**SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010**

Directorate for Quality and Standards in Education
Educational Assessment Unit

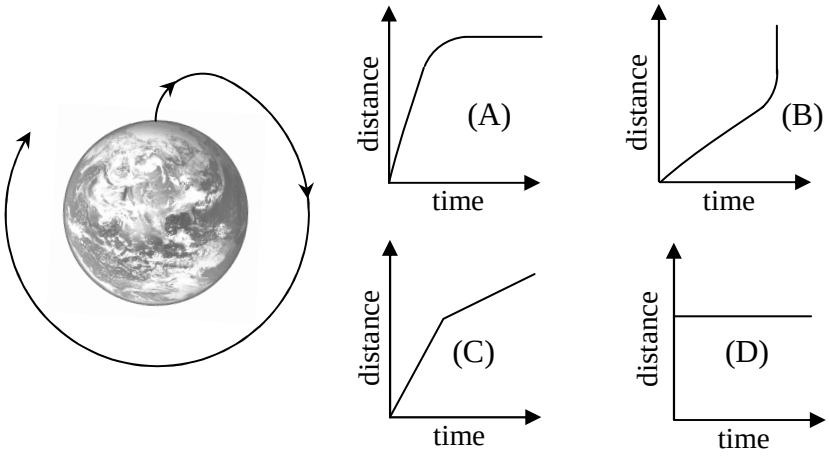
**FORM 4** **MATHEMATICS SCHEME A** **TIME: 20 minutes**
**Non-Calculator Paper**

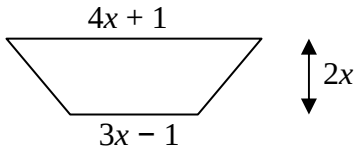
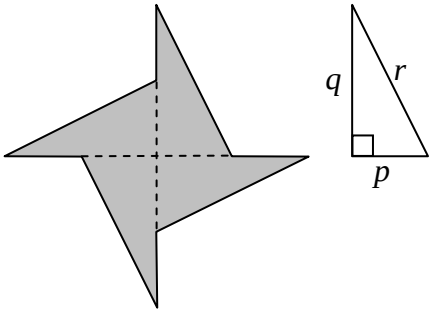
**Name** _____ **Class**_____

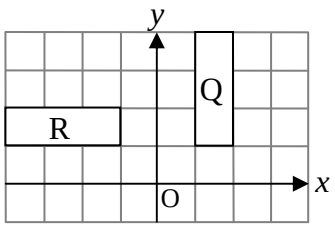
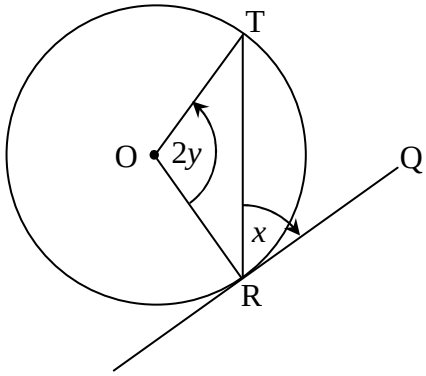
Mark

## 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 if Required |
|---|---|---|
| 1 | Write in **descending** order: $9^4$ , $3^5$ , $27^2$ , 81 .<br>**Ans:** ____ , ____ , ____ , ____. | |
| 2 | Factorise: $9x^2 - 4y^2$<br>**Ans:**_____ | |
| 3 | Express 0·007 $km^2$ in $m^2$.<br>**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.<br>**Ans:**_____cm | |
| 5 | Make $a$ the subject of the formula: $b = \sqrt{x - a}$<br>**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 $n$?<br>**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?<br>  <br>**Ans:**_____ | |

