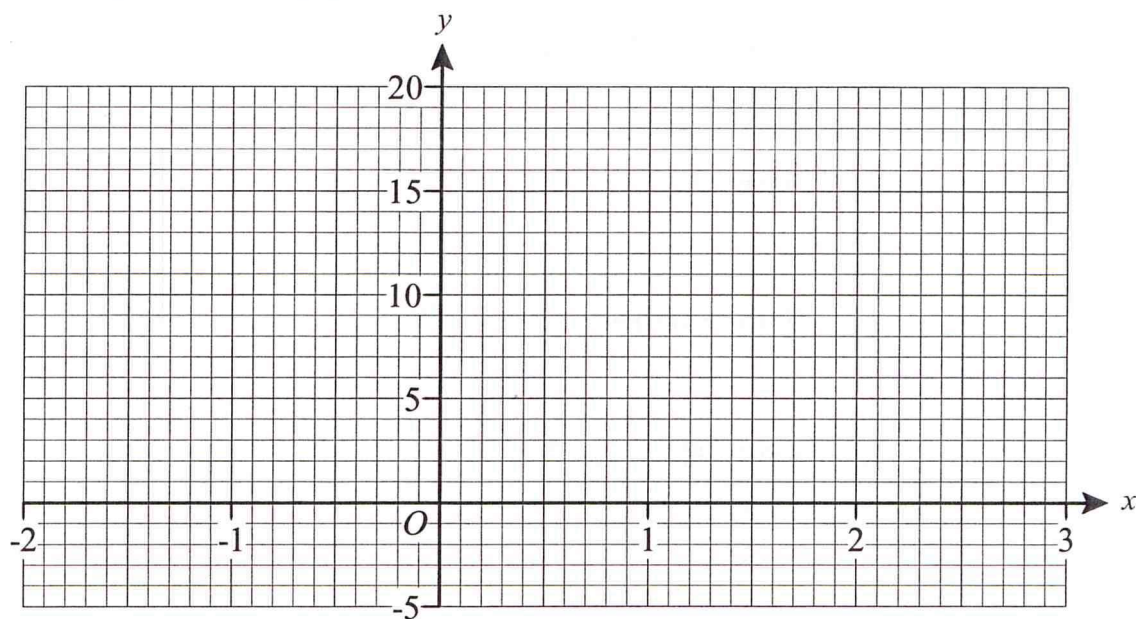
13) Solve the inequality $\dfrac{2x}{3} < 10$

1) a) Complete the table of values for $y = 2x^2 - 3x$

x	-2	-1	0	1	2	3
y	14		0			9

b) On the grid, draw the graph of $y = 2x^2 - 3x$ for values of x from -2 to 3
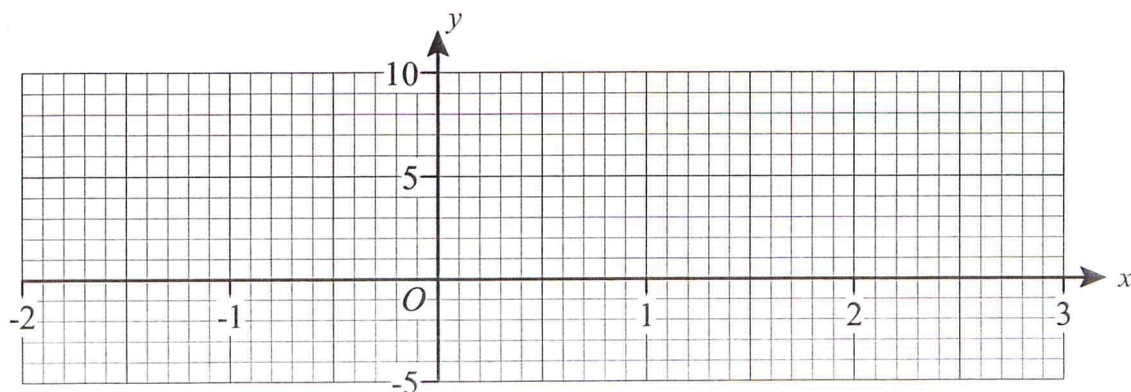

c) Use the graph to find the value of y when $x = -1.5$

d) Use the graph to find the values of x when $y = 4$

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2) a) Complete the table of values for $y = x^2 - 2x$

