DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2012

A

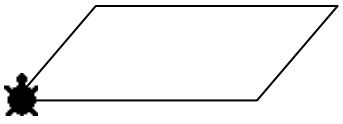
FORM 4 **MATHEMATICS SCHEME A** **TIME: 20 minutes**
Non Calculator Paper

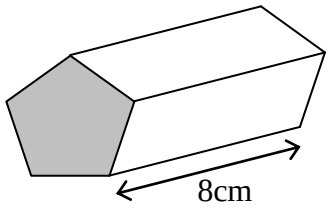
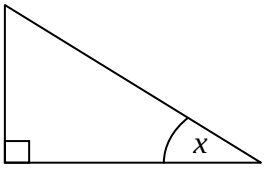
Name: _____ **Class:** _____

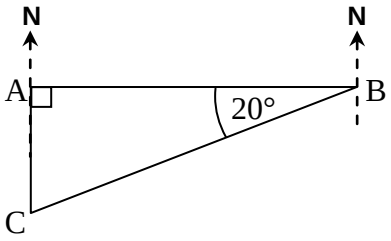
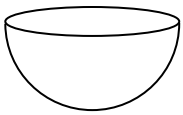
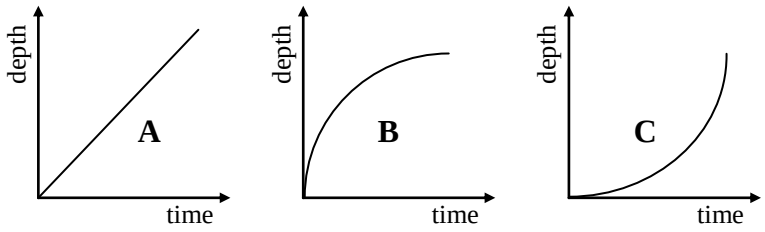
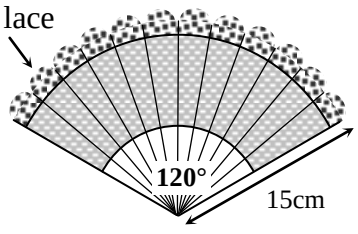
Mark

Instructions to Candidates

- **Answer ALL questions.**
- **This paper carries a total of 20 marks.**
- **Calculators and protractors are NOT ALLOWED.**

No.	QUESTION	Space for Working if Required
1.	Write forty two thousand as a number in standard form. Ans: _____	
2.	Find the value of: $2^3 + 2^{-2} + 2^0$. Ans: _____	
3.	$X = 2^2 \times 3^2 \times 5^3$ and $Y = 2^3 \times 5^2 \times 11$. Find the **least common factor** of X and Y. Ans: _____	
4.	Francesca scored 36 out of 40 in a test. Express her mark as a percentage. Ans: _____%	
5.	Expand $2a^2b(3a - 4b^2)$. Ans: _____	
6.	Make x subject of the equation: $y = 5x^2$ Ans: _____	
7.	Make y subject of the formula given that $\frac{y}{x} = x + 1$. Ans: _____	
8.	Chris wants to draw this parallelogram using **Logo**. Fill in the missing command.  **PD** **RT 30** **FD 50** **RT 60** **FD 100** **_____** **FD 50** **RT 60** **FD 100** **RT 90** **PU**	

No.	QUESTION	Space for Working if Required
9.	A tank has a volume of 0.25 m^3. Express the volume of the tank in cm^3. Ans: _____cm^3	
10.	Simplify: $\sqrt{\frac{4x^6}{25y^4}}$ Ans: _____	
11.	A point A(3, 4) is reflected in the *y* axis. Find the coordinates of A′, the image of point A. Ans: A′(_____, _____)	
12.	Factorise: $x^2 + x - 12$ Ans: _____	
13.	Work out: $\frac{1.8\times10^5}{3\times10^2}$. Give your answer in standard form. Ans: _____	
14.	A prism has a volume of 128 cm^3. It is 8 cm long. Find the cross-sectional area.  Ans: _____cm^2	
15.	If $\tan x = \frac{3}{4}$, find sin *x*.  Ans: _____	