| | | |
|---|---|---|
| 8 | Calculate the **overall percentage change**:<br>A 40% increase and then a 30% decrease.<br>**Ans:**_____ | |
| 9 | Simplify: $\sqrt{\frac{100a^2b^4}{c^6}}$<br>**Ans:**_____ | |
| 10 | Evaluate: $\left(\frac{2}{3}\right)^{-2} + \frac{1}{(3^0 + 3^{-1})}$<br>**Ans** :_____ | |
| 11 | Expand and simplify: $(5x - 1)^2$<br>**Ans:**_____ | |
| 12 | Find and simplify an expression for the **area** of this trapezium.<br>  <br><br>**Ans:**_____ | |
| 13 | The shaded design is made up from four of the triangle shown. What is the **perimeter** of the shape?<br>  <br><br>A) $4p + 4q + 4r$<br>B) $4r + 4q - 4p$<br>C) $4p - 4q - 4r$<br>D) $4r - 4q + 4p$<br>**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?<br>(A) 35 cm (B) 30 cm (C) 25 cm (D) 20 cm<br>**Ans:**_____ | |

| | | |
|---|---|---|
| 15 | Describe **fully** the single transformation from R to Q.<br>  <br>**Ans:**_____ | |
| 16 | QR is a tangent to the circle centre O. TR is a chord. The angle marked $x$ is equal to:<br>A) $180° - 2y$<br>B) $y$<br>C) $4y$<br>D) $2y$<br>  <br>**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: $5(2x + 3) = 7(x + 6)$<br>**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?<br>**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?<br>**Ans:**_____ | |

| Marks | 1 − 5 | 6 − 10 | 11 − 15 | 16 − 20 |
|---|---|---|---|---|
| Frequency | 2 | 3 | 6 | 8 |

**SECONDARY SCHOOL ANNUAL EXAMINATIONS 20**

Directorate for Quality and Standards in Education
Educational Assessment Unit

**FORM 4** **MATHEMATICS SCHEME A** **TIME: 1h 40**
**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: $\frac{3x-2}{5}+\frac{x+2}{2}=5$

**Ans:**_____

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

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

**Ans:**_____

(7 marks)

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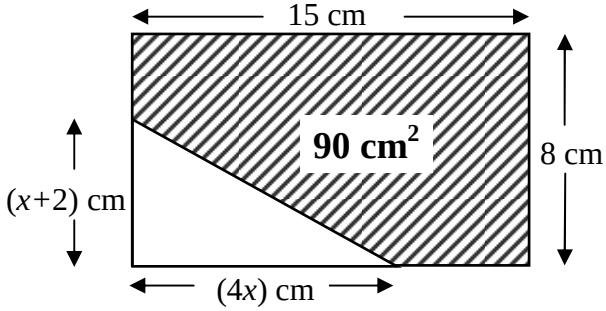
3) A right angled triangle is cut from the corner of a rectangular piece of card 15 cm by 8 cm. The base of the triangle is $4x$ cm and its height is $(x + 2)$ cm. The remaining (shaded) part of the card has an area of 90 cm$^2$.

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)

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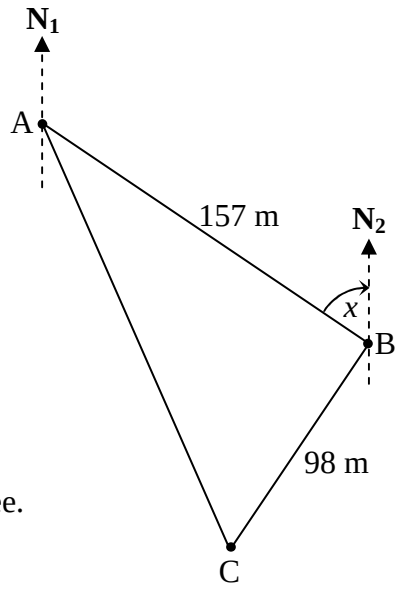
**Name**_____ **Class**_____ **A**

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)

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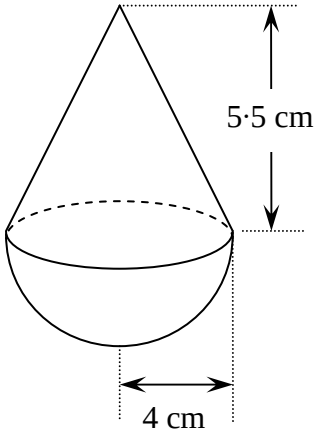
5) A spinning top is made up of a hemisphere of radius 4 cm and a cone of base radius 4 cm and height 5·5 cm. Show that the volume of the spinning top is **$72\pi$.**




Volume of sphere = $\frac{4}{3}\pi r^3$

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

(3 marks)

