1. Jim throws a biased coin 532 times. It lands heads 302 times.
   a) Estimate the probability that the next throw will be heads. Give your answer to 2 decimal places. [2]
   Jim throws the coin a further 100 times and it lands heads 56 times.
   Jim says that the probability that the coin will land heads on *any* throw is 0.56.
   b) Explain why this is not the best estimate that the coin will land heads. [1]

2. a) Write 0.235 as a simplified fraction. [1]
   A pair of trousers costs £122 before a 30% discount is applied.
   b) Calculate the cost of the trousers after the discount. £ [3]
   A computer cost £865 plus VAT at 17.5%.
   c) Calculate the cost of the computer after VAT has been added to the nearest penny. £ [3]

3. The exchange rate for US dollars and Euros is such that $1 = 0.45Euros.
   a) How many Euros can you get for $22? Euros [2]
   b) How many dollars can you get for 1 Euro? Give your answer to 2 decimal places. $ [2]

4. **Copy this shape onto squared cm paper**. Make your shape three times larger. [2]

   Use squared cm paper, squares with side 1cm.

   not to scale
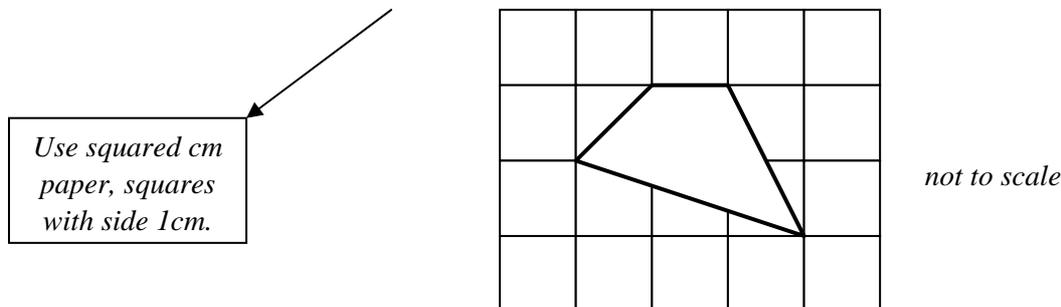
5. **'Double the number, and add 45'**

   Using the above rule, calculate the answer when we start with–
   a) i) 5 [1]
   　 ii) x [2]
   b) i) If the answer is 1000 when using the above rule, what did we start with? [2]
   　 ii) If the answer is y when using the above rule, what did we start with? [2]

   "The rule 'Double and add 45' is equivalent to the rule 'Add 45 and double'"

   c) Do you agree or disagree with this statement? Justify your answer. [1]

6. A hiker walks 47 miles and drinks 3 gallons of water.
   Estimate the number of kilometres the hiker walks and the volume of water he drinks in litres. [4]

7. The area of this right angled triangle is 40cm^2.
   Calculate the height of the triangle.
   Give your answer to 2 decimal places.

   height ... 9cm ... cm [2]
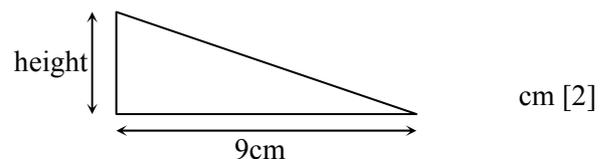
8. Four squares are cut from a big square to make the following shape.

   a) i) Find the perimeter of this shape. [1]
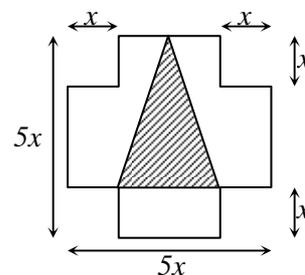   　 ii) Find the area of this shape. [2]
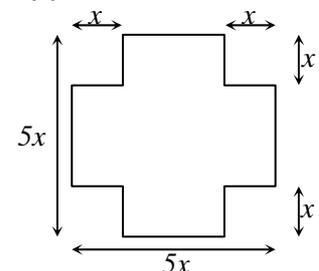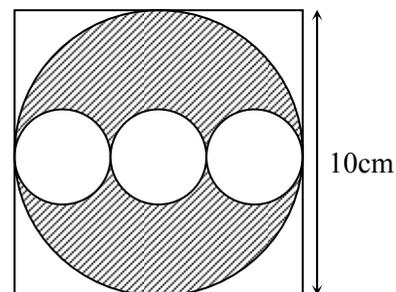
A triangle is constructed as shown.
b)   Calculate the area of the shaded triangle.   [3]