No.	QUESTION	Space for Working if Required
16.	Find the gradient of the line joining the points P(4, 5) and Q(2, −3). Ans: _____	
17.	The figure shows the position of three villages A, B and C. Find the bearing of **C from B**.  Ans: _____	
18.	Water is poured in a hemispherical bowl at a steady rate. Which graph best describes how the **depth** of the water varies over **time**?   Ans: _____	
19.	Five drinks and a sandwich cost €7.20. A sandwich costs as much as a drink. Find the cost of **one sandwich**. Ans: €_____	
20.	A fan opens up to an angle of 120° and has a radius of 15 cm. Find the length of lace needed to decorate the fan at the edge.  **Give your answer in terms of π.** Ans: _____	

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

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

Name: _____ **Class:** _____

CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN. ANSWER ALL QUESTIONS.

1. Rachel invested €2500 at r % compound interest. After 2 years the invested sum amounted to €2756. Calculate the rate of investment, r. Give your answer correct to the nearest whole number.

$$A = P\left(1 + \frac{r}{100}\right)^n$$

Ans. _____

(4 marks)

2. a) Solve the equation: $2x - 9 = 5x - 3(3x + 2)$

Ans. _____

b) Solve the equation: $\frac{x+1}{2} + \frac{3x-1}{4} = 4$

Ans. _____

(6 marks)

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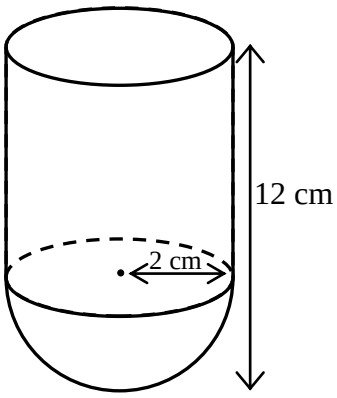
3. The figure below represents a container consisting of a **cylinder** attached to a hemisphere. The **hemisphere** has a radius 2 cm. The height of the container is 12 cm. Calculate the volume of the container. Give your answer correct to 1 decimal place.



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

Ans. _____cm^3

(5 marks)

Name: _____ **Class:** _____

A

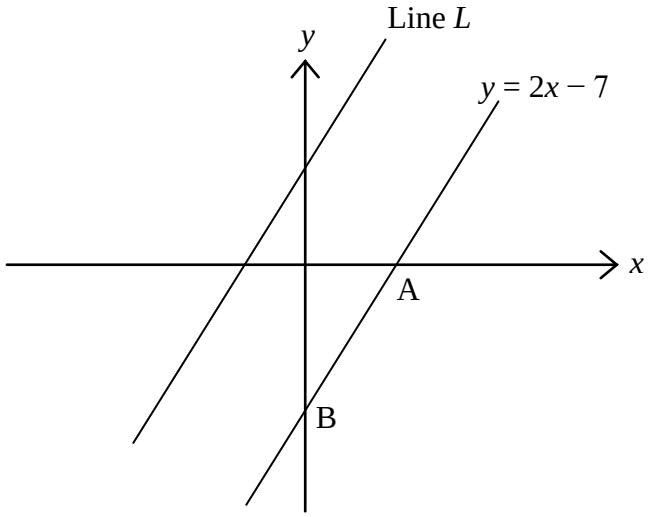
4. Use the formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve the equation $2x^2 - 7x + 4 = 0$. Give your answer correct to 2 decimal places.

$x =$ _____

$x =$ _____

(3 marks)

5.



a) Find the coordinates of the points A and B shown on the graph above.

A(____, ____)

B(____, ____)

b) Line L is parallel to the line $y = 2x - 7$ and passes through the point (0, 3). Find the equation of Line L.

