

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16	
TOTAL	



General Certificate of Secondary Education
Higher Tier

Mathematics

4365/1H

Paper 1 Non-calculator

Practice Paper 2012 Specification (Set 1)

H

For this paper you must have:

- mathematical instruments.

You must **not** use a calculator.



Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 70.
- The quality of your written communication is specifically assessed in questions 11 and 13.
These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.

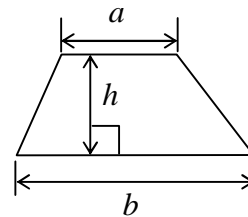
Advice

- In all calculations, show clearly how you work out your answer.

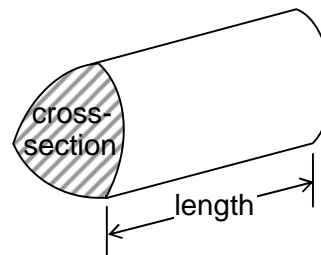
4365/1H

Formulae Sheet: Higher Tier

$$\text{Area of trapezium} = \frac{1}{2}(a + b)h$$

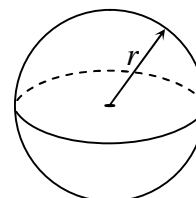


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



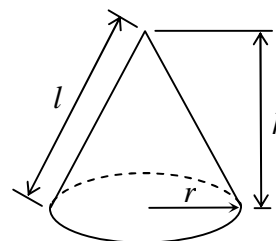
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$\text{Surface area of sphere} = 4\pi r^2$$



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

$$\text{Curved surface area of cone} = \pi r l$$

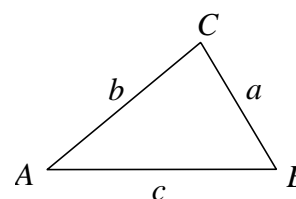


In any triangle ABC

$$\text{Area of triangle} = \frac{1}{2}ab \sin C$$

$$\text{Sine rule} \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

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

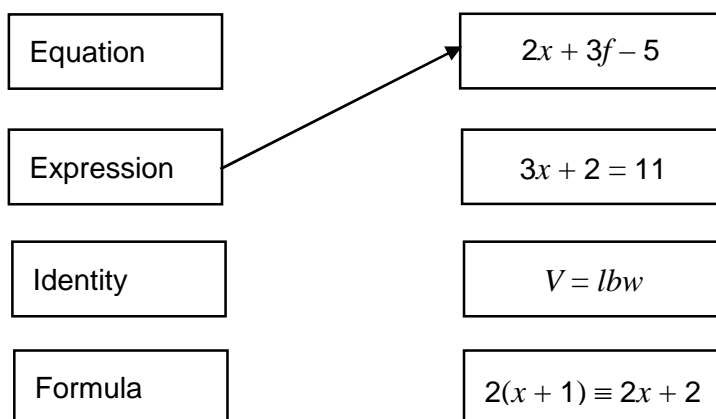
Answer **all** questions in the spaces provided.

- 1 (a) How many terms are in the expression $2x + 3f - 5$?

Answer (1 mark)

- 1 (b) Join each box on the left with the matching box on the right.

One has been done for you.



(2 marks)

- 2 A sensor records the temperature at 7 am.
It then records the temperature every 3 hours.
Another sensor records the air pressure at 8 am.
It then records the air pressure every 4 hours.

At what times in every 24-hour period will the two sensors take readings at the same time?

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Answer (3 marks)

- 3** The table shows the activities on a trip.
Each student chooses **two** activities.

Twice as many boys as girls choose rock climbing.

Two more boys choose archery than choose horse riding.

Five times more girls choose horse riding than choose archery.

	Rock climbing	Horse riding	Archery
Girls	8		4
Boys		10	

How many students are on the trip altogether?

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Answer (5 marks)

4 A teacher gave her students a test.
The test is out of 30 marks.

The stem-and-leaf diagram shows the results.

Key 1 | 3 represents 13 marks



What percentage of the students score 80% or more?

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Answer% (4 marks)

5 (a) Expand $5(x + 5)$

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Answer (1 mark)

5 (b) Factorise $x^2 + 6x$

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Answer (1 mark)

5 (c) x is an odd number.

Complete these sentences using one of the following

always even always odd either odd or even

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The expression $5(x + 5)$ is

The expression $x^2 + 6x$ is

(2 marks)

6 In a wood half of the trees are Oak.
30% of the trees are Sycamore.
The rest are Elm.

6 (a) Write the ratio of the number of Oak : Sycamore : Elm
Give your answer in its simplest form.

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Answer : : (2 marks)

6 (b) One-fifth of the Oak trees and half of the Sycamore trees are cut down.
Work out the new ratio of the number of Oak : Sycamore : Elm
Give your answer in its simplest form.

