OCR
RECOGNISING ACHIEVEMENT

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**
**General Certificate of Secondary Education**

# MATHEMATICS SYLLABUS A 1962/4

PAPER 4 (Intermediate Tier)

Wednesday **15 JUNE 2005** Morning 2 hours

Candidates answer on the question paper.
Additional materials:
Electronic Calculator
Geometrical instruments
Tracing paper (optional)

| Candidate Name | Centre Number | Candidate Number |
|---|---|---|
| | | |

**TIME** 2 hours

**INSTRUCTIONS TO CANDIDATES**

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for working that shows that you know how to solve the problem even if you get the answer wrong.
- You are expected to use an electronic calculator for this paper.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Unless otherwise instructed in the question, take $\pi$ to be 3.142 or use the $\pi$ button on your calculator.

| FOR EXAMINER'S USE |
|---|
| |

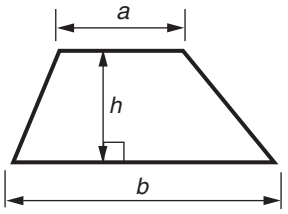
**This question paper consists of 18 printed pages and 2 blank pages.**



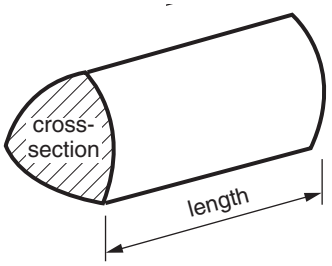
Registered Charity Number: 1066969
**[Turn over**

# Formulae Sheet: Intermediate Tier

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




**Volume of prism** = (area of cross-section) × length



**1** Jenny went on holiday to France.

**(a)** The rate of exchange was

£1 = €1.48.

**(i)** She changed £90 into euros.

How many euros did Jenny receive?

.....

.....

**(a)(i)** € _____[2]

**(ii)** She bought a set of crayons for €2.59.

Find the cost of the crayons in pounds.

.....

.....

**(ii)** £_____[2]

**(b)** Jenny bought a melon and 0.5 kg of grapes. She spent €3.13.
The melon cost €1.45.

Find the cost, in euros, of one kilogram of grapes.

.....

.....

.....

.....

**(b)** € _____[3]

**(c)** Jenny also bought some apples and oranges. The ratio of apples to oranges was 4 : 1.
She bought 12 apples.

How many oranges did Jenny buy?

.....

.....

**(c)** _____[2]

**2** The marks of 25 students in a Maths exam are listed in the unordered stem and leaf diagram below.

| | |
|---|---|
| 3 | 2 0 4 |
| 4 | 8 6 |
| 5 | 3 2 1 |
| 6 | 5 9 7 |
| 7 | 1 4 7 0 9 4 5 |
| 8 | 0 2 9 6 0 |
| 9 | 4 6 |

3 | 2 represents 32

**(a)** Write these marks in an **ordered** stem and leaf diagram.

| | |
|---|---|
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |

[2]

**(b)** Work out the range of the marks.

.....

**(b)** _____[1]

**(c)** What percentage of the students gained a mark higher than 60?

.....

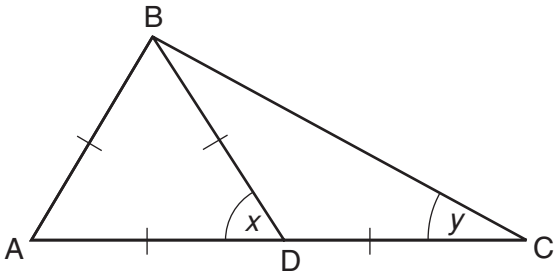
.....

.....

.....

**(c)** _____% [3]

**3**




NOT TO SCALE

ABC is a triangle.
Point D is on AC such that AB = AD = BD = DC.

**(a)** Work out angle *x*.

Give a reason for your answer.

.....

*x* = _____° because _____

_____[2]

**(b)** Work out angle *y*.

Give reasons for your answer.

.....

.....

*y* = _____° because _____

_____

_____[3]

**(c)** Point D is due east of point A.

Work out the bearing of B from A.

.....

