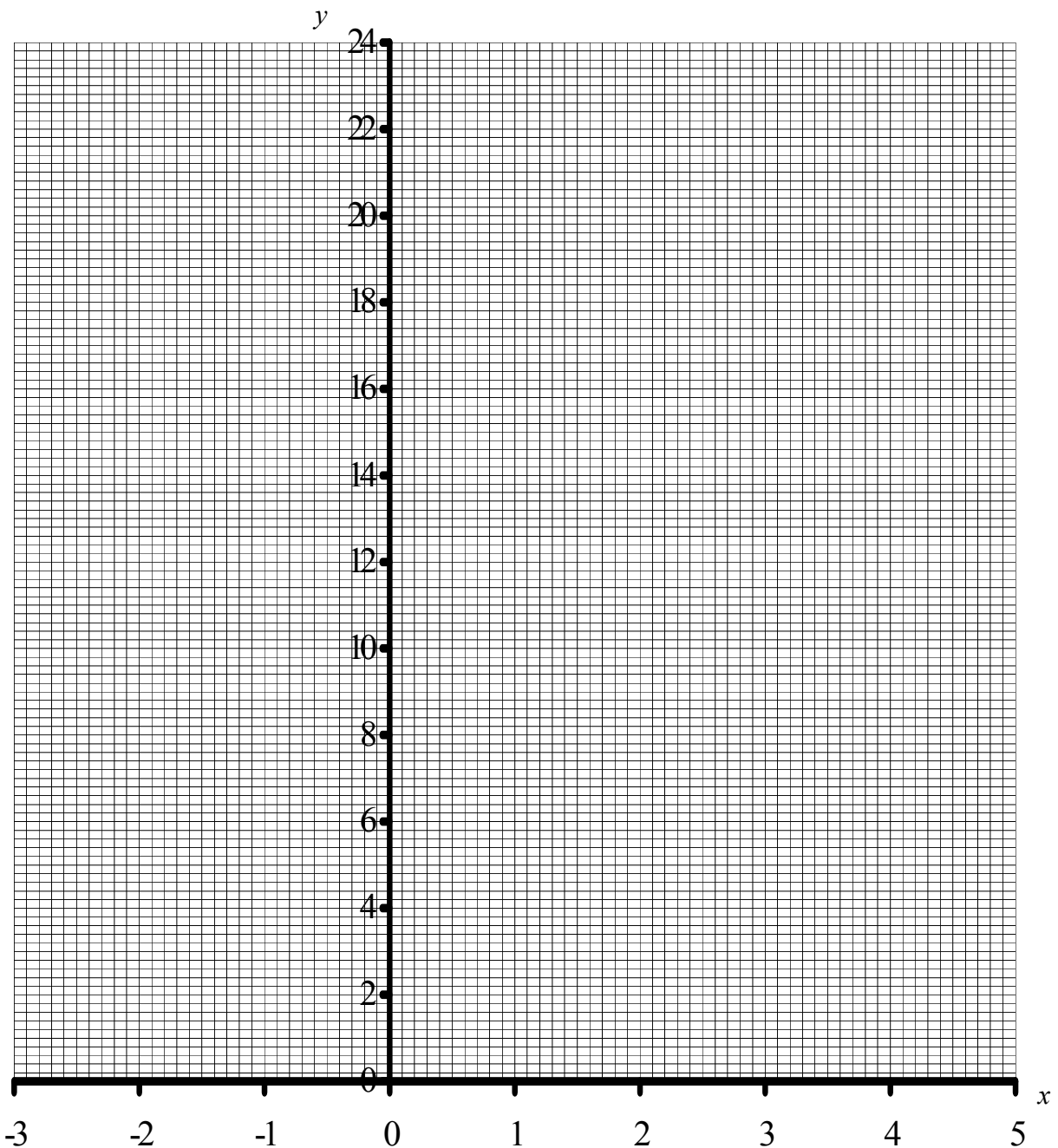


## MISCELLANEOUS REVISION QUESTIONS

1. a) Complete the following table which gives the values of  $y = 2x^2 - 5x + 3$  for values of  $x$  from  $-2$  to  $4$ .