A student says that the perimeter of the triangle is $11x$.
c)   Do you agree with them? Justify your answer.   [1]

9.   The diagram shows some circles inside a square of side 10cm.
Calculate the shaded area using $\pi = 3.14$.
Give your answer to 1 decimal place.

cm^2 [6]

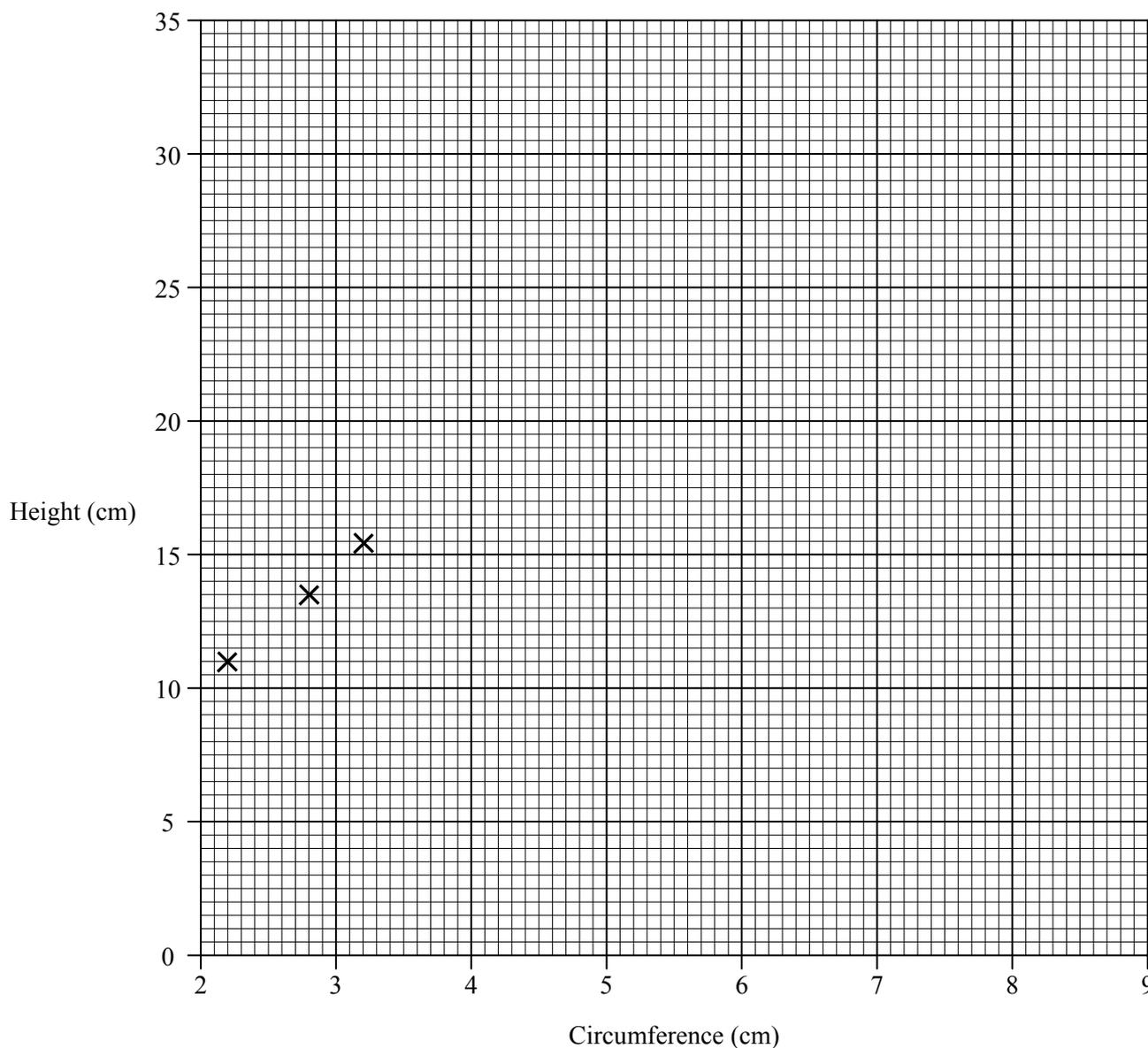**10.**   The height of a particular type of plant is compared to the circumference around its stalk.