_____

(5 marks)

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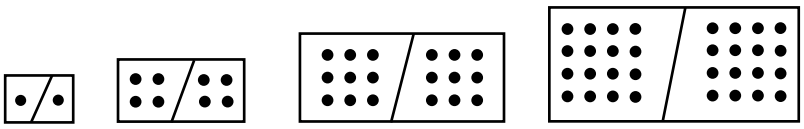
6. The shapes below represent the first four terms of a sequence.



Shape 1 **Shape 2** **Shape 3** **Shape 4**

a) Fill in the following table:

Shape	1	2	3	4	5
Number of Dots	2		18		

b) Find the number of dots in shape 10.

Ans. _____

c) Choose the expression which gives the number of dots in shape n.

A. $3n + 2$	B. $5n + 3$	C. $2n^2$	D. $n^2 + 2$

Ans. _____

d) Is there a shape in the sequence having 154 dots? Give a reason for your answer.

(6 marks)

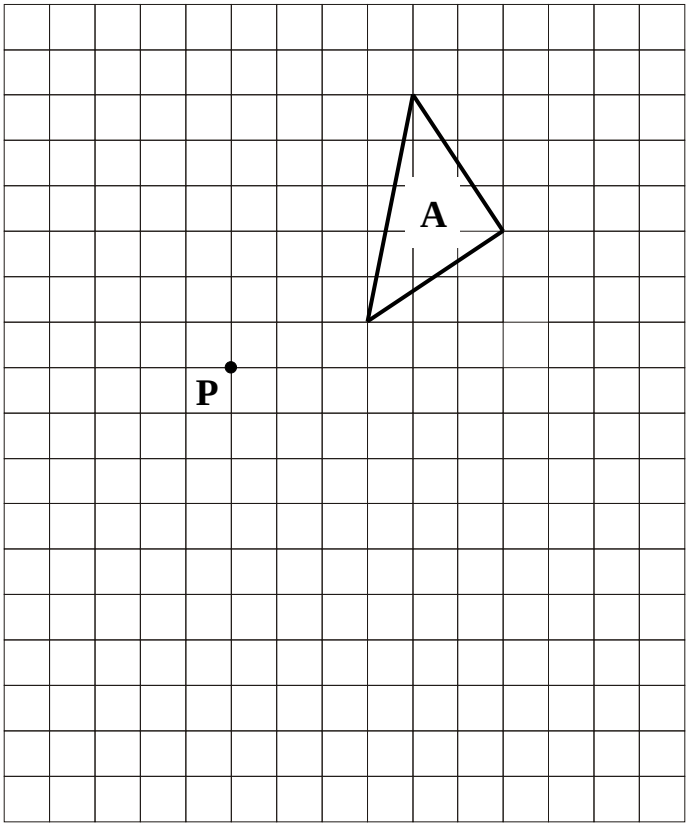
Name: _____ **Class:** _____

A

7. On the grid below:

a) Translate triangle **A** by column vector $\begin{pmatrix} -6 \\ -9 \end{pmatrix}$. Label the image **B**.

b) Rotate triangle **A** 90° clockwise about point **P**. Label the image **C**.



(4 marks)

8. Trevor checked 20 boxes of nails of the brand ***Nailit*** and recorded the number of nails in each box in the frequency table shown below.

Number of nails, *x*	**Frequency, *f***
48	1
49	3
50	5
51	3
52	4
53	1
54	3

a) Complete the table below for the nail boxes of the brand ***Nailit***.

	Mean	**Median**	**Mode**
Nailit			

Trevor also checked a sample of nail boxes of the brand ***Fixall*** and obtained the following results.

	Mean	**Median**	**Mode**
Fixall	50.5	52	51

b) Which brand is likely to contain more nails? Give a reason for your answer by comparing the results of both brands.

