SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010
Directorate for Quality and Standards in Education
Educational Assessment Unit
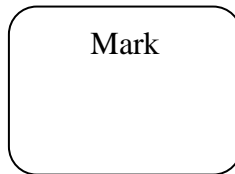
A

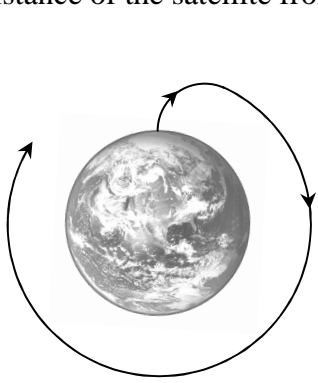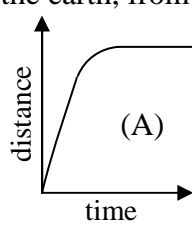| **FORM 4**	**MATHEMATICS SCHEME A** **Non-Calculator Paper**	**TIME: 20 minutes**
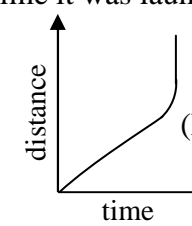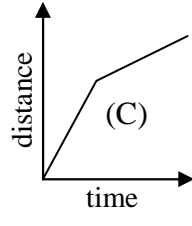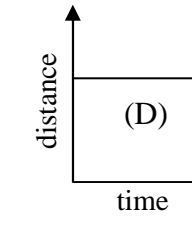
Name _____   **Class**_____

Mark

Instructions to Candidates

- Answer all questions. There are 20 questions to answer.

- Each question carries 1 mark.

- Calculators and protractors are not allowed.

- You are not required to show your working. However space for working is provided if you need it.

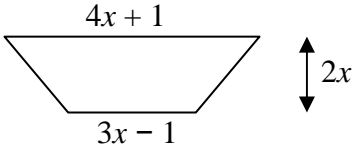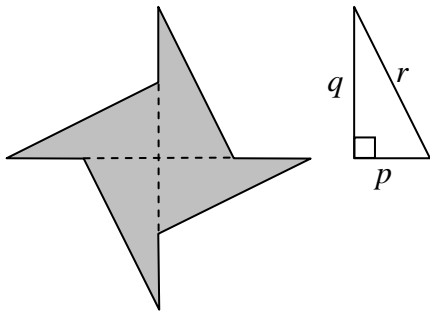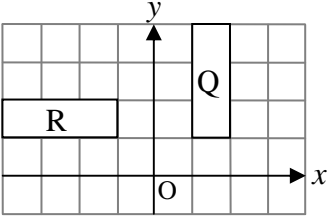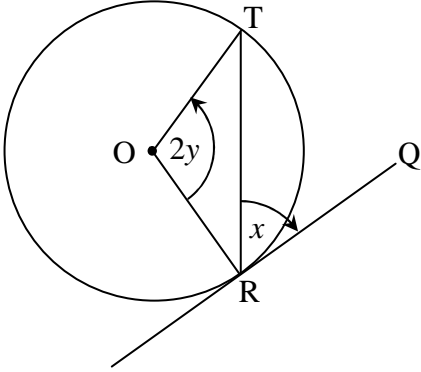| No.	QUESTION	Space for Working if Required
1	Write in **descending** order: 9^4 , 3^5 , 27^2 , 81 . **Ans:** ____ , ____ , ____ , ____.	
2	Factorise: $9x^2 - 4y^2$ **Ans:**_____	
3	Express $0{\cdot}007$ km^2 in m^2. **Ans:**_____m^2	
4	The area of uniform cross section of a prism-shaped container is 400 cm^2. Calculate the **length** of the prism if it has a capacity of 30 litres. **Ans:**_____cm	
5	Make a the subject of the formula: $b = \sqrt{x - a}$ **Ans:**_____	
6	The points $(0, 2)$, $(1, 4)$, $(2, 6)$ and $(7, n)$ all lie on the same straight line. What is the value of n? **Ans:**_____	
7	A satellite is launched from the earth. At a certain height it starts to orbit the earth as shown in the diagram. Which graph represents the distance of the satellite from the earth, from the time it was launched? (A) (B) (C) (D) **Ans:**_____	