$x$	$-2$	$-1$	$0$	$1$	$2$	$3$	$4$
$y = 2x^2 - 5x + 3$	$21$		$3$	$0$		$6$	$15$

- b) On the axes below, draw the graph of  $y = 2x^2 - 5x + 3$  for values of  $x$  from  $-2$  to  $4$ .



- c) Draw the line  $y = 8$  on the same axes (above) and write down the  $x$ -values of the points where the 2 graphs meet.
- d) Write down the equation in  $x$  whose solutions are the  $x$ -values you found in (c).

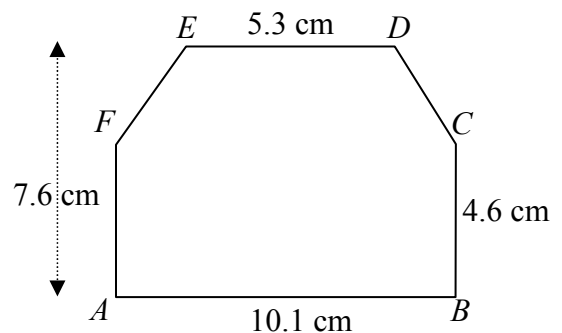


11. a) Write 180 as the product of its prime factors in index form.  
 b) Write down the square root of the number  $2^2 \times 3^4 \times 7^2$ , giving your answer as the product of prime factors in index form.
12. A dress is offered in a sale at a discount of 15%. The sale price is £21.08. What was the price of the dress before the discount?
13. Calculate the value of  $\left(\frac{w}{x} - yp\right)^{n+4}$  when  $w = 10$ ,  $x = -5$ ,  $y = -3$ ,  $p = 4$  and  $n = -2$ .
14. Simplify the following. a)  $3x^2 \times 4x^3$ ,      b)  $(2x^3)^3$ ,      c)  $\frac{16a^6b^3}{4a^3b^2}$ .
15. The diagram shows the cross-section,  $ABCDEF$ , of a metal block.  
 $AB$  and  $ED$  are parallel, with  $AB = 10.1$  cm and  $ED = 5.3$  cm.  
 $AF$  and  $BC$  are perpendicular to  $AB$  and are each 4.6 cm.  
 The perpendicular distance between  $ED$  and  $AB$  is 7.6 cm.

a) Calculate the area of cross-section of the metal block.

b) The metal block is 12.5 cm long and the density of the metal is  $2.5 \text{ g/cm}^3$ .

Calculate the mass of the metal block.



16. Discs of diameter 6 cm are cut from a rectangular plastic sheet of length 60 cm by 45 cm.

a) How many discs can be cut out?

b) Calculate the total area of all the discs that can be cut from the sheet.

c) The plastic left after the discs are cut out is wasted. What percentage of each sheet of plastic is wasted?



17. A solution of the equation  $x^3 - 2x = 15$  lies between 2 and 3. Use the method of trial and improvement to find this solution correct to one decimal place.

18. Solve the following equations.

a)  $5x + 3(x - 2) = 100 - 2(x + 3)$ ,

b)  $5x - 3(x - 2) = 30 - 3(x + 3)$ ,

c)  $\frac{5x + 4}{3} - \frac{3x + 4}{4} = 4$ ,

d)  $\frac{2x + 5}{5} - \frac{x + 2}{6} = 3$ .

19. a) Rearrange the inequality

$$4n - 4 < 20 - n$$

into the form

$$n < \underline{a \text{ number}}.$$

b) Write down the greatest whole number value of  $n$  which satisfies this inequality.

20. In a certain rectangle the length of each of the longer sides are 5 cm more than the length of each of the shorter sides. Let  $x$  cm denote the length of each of the shorter sides.

a) Write down, in terms of  $x$ , the length of each of the longer sides.

b) Write down, in terms of  $x$ , the perimeter of the rectangle. Simplify your answer as far as possible.

c) The perimeter of the rectangle is 60 cm. Write down an equation in  $x$ . Solve this equation to find the value of  $x$ .