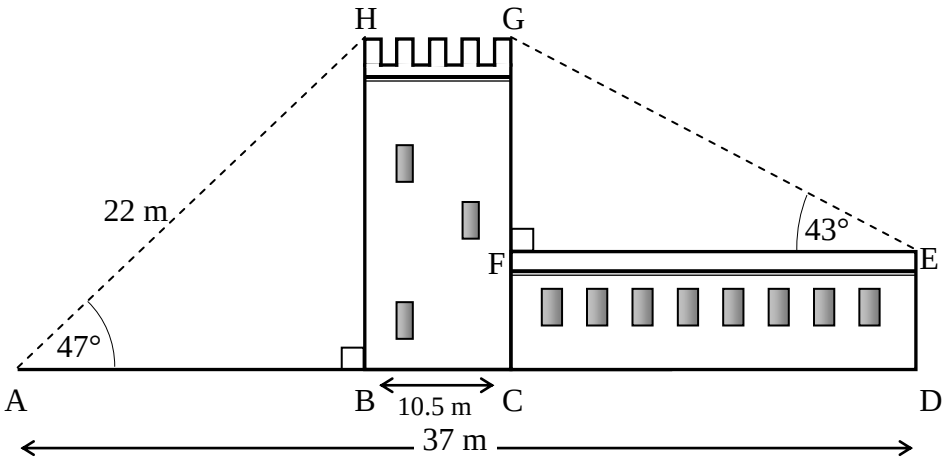
Brand _____

Reason _____

_____

(6 marks)

9. The diagram shows a tower BCGH, next to a building CDEF. The angle of elevation of H from A is 47° and AH = 22 m. The angle of elevation of G from E is 43°. BC = 10.5 m and AD = 37 m. A, B, C and D lie on level ground.



Giving your answer correct to 1 decimal place, find:

a) BH, the height of the tower BCGH.

BH = _____m

b) AB.

AB = _____m

c) CD.

CD = _____m

d) GF.

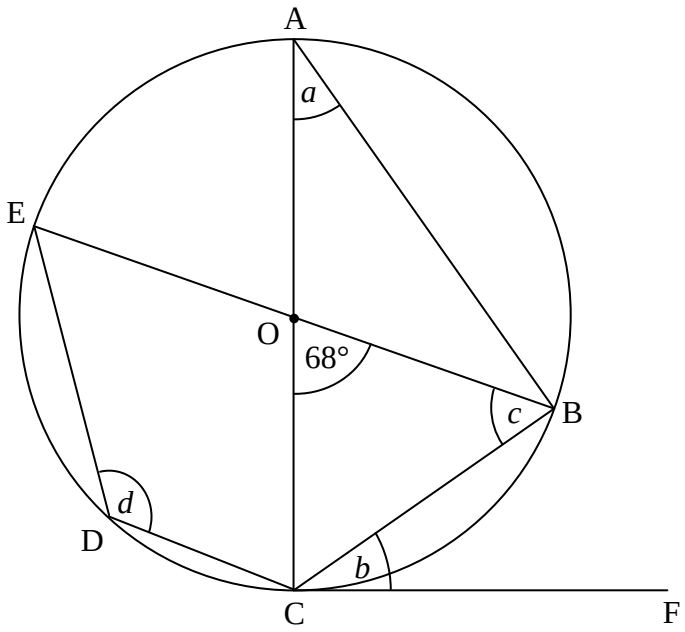
GF = _____m

e) ED, the height of the building CDEF.

ED = _____m

(11 marks)

10. A, B, C, D and E are five points on the circumference of a circle centre O. CF is a tangent to the circle.



Find the value of angles *a*, *b*, *c* and *d*. Give reasons for your answers.