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Answer : : (2 marks)

7 (a) Solve the equation $10x - 3 = 4x - 12$

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Answer $x =$ (3 marks)

7 (b) Solve the equation $\frac{5}{6} + d = 1\frac{3}{4}$

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Answer $d =$ (3 marks)

8

Three friends are talking about regular polygons.

Alison



The exterior angle of a regular pentagon is 72°

A regular decagon has twice as many sides as a pentagon.
So the exterior angle must be $72^\circ \div 2$

Colin



A regular decagon has twice as many sides as a pentagon.
So the exterior angle must be $2 \times 72^\circ$

Ben



Is Ben or Colin correct?

Tick your answer.

Ben

Colin

You **must** show your working.

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(3 marks)

9 (a) Here is the rule for continuing a sequence

Multiply the previous term by 2 and subtract 1

Part of a sequence that follows this rule is

..... 4 7 13

Work out the first and fifth terms of this sequence.

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Answer First term =

Fifth term =

(2 marks)

9 (b) Here is a different sequence.

4 7 10 13 16

Work out the n th term.

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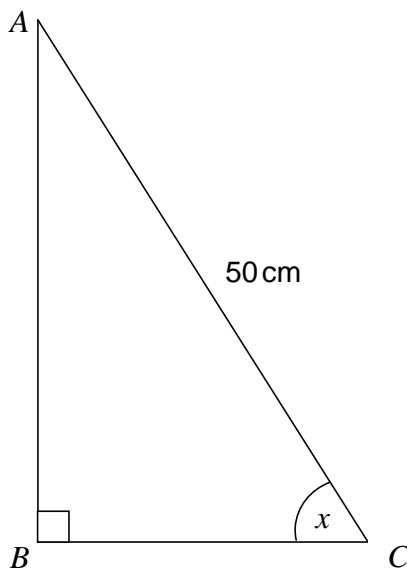
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Answer (2 marks)

- 10** The diagram shows a right-angled triangle ABC .
 $AC = 50$ cm
 Angle $ACB = x$

You are given that $\sin x = \frac{24}{25}$ $\cos x = \frac{7}{25}$ $\tan x = \frac{24}{7}$



Not drawn
accurately

Calculate the length BC .

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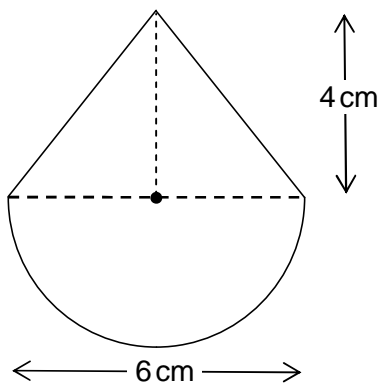
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Answer cm (3 marks)

Turn over for the next question

- 12** A shape is made from a semi-circle and an isosceles triangle as shown.
The height of the triangle is 4 cm.
The diameter of the semi-circle is 6 cm.



Not drawn
accurately

Work out the perimeter of the shape.
Give your answer in terms of π .

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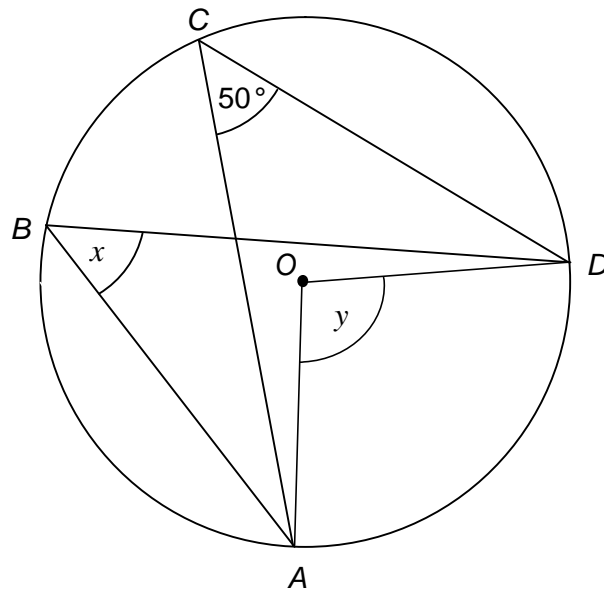
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Answer cm (4 marks)

Turn over for the next question

- *13 (a) $ABCD$ are points on the circumference of a circle centre O .
Angle $ACD = 50^\circ$