8	Calculate the **overall percentage change**: A 40% increase and then a 30% decrease. Ans:_____	
9	Simplify: $\sqrt{\dfrac{100a^2b^4}{c^6}}$ Ans:_____	
10	Evaluate: $\left(\dfrac{2}{3}\right)^{-2} + \dfrac{1}{(3^0 + 3^{-1})}$ Ans :_____	
11	Expand and simplify: $(5x - 1)^2$ Ans:_____	
12	Find and simplify an expression for the **area** of this trapezium. $4x + 1$ $2x$ $3x - 1$ Ans:_____	
13	The shaded design is made up from four of the triangle shown. What is the **perimeter** of the shape? q r p A) $4p + 4q + 4r$ B) $4r + 4q - 4p$ C) $4p - 4q - 4r$ D) $4r - 4q + 4p$ Ans:_____	
14	The minute hand of a clock is 10 cm long. Which one of the following is the distance travelled by the tip of the minute hand in 24 minutes, correct to the nearest cm? (A) 35 cm (B) 30 cm (C) 25 cm (D) 20 cm Ans:_____	

15	Describe **fully** the single transformation from R to Q.

Ans:_____

16	QR is a tangent to the circle centre O. TR is a chord. The angle marked x is equal to: A) $180° - 2y$ B) y C) $4y$ D) $2y$	

Ans:_____

17	The mass of a house mouse is $1{\cdot}2 \times 10^{-2}$ kg while that of an elephant is $6{\cdot}0 \times 10^{3}$ kg. Complete: The mass of an elephant is _____ times the mass of a house mouse.

18	Solve the equation: $5(2x + 3) = 7(x + 6)$

Ans:_____

19	A rectangular room is 360 cm long and 336 cm wide. Its floor has to be covered with **square** tiles. What is the **length** of the largest tile that can be used?

Ans:_____cm

20	This frequency table shows the distribution of marks in a test of a group of students. Which **class interval** contains the **median** mark?

Marks	1 – 5	6 – 10	11 – 15	16 – 20
Frequency	2	3	6	8

Ans:_____

FORM 4   **MATHEMATICS SCHEME A**   **TIME: 1h 40min**
Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Main	Non-Calculator	**Global Mark**
Mark																

DO NOT WRITE ABOVE THIS LINE

Name: _____   **Class:** _____

- Answer all questions.

- This paper carries 80 marks.

- Calculators and mathematical instruments are allowed but all necessary working must be shown.

---

1) Christian invested €800 into a bank account which paid 3% interest per annum. He left the money in the account.
   a) Calculate the final amount after 2 years.

   Ans: _____

   b) For how many complete years will he have to leave the money in the account for the amount to become at least €955?

   Ans:_____

   (4 marks)

2)

a) Solve the equation: $\dfrac{3x-2}{5} + \dfrac{x+2}{2} = 5$

Ans:_____

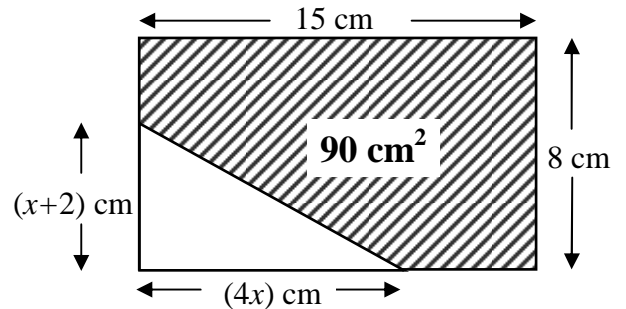b) Solve the equation $2x^2 + 5x - 1 = 0$ giving your answers correct to 2 decimal places.

Ans:_____

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(7 marks)

_____

3) A right angled triangle is cut from the corner of a rectangular piece of card 15 cm by 8 cm. The base of the triangle is $4x$ cm and its height is $(x + 2)$ cm. The remaining (shaded) part of the card has an area of 90 cm^2.

a) Find the area of the triangle in terms of x.