x	-2	-1	0	1	2	3
y	8		0			

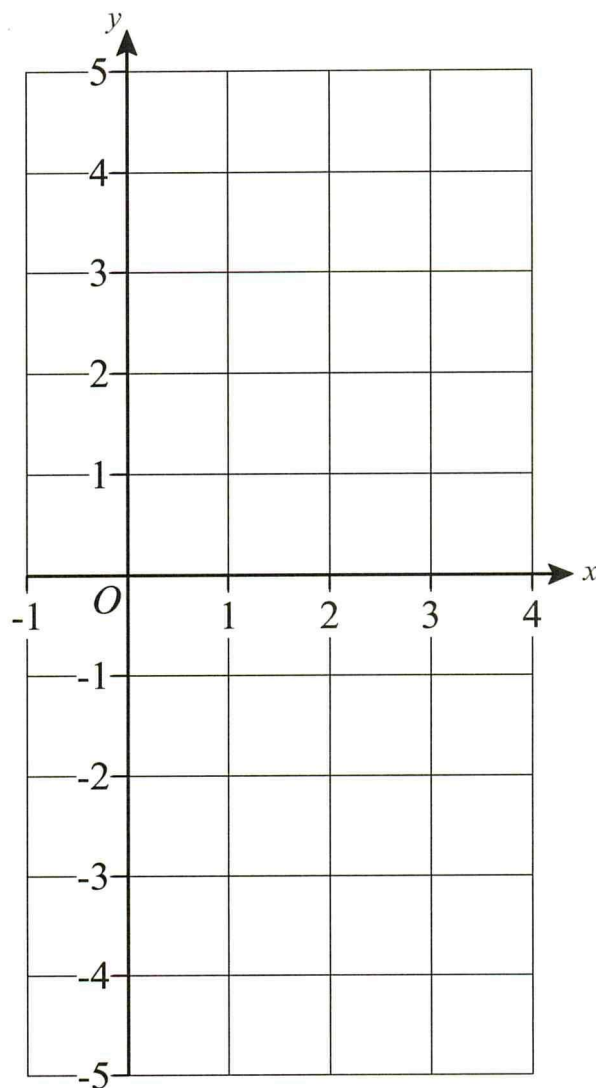b) On the grid, draw the graph of $y = x^2 - 2x$ for values of x from -2 to 3

c) (i) On the same axes draw the straight line $y = 2.5$

(ii) Write down the values of x for which $x^2 - 2x = 2.5$

1) a) Complete the table of values for $y = 2x - 3$

x	-1	0	1	2	3	4
y				1		

b) Using the axes on the right draw the graph of $y = 2x - 3$

c) Use your graph to work out the value of y when $x = 2.5$

d) Use your graph to work out the value of x when $y = 4.5$
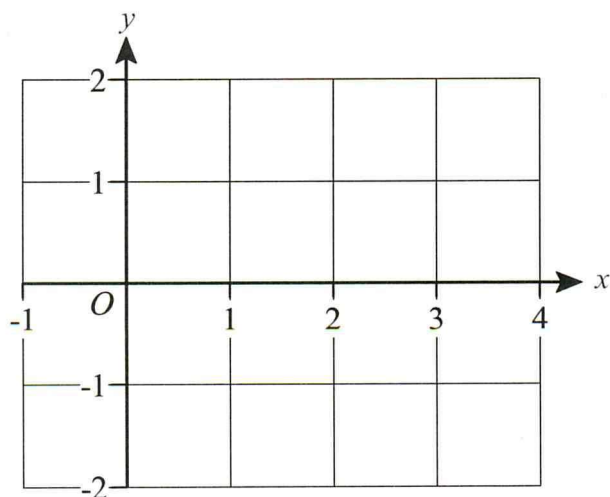
2) a) Complete the table of values for $y = 2 - x$