Circumference in cm	2.2	2.8	3.2	3.4	4.0	5.0	5.5	6.0
Height in cm	11.0	13.5	15.5	18.5	20.0	26.0	30.0	31.0

a)   **Copy** and complete the scatter diagram for the information in the table.   [2]

Height (cm)

Circumference (cm)

b)   i)   Draw a line of best fit on the scatter diagram.   [2]
            Another plant of the same type has a height of 23.0cm.
      ii)   Estimate from your line the circumference of the stalk of this plant.   [2]

c)   A student has grown a plant of the same type, 100cm high. Explain why it might not be wise to
      use the information in the table or from the graph to estimate the circumference of this plant's stalk.
                                                                                                                                [1]

11.   100 plant seeds were divided into 2 groups, A and B.
      Group A was grown in field A. Group B was grown in field B.
      The box and whisker plots of the heights of the plants are shown below.

Height (cm)
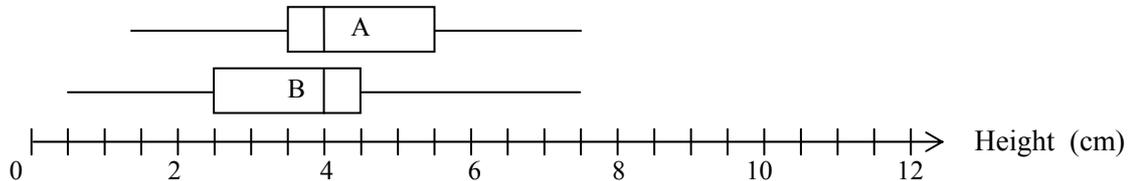
      Comment on three statistical features that are the same between the two groups.   4 marks

12.   Find length AB to 2 decimal places.   7 marks
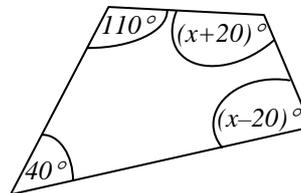

13.   Simplify the expressions
      a) $x^5 \times x^6 \times y \times y^3$

      b) $\dfrac{6y^5}{2y}$

      c) $(y^6)^4$ 4 marks

14.   a)   Formulate an equation in x.
      b)   Solve your equation to find x.   5 marks

15.   A biased 4 sided die was thrown 100 times and the results are summarised in the table below.
      a)   Calculate the median score.
      b)   Estimate the probability that the next throw of the dice is a 1.

                                                                                                                        3 marks

SCORE	FREQUENCY
1	11
2	19
3	32
4	38

16.   a)   Calculate angle BDC.
      b)   i)   Write down angle ABO justifying your answer.
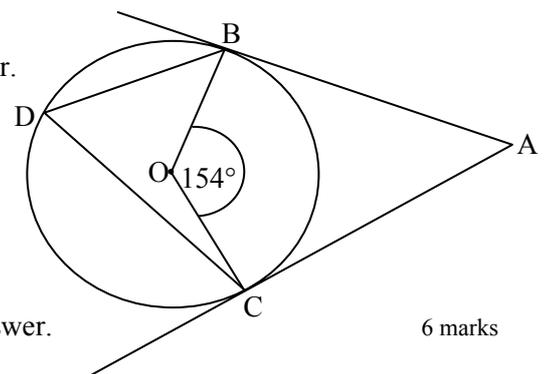   ii)   Calculate angle BAC.

      A student says that BCDO is a cyclic quadrilateral.
      c)   Are they correct? Justify your answer.