Ans:_____

b) i) Show that: $x^2 + 2x - 15 = 0$ (ii) Solve the equation in (i).

Ans:_____   Ans:_____

c) Find the area of the triangle.

Ans:_____

(8 marks)

_____

4) ABC is a triangular field where AB = 157 m and BC = 98 m. B is on a bearing of 124° from A.
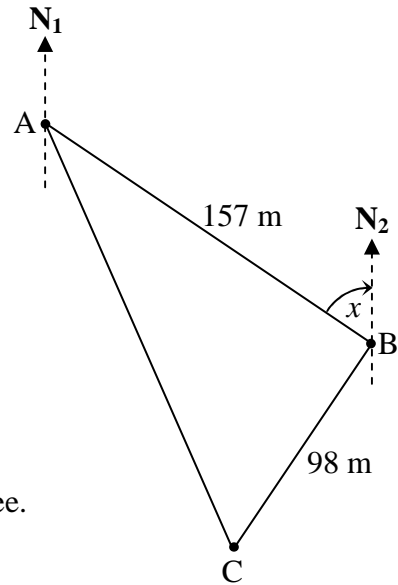C is on a bearing of 214° from B.

a) Find the angle marked *x*.

Ans:_____
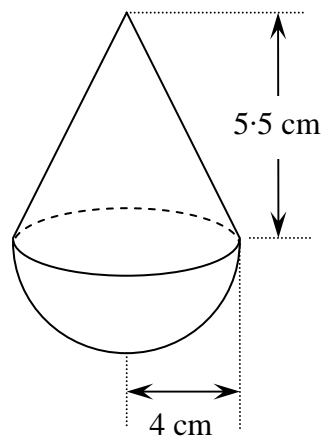
b) Calculate ∠ABC.

Ans:_____

c) Calculate the bearing of C from A correct to the nearest degree.

Ans:_____

(5 marks)

_____

5) A spinning top is made up of a hemisphere of radius 4 cm and a cone of base radius 4 cm and height
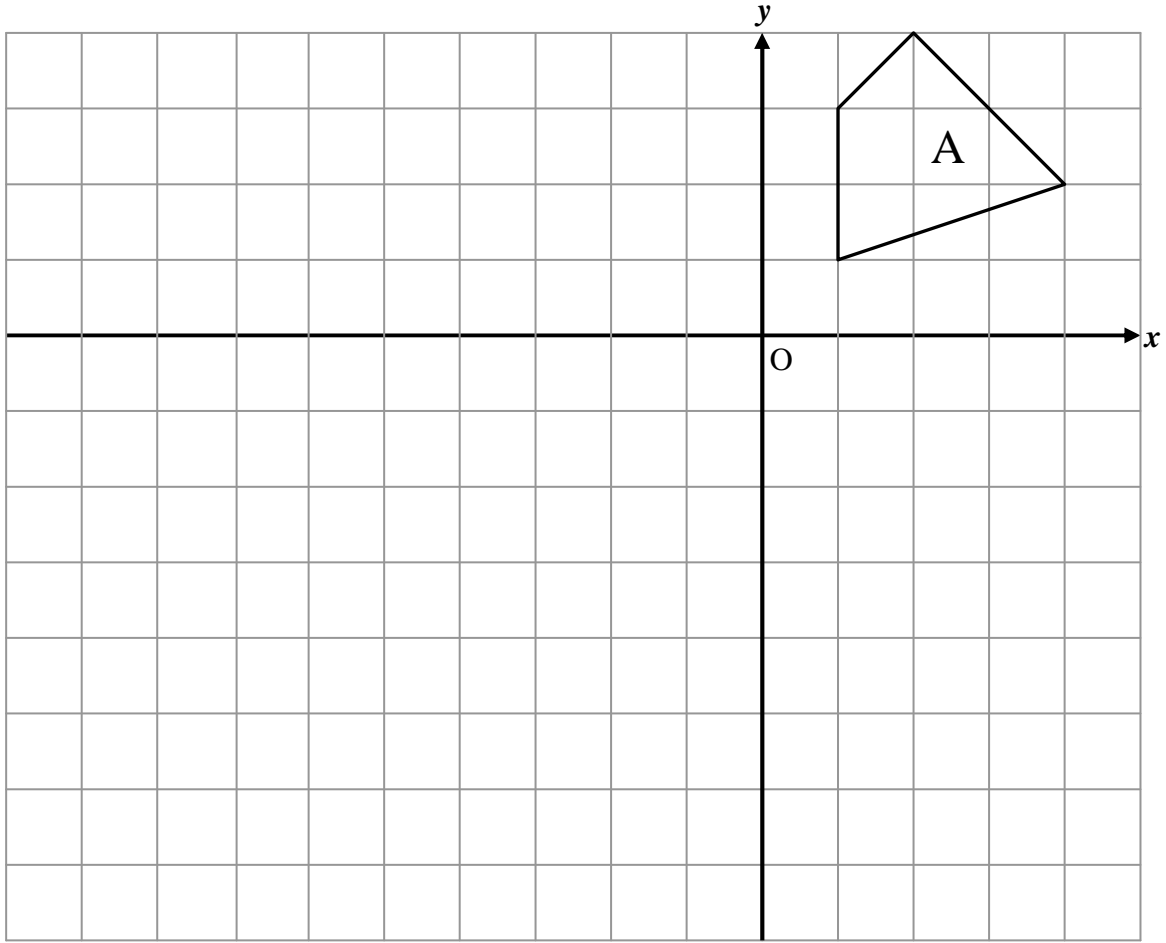5·5 cm. Show that the volume of the spinning top is **72π.**