Angle *a* = _____

Reason _____

Angle *b* = _____

Reason _____

Angle *c* = _____

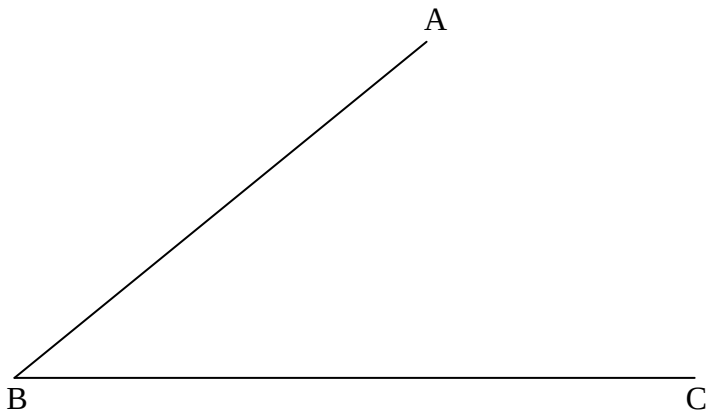
Reason _____

Angle *d* = _____

Reason _____

(8 marks)

11. In the diagram below the lines AB and BC meet at point B.



On the above diagram:

a) draw the locus of points equidistant from B and C.

b) draw the locus of points equidistant from AB and BC.

c) shade the region consisting of all points that are nearer to B than to C **and** nearer to AB than to BC.

(3 marks)

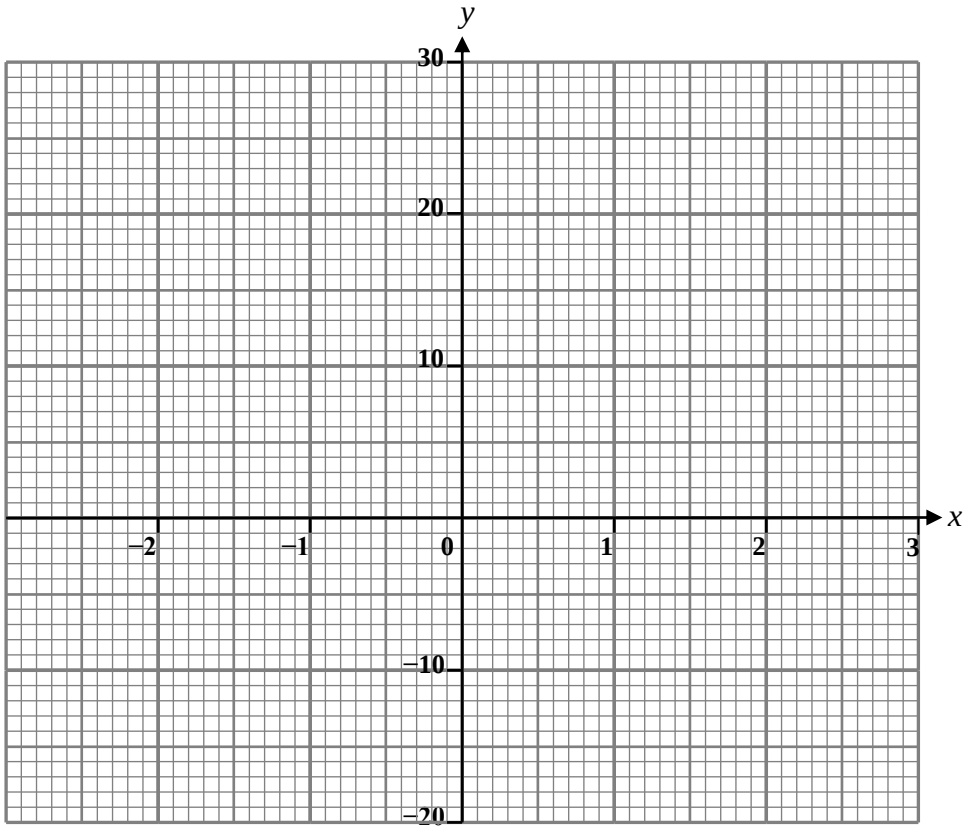
12. a) Complete the table for $y = 4x^2 - 8x - 5$.

x	–2	–1	0	1	2	3
$4x^2$	16		0			36
$-8x$	16			−8	−16	−24
-5	–5	−5	–5	–5		−5
y	27	7			−5	

b) Complete the table for $y = -8x + 11$.

x	–2	1	2
$-8x$		−8	−16
11	11		11
y			–5

c) Plot the graphs of $y = 4x^2 - 8x - 5$ and $y = -8x + 11$ on the grid below.



d) Use your graph:

i) to find the minimum value of $y = 4x^2 - 8x - 5$.