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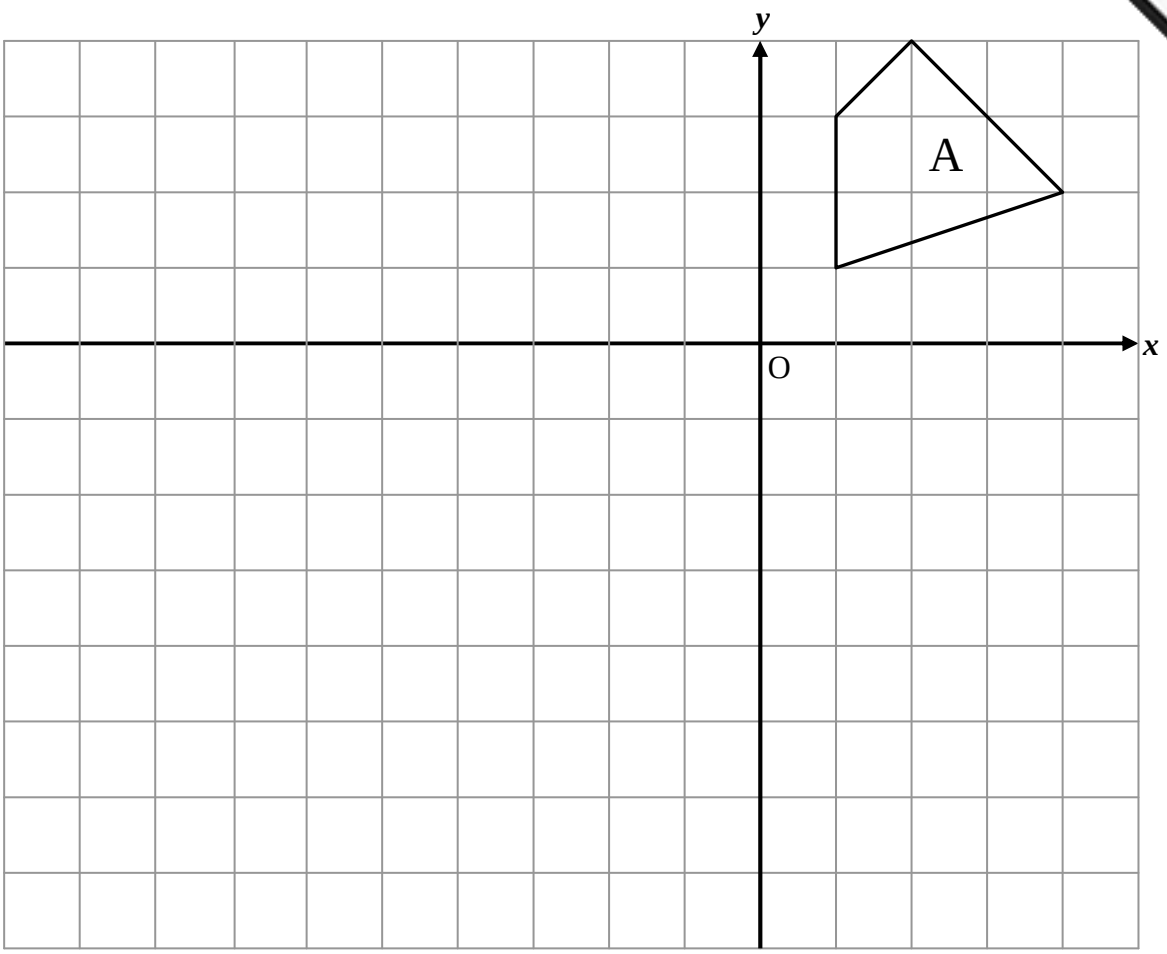
6) Enlarge shape A by scale factor −2 using the origin as the centre of enlargement.