| Volume of sphere = $\frac{4}{3}\pi r^3$ |
| Volume of cone = $\frac{1}{3}\pi r^2 h$ |

(3 marks)

_____

6) Enlarge shape A by scale factor −2 using the origin as the centre of enlargement.

(4 marks)

_____

7) Lines AB and CD are parallel. The equation of line AB is **2x + y = 4** and CD passes through the point (0,1). Write down the equation of the line CD.

Ans:_____

(4 marks)
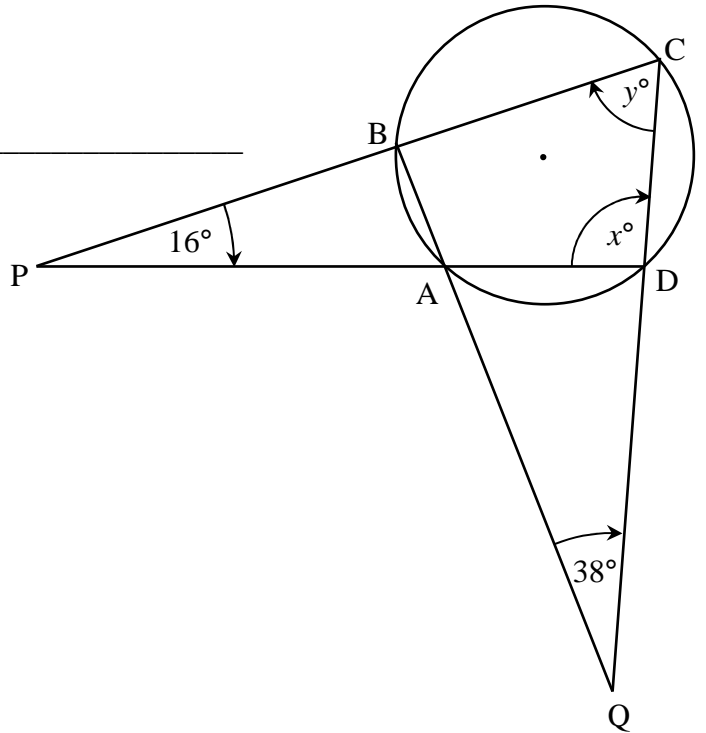
_____

8) ABCD is a cyclic quadrilateral. PBC, PAD, QAB and QDC are straight lines.

    a) Write ∠ABC in terms of x. Give a reason for your answer.
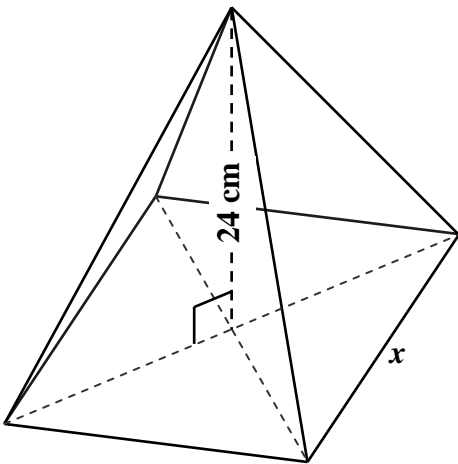
     Ans:_____

      Reason: _____

    b) Find x.