x	-1	0	1	2	3	4
y					-1	

b) Using the axes on the right, again, draw the graph of $y = 2 - x$

3) a) Complete the table of values for $y = \frac{1}{2}x - 1$
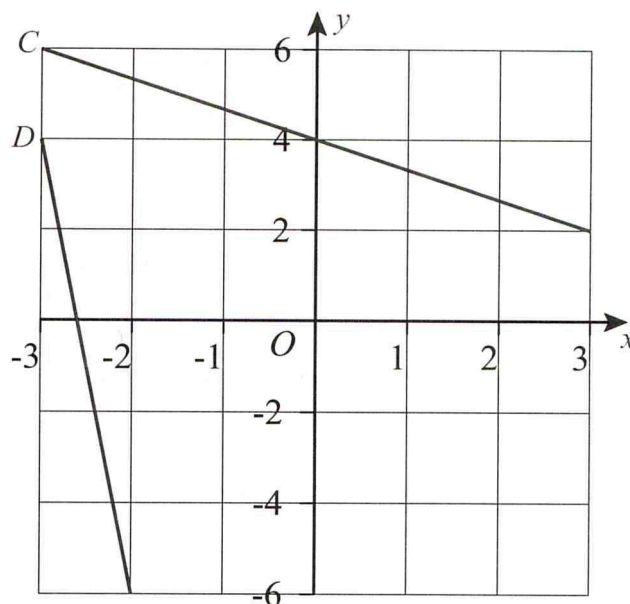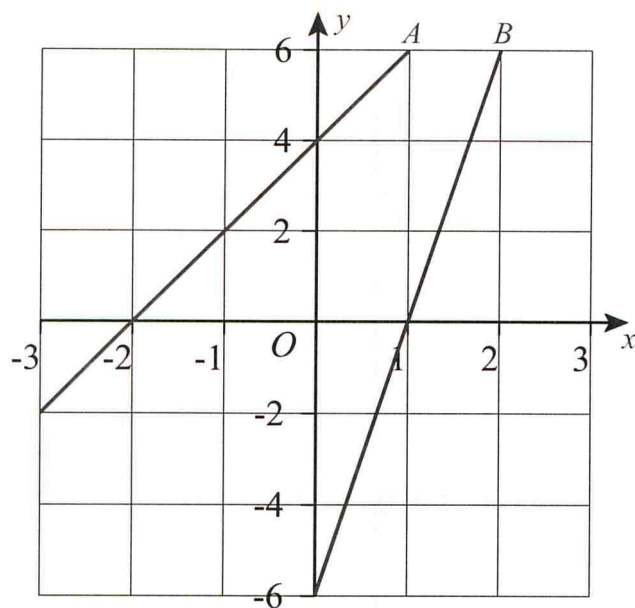
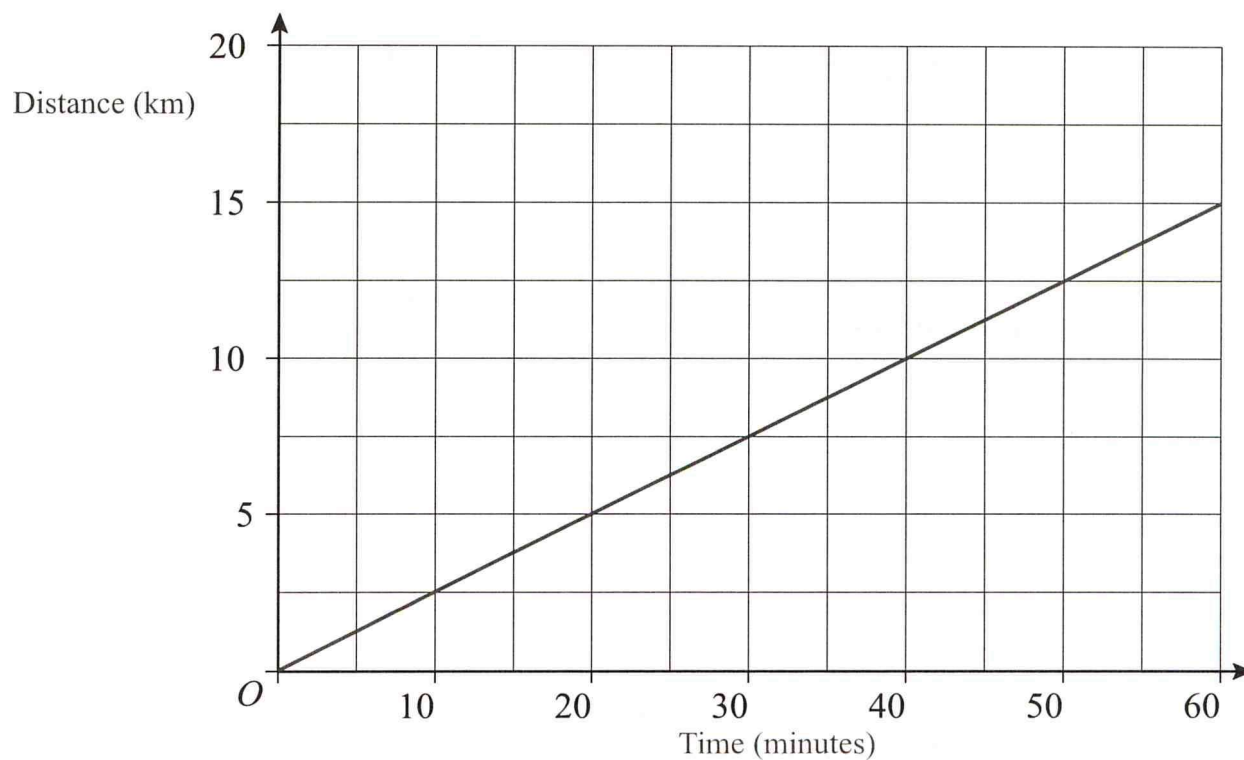b) Draw the graph of $y = \frac{1}{2}x - 1$