(4 marks)

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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)

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**Name**_____ **Class**_____ A

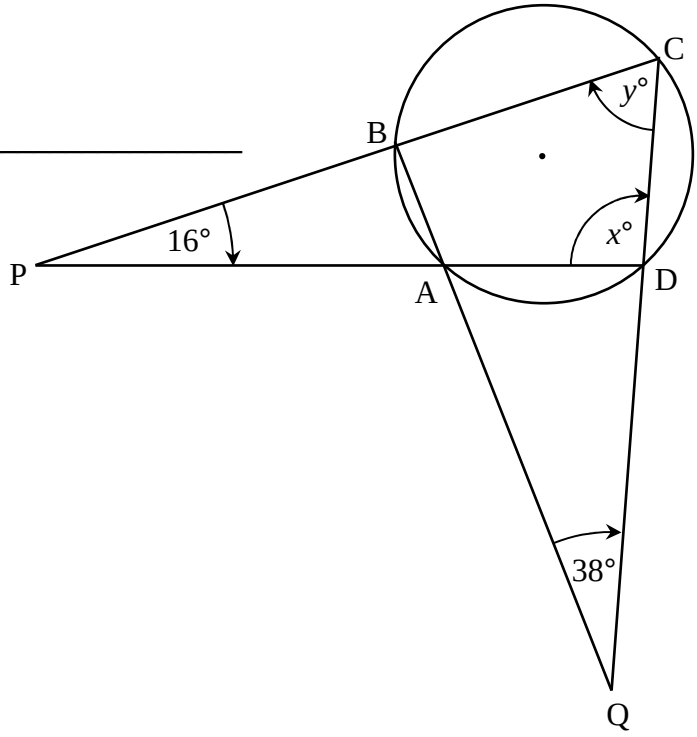
8) ABCD is a cyclic quadrilateral. PBC, PAD, QAB and QDC are straight lines.

a) Write ∠ABC in terms of *x*. Give a reason for your answer.

**Ans:**_____

**Reason:** _____

b) Find *x*.




**Ans:**_____

(4 marks)

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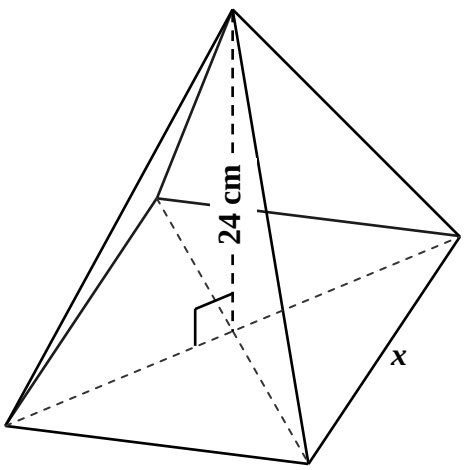
9) A square based pyramid has a vertical height of 24 cm and a volume of 392 $cm^3$. Calculate the length ***x*** of the square base.




**Ans:**_____

Volume of a pyramid = ⅓ base area × height

(4 marks)