      Ans:_____

(4 marks)

_____

9) A square based pyramid has a vertical height of 24 cm and a volume of 392 cm^3. Calculate the length x of the square base.

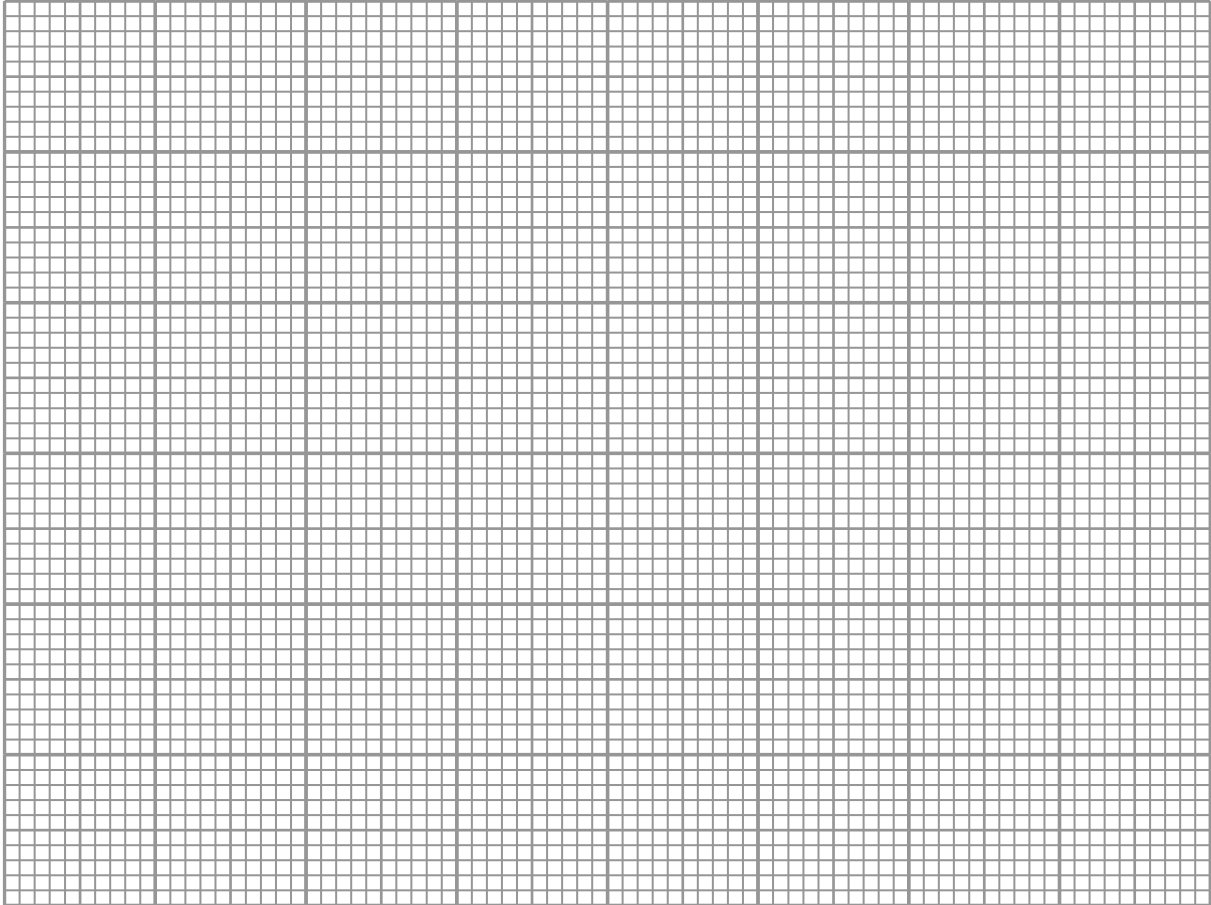   **Ans:**_____

Volume of a pyramid = ⅓ base area × height

(4 marks)