21. A baker sells cream cakes and sticky buns. Bob buys 2 cream cakes and 3 sticky buns and pays a total of £2.40. Sarah buys 3 cream cakes and 2 sticky buns and pays a total of £2.60.

Letting  $x$  stand for the price of a cream cake and  $y$  stand for the price of a sticky bun, use the above information to write down two equations involving  $x$  and  $y$ .

Solve these equations to find the price of a cream cake and the price of a sticky bun.

**DO NOT use a trial and improvement method.**

22. Write the following numbers in standard form: a) 310, b) 25500, c) 8, d) 0.0045.

23. Work out the following, giving your answers in standard form.

a)  $(3.2 \times 10^4) \times (2.5 \times 10^3)$ ,

b)  $\frac{8.6 \times 10^6}{4.3 \times 10^{-3}}$ ,

c)  $(3.6 \times 10^5)^3$ .

24. For each of the following, expand the brackets and simplify as far as possible.

a)  $(x + 3)(3x - 2)$ ,

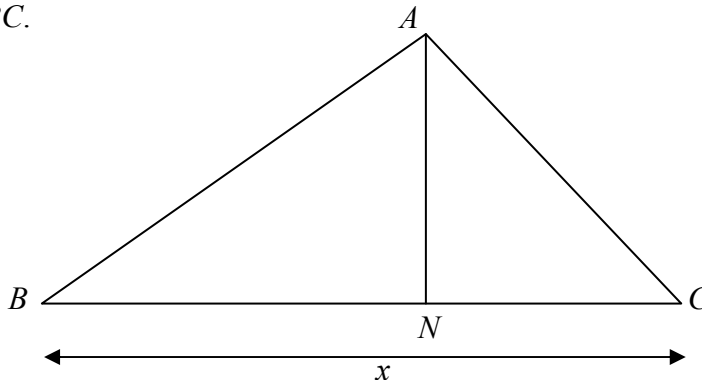
b)  $(2x - 1)(4x - 5)$ ,

c)  $(2x + 1)^2$ ,

d)  $(3x + 2y)(2x - y)$ .

25. Solve the following equations.  
 a)  $x^2 + 6x + 5 = 0$ ,                      b)  $x^2 - 5x + 4 = 0$ ,                      c)  $x^2 - 2x - 24 = 0$ .

26. The area of a triangle  $ABC$  is  $20 \text{ cm}^2$ . The length of its side  $BC$  is  $x \text{ cm}$  long. The perpendicular height  $AN$  is  $3 \text{ cm}$  shorter than  $BC$ .

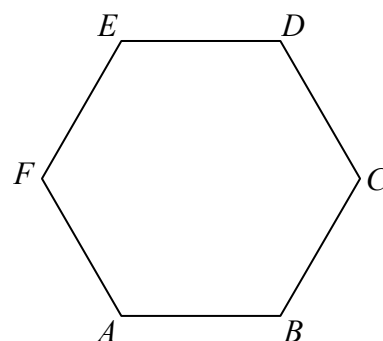


- a) Showing all your working, prove that  $x$  satisfies the equation  $x^2 - 3x - 40 = 0$ .  
 b) Solve the equation and write down the length of the side  $BC$  of the triangle.