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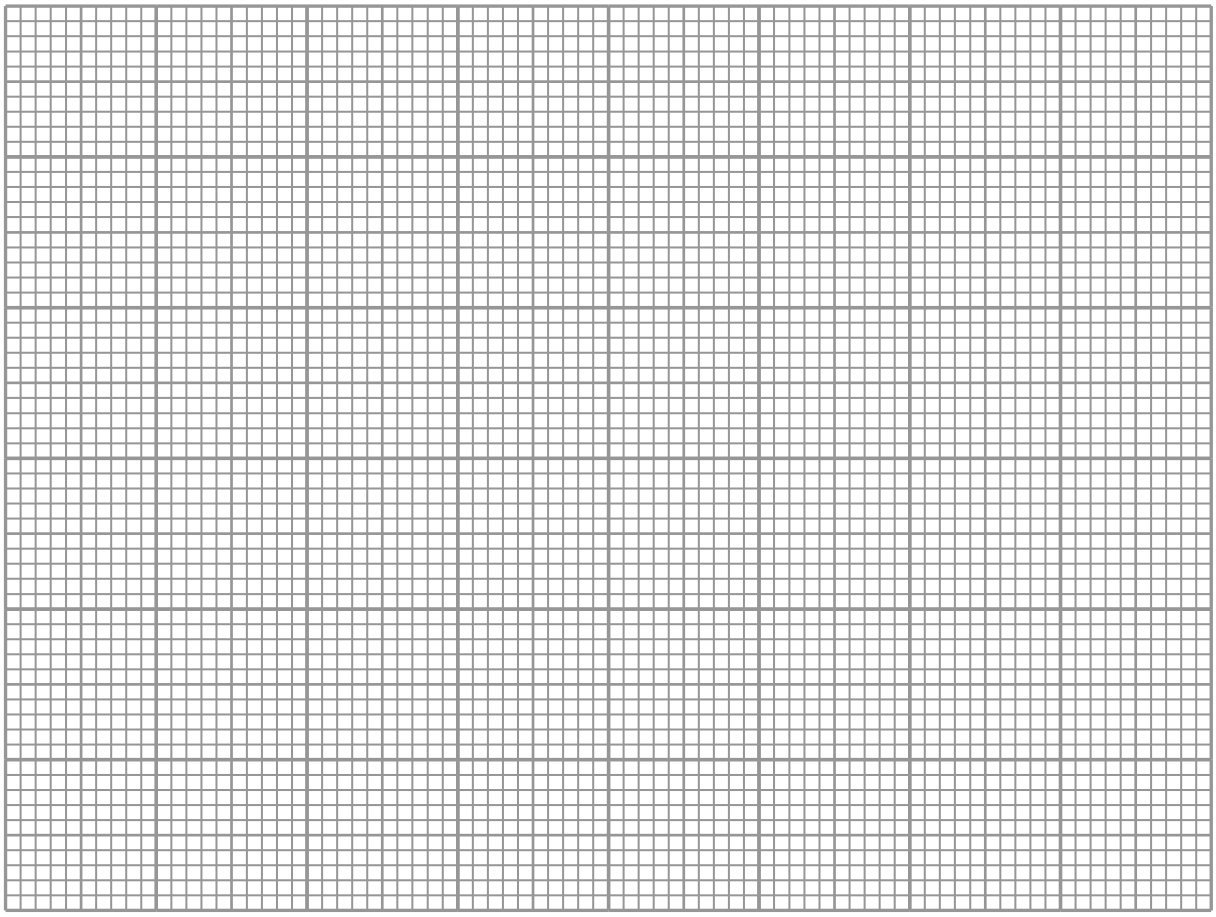
10)

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: $y = x + 2$.

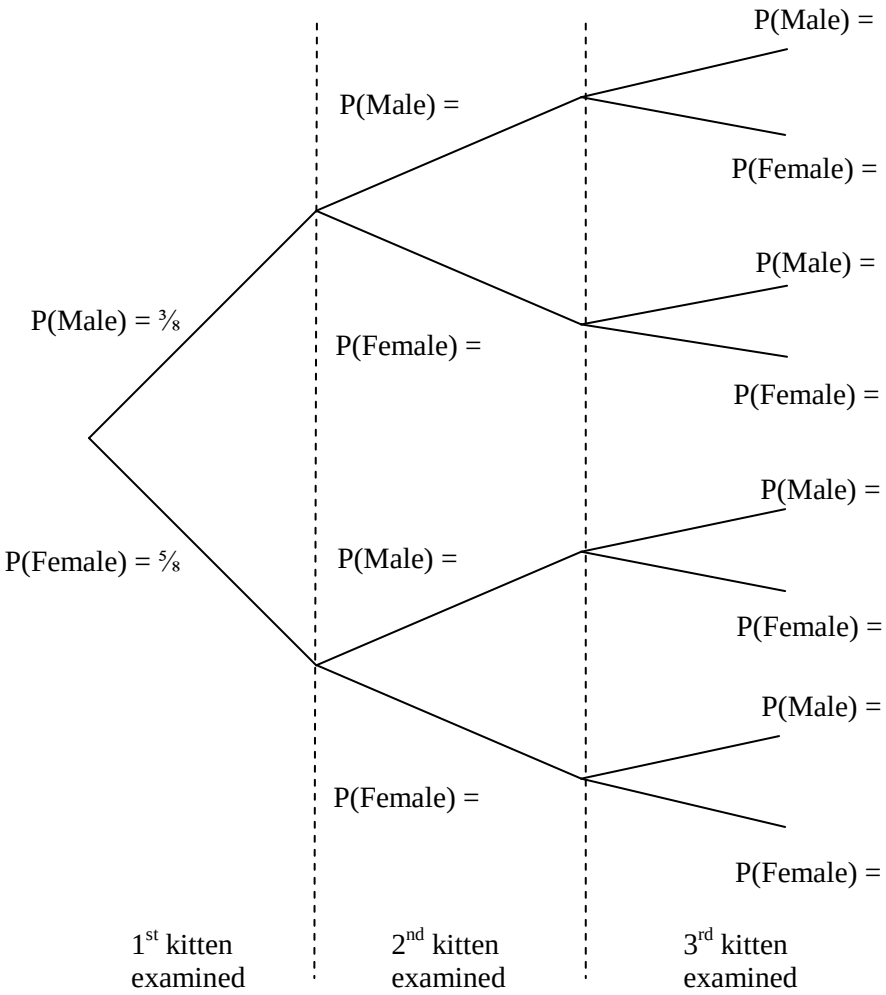
f) **Use your graph** to solve the simultaneous equations: $y = 3 + x - x^2$ and $y = x + 2$.