_____

10)

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

x	-1.5	-1	-0.5	0	0.5	1	1.5	2	2.5
y	-0.75		2.25			3		1	

b) Draw the graph of $y = 3 + x - x^2$, for values of x from -1.5 to 2.5 and values of y from -1 to 4.
Take 4 cm for each unit on the x axis and 2 cm for each unit on the y axis.

c) What is the maximum value of: $3 + x - x^2$?

Ans:_____

d) **Use your graph** to solve the equation: $3 + x - x^2 = 0$
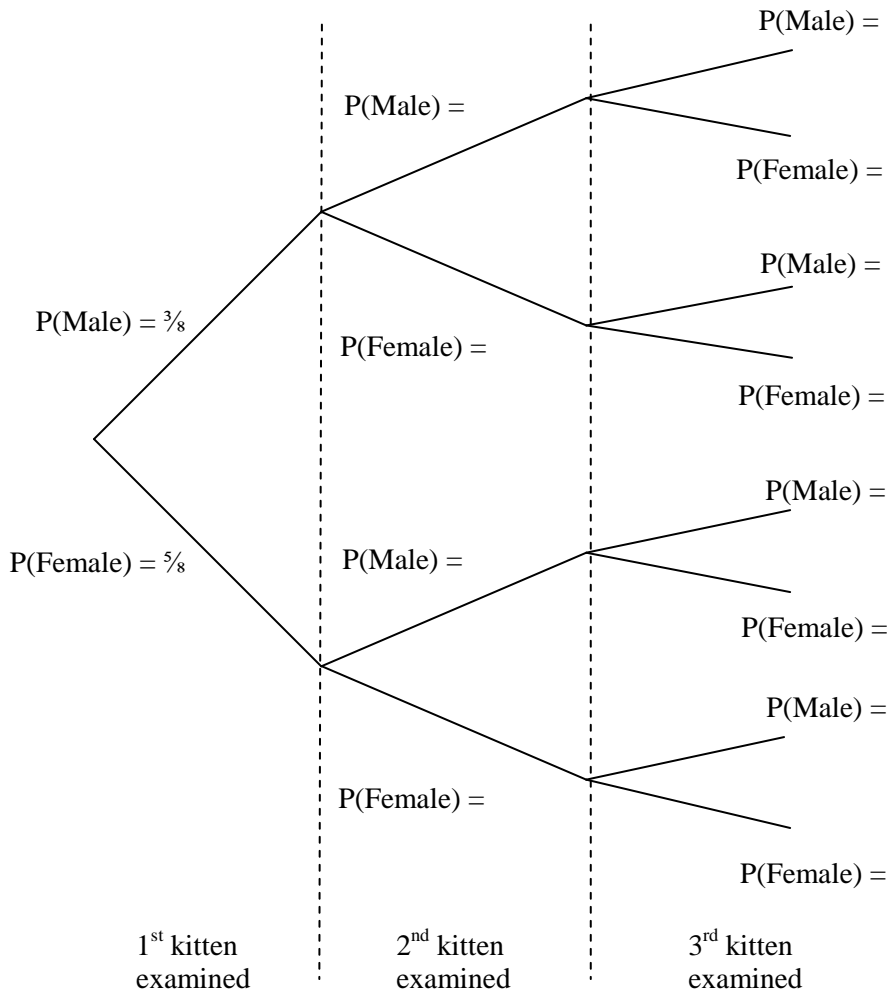
Ans:_____

e) Draw also the graph: $y = x + 2.$

f) **Use your graph** to solve the simultaneous equations: $y = 3 + x - x^2$ and $y = x + 2.$

Ans:_____

(13 marks)

11) Leo's cat has a litter of kittens: five are female and three are male. The vet examines them randomly one by one.
 a) Complete the tree diagram.