27. Make  $c$  the subject of the following equation.  $\frac{bc^2}{d} = 10$ .

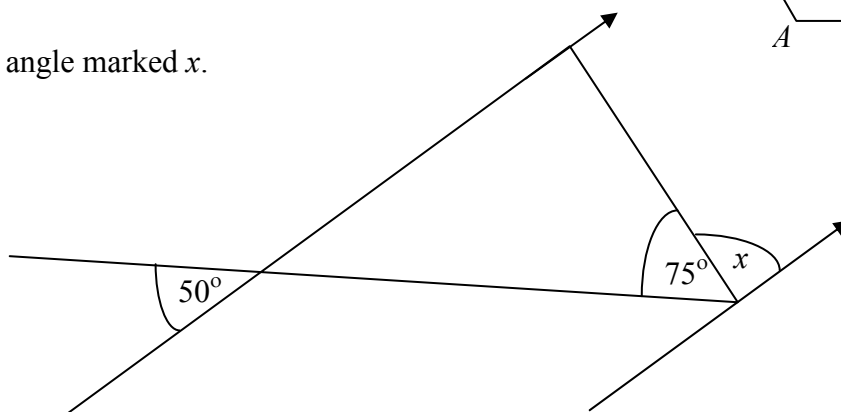
28. a) Mariane worked for a firm that pays her  $\pounds x$  per hour for work done during Monday to Friday. How much was she paid for 40 hours of work during Monday to Friday?  
 b) On Sundays she gets paid at three times the Monday to Friday rate. How much was she paid for working a total of 8 hours during Sunday?  
 c) How much was Mariane paid altogether, giving your answer in its simplest form.  
 d) Christopher was paid  $\pounds 1$  per hour more than Mariane. How much was Christopher paid for 6 hours worked on a Monday?