      ABOC is a special type of quadrilateral.
      d)   What type of quadrilateral is ABOC? Justify your answer.   6 marks

17. Two points A and B are approximately 9cm apart.

Draw two points roughly 9cm apart and label the points A and B.
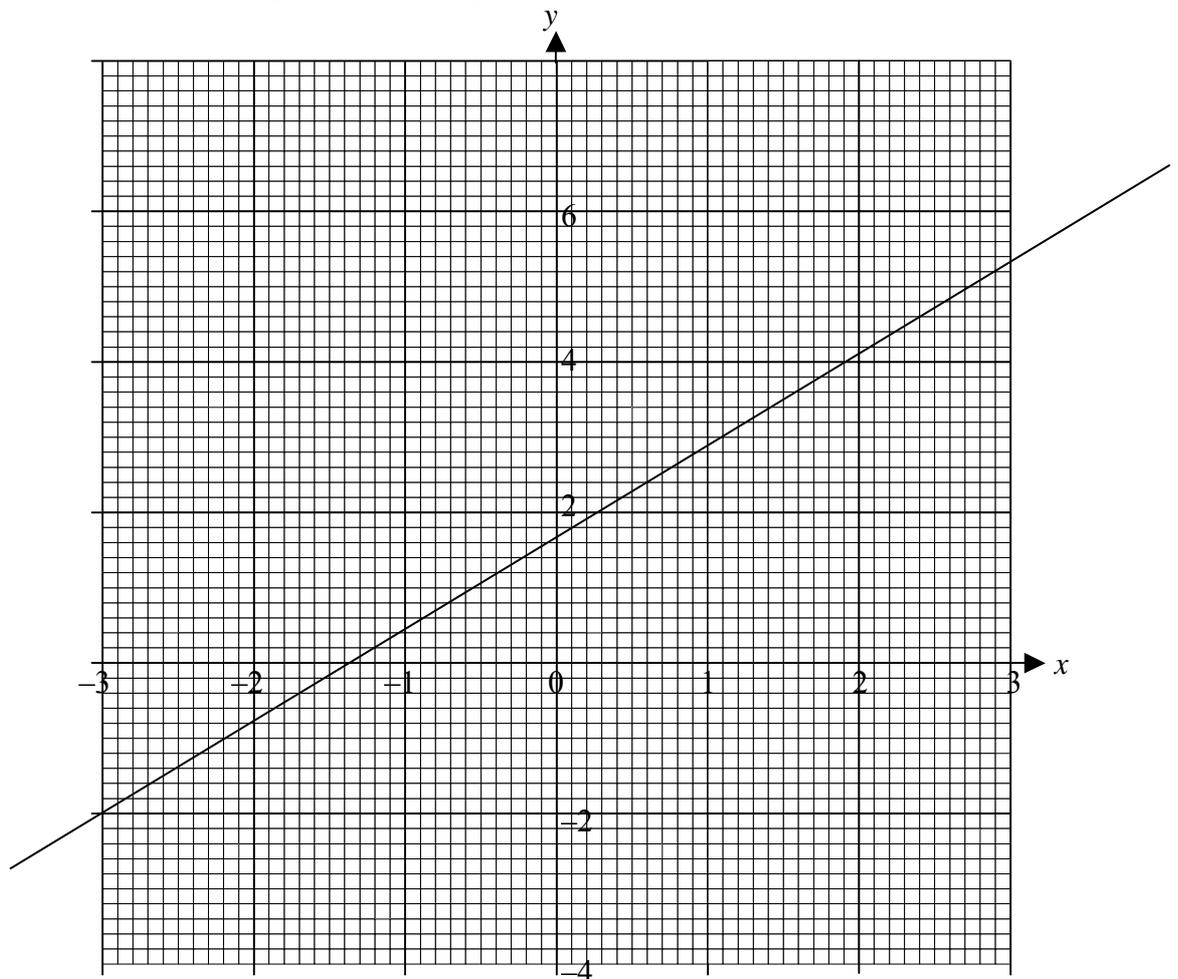Ensure that AB is not horizontal or vertical.

By construction, using a straight edge and compasses only,
find the mid-point of AB.

3 marks

18. Estimate the equation of the graph of the straight line shown. 6 marks

19. a) Copy and complete the table of values for y = x^3.

x	−3	−2	−1	0	1	2	3
y = x^3				0	1	8	

b) Using your table of values, draw a graph of y = x^3. 6 marks

20. Make 'w' the subject of the following formulae
   a) $s = w(r - 14)$
   b) $p = qw^3$
   c) $vw = w + 2$ 6 marks