P(Male) =

P(Male) =

P(Female) =

P(Male) =

P(Male) = ⅜

P(Female) =

P(Male) =

P(Male) =

P(Female) = ⅝   P(Male) =

P(Female) =

P(Male) =

P(Female) =

P(Female) =

| 1ˢᵗ kitten examined | 2ⁿᵈ kitten examined | 3ʳᵈ kitten examined |

b) Calculate the probability that the first three kittens examined:
  i) will all be male.

Ans:_____

  ii) will include two males and a female.
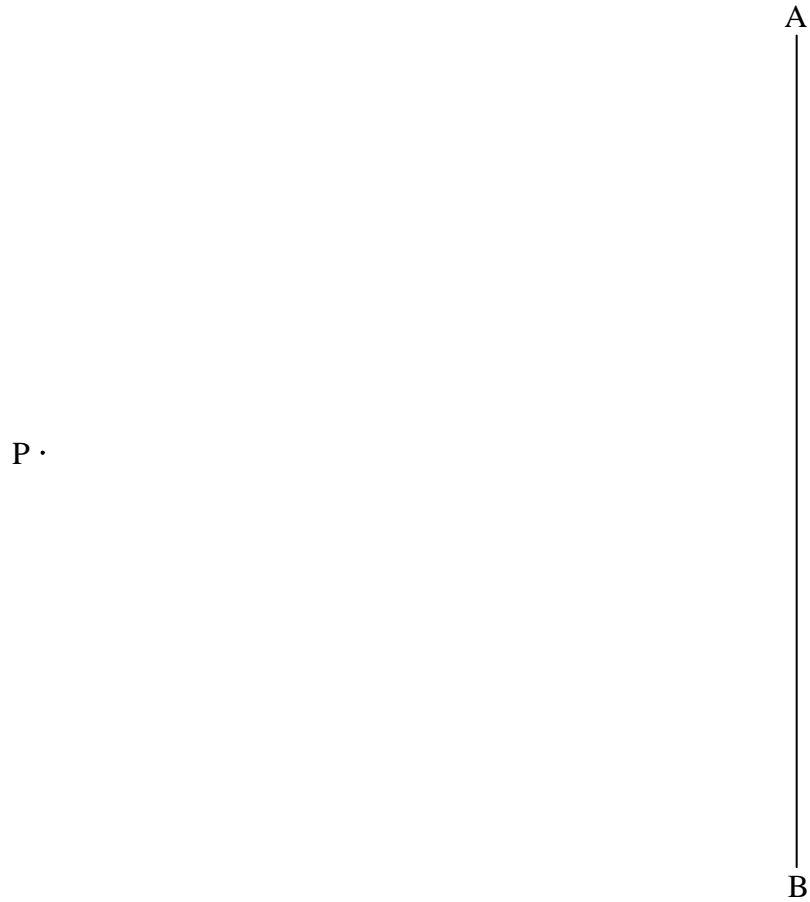
Ans:_____

  iii) will include **at least** one female.

Ans:_____

(11 marks)

12)
   a) The perpendicular distance of a point P to the line AB is 10 cm. By drawing appropriate loci of
      points, shade the region which is ≤ 6 cm away from the point P and ≤ 7 cm away from the line.
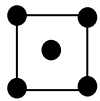
A

P ·

B

   b) Take the necessary measurements to calculate the area of the region correct to the nearest cm^2.
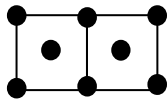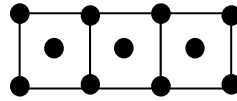
Ans:_____

(6 marks)

13) The diagram shows part of a sequence of shapes made from squares with a dot at each corner and a dot in the middle.

Shape 1   Shape 2   Shape 3

a) Complete the table to show the number of dots in each of the first five shapes.

Shape number (n)	1	2	3	4	5
Number of dots (d)	5	8	11		

b) Write down a formula which can be used to calculate the number of dots d in terms of the shape number n.

Ans:_____

c) Use the formula you found in (b) to find the number of dots in shape 59.

Ans:_____

d) Which shape contains 107 dots?

Ans:_____

(7 marks)

BLANK PAGE