Not drawn
accurately

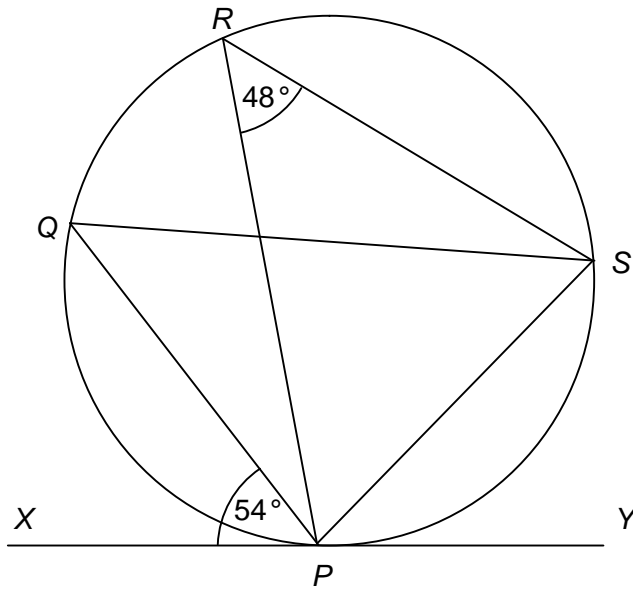
- 13 (a)(i) Write down the value of angle x .

Answer degrees (1 mark)

- 13 (a)(ii) Write down the value of angle y .

Answer degrees (1 mark)

- 13 (b)** $PQRS$ are points on the circumference of another circle.
 XY is a tangent to the circle at P .
 Angle $PRS = 48^\circ$, angle $QPX = 54^\circ$



Not drawn
accurately

- 13 (b)(i)** Which circle theorem states that angle $YPS =$ angle PQS

Answer

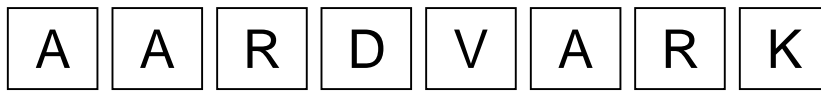
..... (1 mark)

- 13 (b)(ii)** Work out the value of angle QPS .

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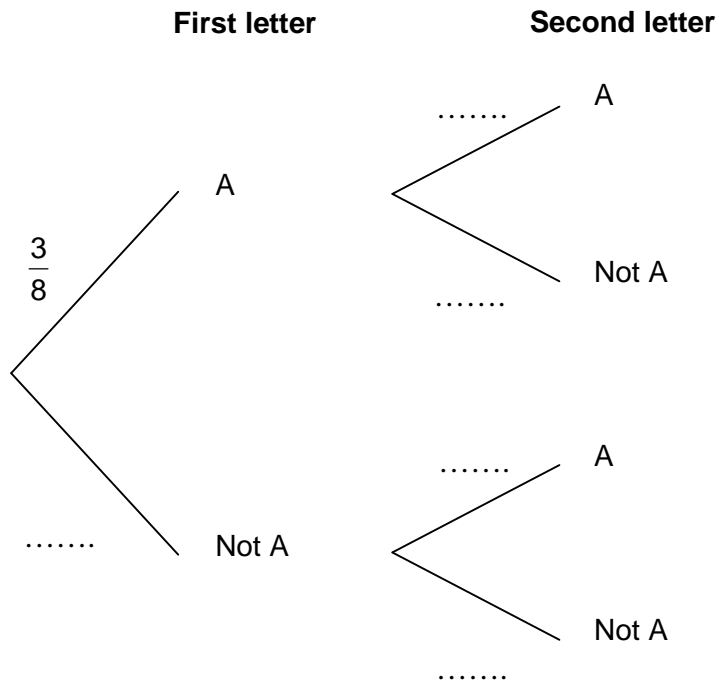
Answer degrees (2 marks)

14 These eight letters are placed in a hat.



A letter is drawn from the hat at random, noted, and replaced.
Another letter is drawn from the hat at random.

14 (a) Complete the tree diagram.



(1 mark)

14 (b) Work out the probability that exactly one of the two letters drawn is an A.

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Answer (3 marks)

15 Work out $(\sqrt{2} + 3)(\sqrt{2} + 5)$

Give your answer in the form $a + b\sqrt{c}$ where a, b and c are integers.

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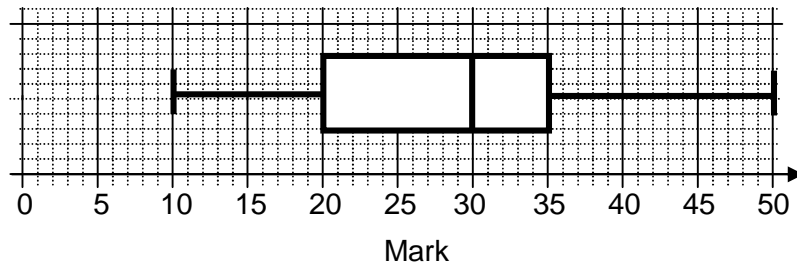
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Answer (3 marks)

16 A test is marked out of 50 marks.
The box plot shows the distribution of marks.



60% of the students passed the test.

Estimate the pass mark.

You **must** show your working.

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Answer (4 marks)

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