**Ans:**_____

(13 marks)

11) Leo's cat has a litter of kittens: five are female and three are male. The vet examines [illegible]omly one by one.

a) Complete the tree diagram.




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**:_____

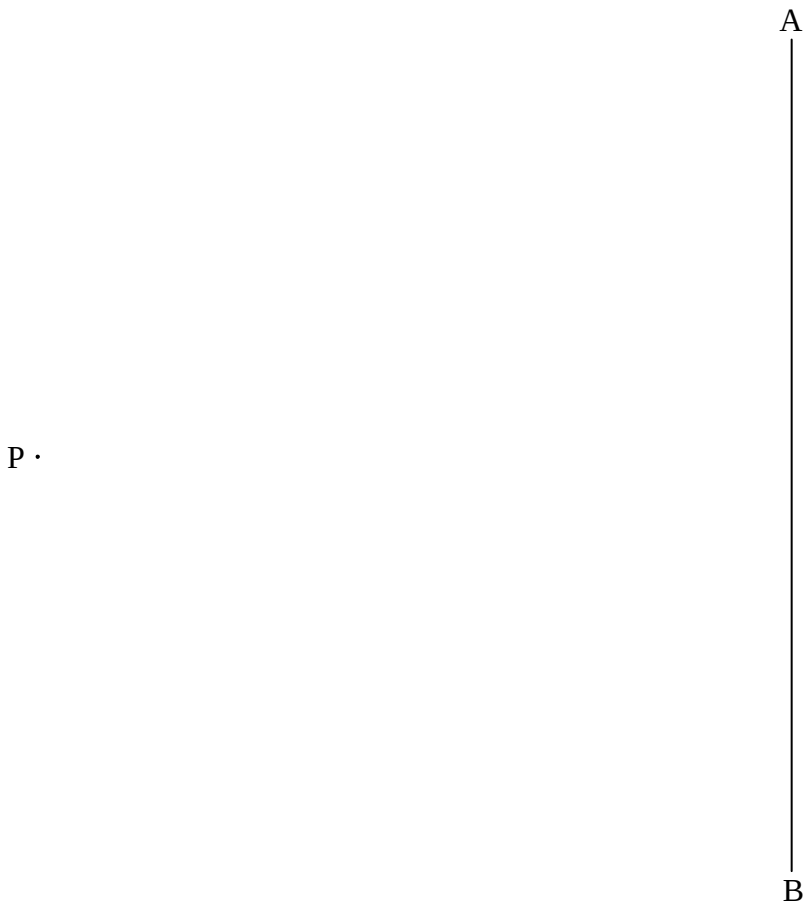
iii) will include **at least** one female.

**Ans**:_____

(11 marks)

12)

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

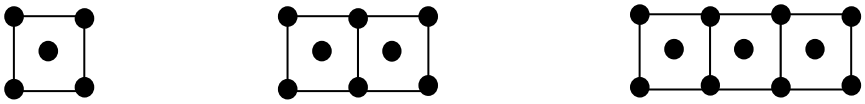



b) Take the necessary measurements to calculate the area of the region correct to the nearest $cm^2$.

**Ans:**_____

(6 marks)

13) The diagram shows part of a sequence of shapes made from squares with a dot at each [illegible] 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)

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