29. The following shows a regular hexagon,  $ABCDEF$ .  
 Point  $B$  is due east of  $A$  and due south of  $D$ ,

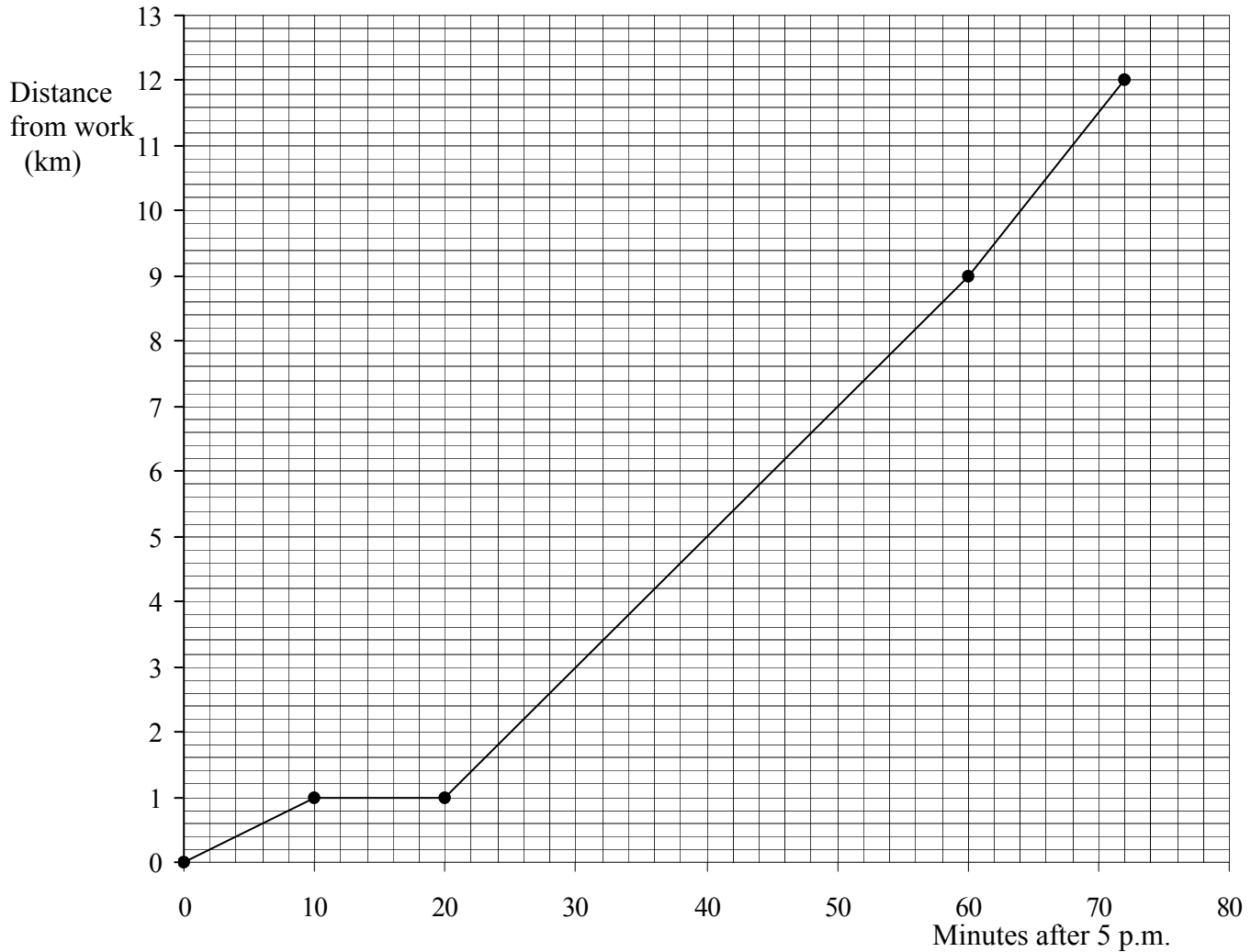


- i) What is the bearing of  $C$  from  $B$ ?  
 ii) What is the bearing of  $E$  from  $C$ .

30. Calculate the angle marked  $x$ .



31. Matthew leaves work at 5 p.m. and travels the 12 km home. The graph below shows the different stages of his journey.



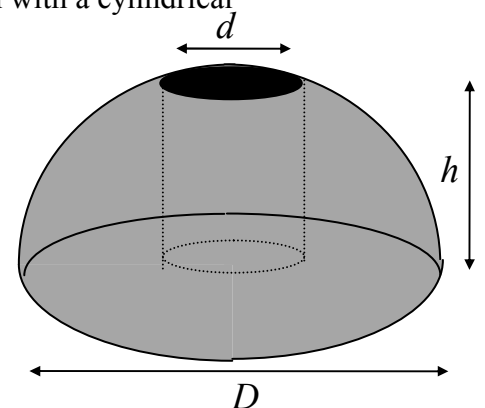
- a) The first part of Matthew's journey involved walking to a bus stop. How fast did Matthew walk?

The remainder of the journey involved a bus journey followed by Matthew cycling to his house.

- b) How far was the bus journey?  
 c) What was the average speed of the bus?  
 d) At what time did Matthew arrive home?  
 e) At 5.20 p.m., Matthew's sister, Sarah, left home and cycled towards Matthew's place of work at an average speed of 10 km/h. Draw the graph of Sarah's journey on the graph above.  
 f) At what time did Sarah and Matthew pass each other?

32. A pressure washer is a section from a hemisphere of diameter  $D$  cm with a cylindrical hole of diameter  $d$  cm in it. It is  $h$  cm high.

- a) Explain why the formula  $A = 2\pi(d + D + h)$  could not be used to work out the curved surface area of the pressure washer.



b) Which of the following could be the formula for its curved surface area?

$$A = 0.5\pi(D + d + h)$$

$$A = 0.25\pi h(D^2 + d^2)$$

$$A = 0.25Ddh$$

$$A = \pi h(D + d).$$

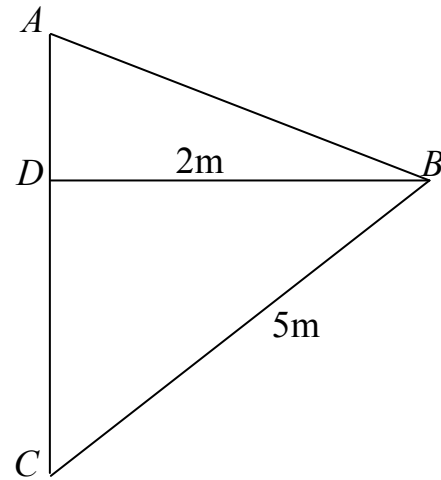
33. This diagram shows the design for a sail. Angles  $ABC$  and  $ADB$  are right angles.  $BC$  is 5 metres long and  $BD$  is 2 metres long.

a) Calculate the length of  $DC$ .

b) Calculate the size of angle  $CBD$ .

c) Calculate the length of  $AD$ .

d) What is the length of  $AC$ .