x	-1	0	1	2	3	4
y				0		

c) Use your graph to find the value of y when $x = 3.5$

The Gradient of a Line

1) Find the gradient of lines *A*, *B*, *C* and *D*.

2) The graph shows how Meg cycles at a constant speed for 60 minutes.

a) Find the gradient of the line.

b) What does the gradient show?

This table shows information about the time, *m* minutes, it takes to show each of 120 films.

Time (*m* minutes)	Frequency
70 < *m* ≤ 80	3
80 < *m* ≤ 90	13
90 < *m* ≤ 100	34
100 < *m* ≤ 110	32
110 < *m* ≤ 120	26
120 < *m* ≤ 130	12

a) Write down the modal class interval.

b) Complete this cumulative frequency table.

Time (*m* minutes)	Cumulative frequency
70 < *m* ≤ 80	3
70 < *m* ≤ 90	
70 < *m* ≤ 100	
70 < *m* ≤ 110	
70 < *m* ≤ 120	
70 < *m* ≤ 130	

c) On the grid, draw a cumulative frequency graph for your cumulative frequency table.
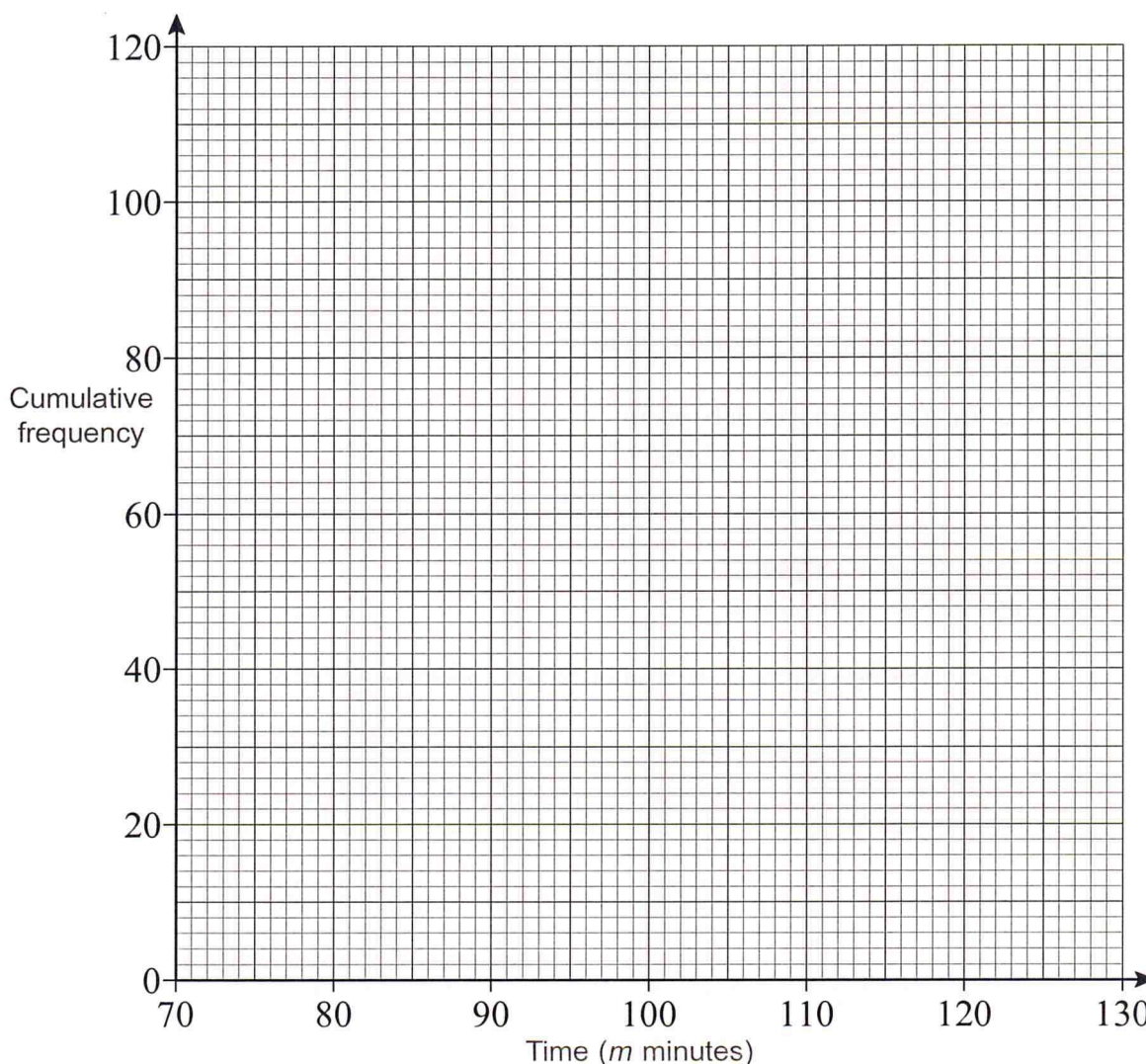
d) Use your graph to find an estimate for the median.