Ans. _____

ii) to solve the simultaneous equations $y = 4x^2 - 8x - 5$ and $y = -8x + 11$.

x = _____, y = _____ and x = _____, y = _____

(11 marks)

13. a) A box contains 45 chocolates. There are three varieties of chocolate: white, dark and mint chocolates. The probability of picking a white chocolate is $\frac{1}{3}$, and the probability of picking a dark chocolate is $\frac{2}{5}$. How many mint chocolates are there inside the box?

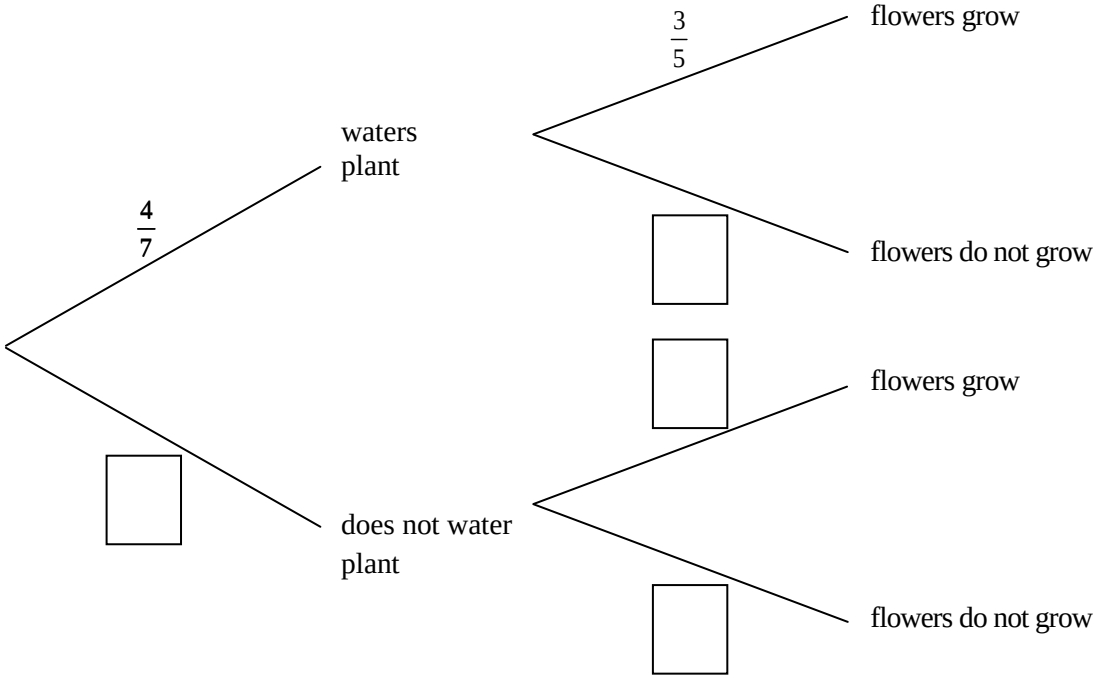
Ans. _____ chocolates

b) The probability that Lina **waters** her plant is $\frac{4}{7}$.

If she waters her plant, the probability that flowers grow is $\frac{3}{5}$.

If she does not water her plant, the probability that flowers grow is $\frac{1}{5}$.

i) Complete the tree diagram below:



ii) Calculate the probability that flowers grow.

Ans. _____

(8 marks)

END OF PAPER