34. On graph paper, draw a set of axes with  $x$  from  $-2$  to  $5$  and  $y$  from  $-2$  to  $12$ .

i) Draw the following graphs on the same axes: a)  $x = 1$ , b)  $2x + y = 8$ .

ii) Indicate, by shading the unwanted region, the set of points satisfying:

$$x > 1, \quad y > 0, \quad 2x + y < 8.$$

iii) Use your graph to write down all **integer** pairs of numbers  $x$  and  $y$  satisfying the inequalities above.

35. a) 'Fitite Toys' make cubes of side  $5.7$  cm, correct to 1 decimal place. Write down the range of possible values for the width of a cube.

b) Six of these cubes are placed side by side in a row. Calculate the range of possible values for the length of the row of six cubes.

c) Box  $A$  has a width of  $34$  cm and box  $B$  has a width of  $35$  cm, both measured to the nearest cm. Explain why you may not always be able to get the row of six cubes into box  $A$  along its width, but you should be able to get the row of six into box  $B$ .

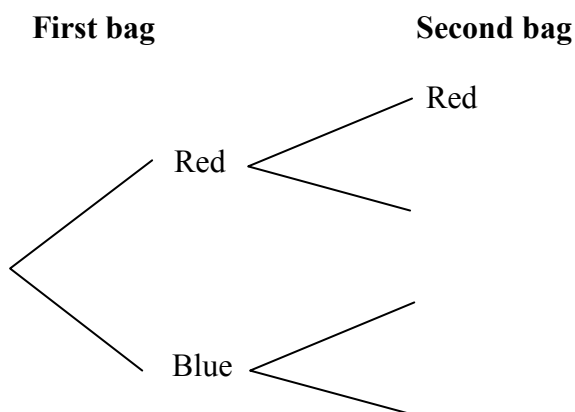
36. At a fair ground game, contestants spin a wheel and win an amount as shown in the following table.

	20 p	50 p	£1	£2
Probability	0.26	0.14	0.10	0.05

a) What is the probability that a contestant loses?

b) On a particular day, 400 people each play the game once. How many are likely to win exactly 50 pence?

37. At a school fete, contestants play a game with a probability of 0.45 of winning.
- If 300 people play the game, how many are likely to lose?
  - The cost of one turn of the game is 10 pence and if a contestant wins, he/she receives 20 pence. How much profit is the game likely to make if 300 people play the game?
38. a) A bag contains 4 red balls and 6 blue balls. Another bag contains 3 red and 5 blue balls. John takes one ball from each bag without looking. Complete this tree diagram to show the possible outcomes and their probabilities.



- What is the probability that John takes                      i) two reds,                      ii) exactly one red?
39. A biologist measures the heights of 100 shrubs to the nearest cm. The following table shows her results.

Height (to nearest cm)	1 to 5	6 to 10	11 to 15	16 to 20	21 to 30
Frequency	22	9	20	19	30

- Calculate an estimate of the mean height of the trees in the sample.
  - Draw a frequency polygon to show the biologist's results.
40. The following table shows the scores obtained by a group of students in a Physics test.

Mark	20 to 39	40 to 59	60 to 69	70 to 79	80 to 89	90 to 99
Frequency	4	9	10	9	5	3

- a) Copy and complete the table below to show the cumulative frequencies for these results.

Mark	40	60	70	80	90	100
Cumulative Frequency						

- On graph paper**, draw the cumulative frequency graph of the test scores.
- Use your graph to estimate the Median, the Lower Quartile, the Upper Quartile and the Interquartile range of the test scores.
- The top 60% of pupils passed the test. What was the pass mark?