e) Use your graph to find an estimate for the interquartile range of times.

f) Use your graph to find an estimate for the number of films which take longer than 115 minutes to show.

1) The ages of 20 teachers are listed below.

22, 22, 24, 25, 27, 27, 28, 29, 29, 29, 34, 35, 41, 43, 44, 49, 55, 57, 58, 58

   a) On the grid below, draw a box plot to show the information about the teachers.

10   20   30   40   50   60   70
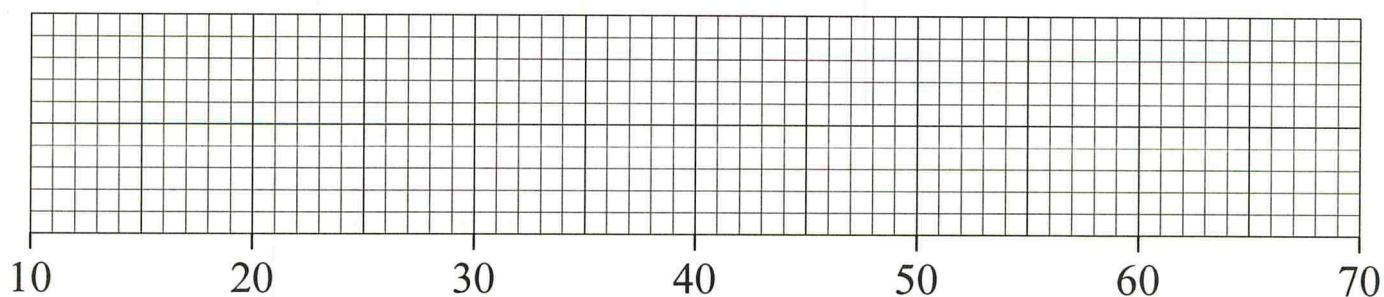
   b) What is the interquartile range of the ages of the teachers?

2) A warehouse has 60 employees working in it.

   The age of the youngest employee is 16 years.
   The age of the oldest employee is 55 years.

   The median age is 37 years.
   The lower quartile age is 29 years.
   The upper quartile age is 43 years.

   On the grid below, draw a box plot to show information about the ages of the employees.

10   20   30   40   50   60