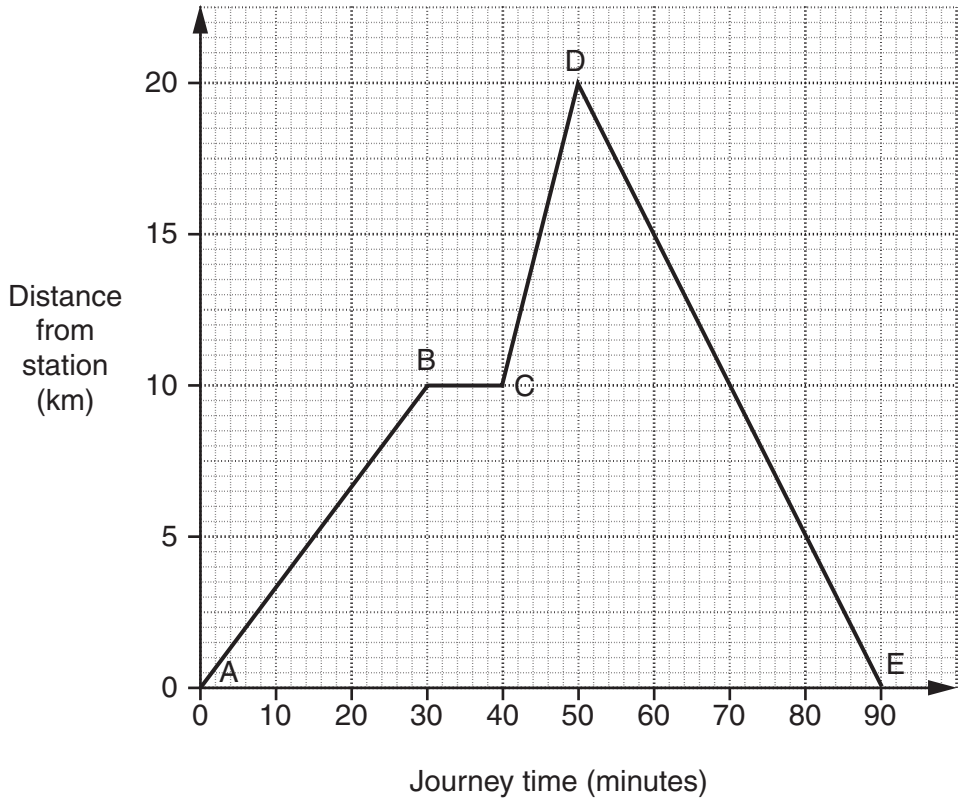
.....

**(c)** _____° [2]



**[Turn over**

**4** The graph below represents the journey of a steam train.




**(a)** How far did the train travel in the first 10 minutes?

**(a)** _____ km [1]

**(b)** What does the line BC represent?

_____[1]

**(c)** Tracy thinks that the line DE represents the train going down hill.
She is wrong.
What does the line DE represent?

_____[1]

**(d)** Work out the speed of the train between A and B.
Give your answer in kilometres per hour.

.....

.....

**(d)** _____km/h [2]

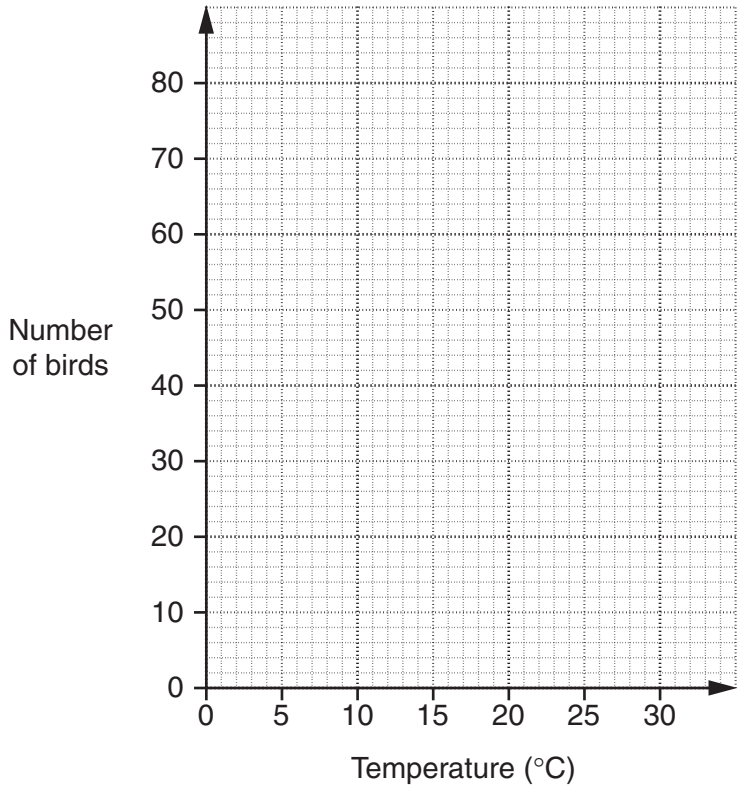
**5** Jackie and Terence are keen bird watchers.

They recorded the number of birds visiting their bird table in one hour on six occasions. They also recorded the temperature.

Their results are listed below.

| Temperature (°C) | 5 | 10 | 15 | 20 | 25 | 30 |
|---|---|---|---|---|---|---|
| Number of birds | 70 | 52 | 42 | 26 | 12 | 4 |

**(a)** Draw a scatter diagram of this information on the grid below.




[2]

**(b) (i)** Draw a line of best fit on your scatter diagram. [1]

**(ii)** Estimate the number of birds that might visit the bird table when the temperature is 17°C.

**(ii)** _____ [1]

6 (a) Solve.

$$13 + 2x = 11$$

.....

.....

(a) _____[2]

(b) A box contains 6 bottles of wine.

**An image has been removed due to third party copyright restrictions**

Details: An image of a box containing six bottles of wine

One bottle of wine weighs w kg.

The box weighs 1 kg less than one bottle of wine.

(i) Show that the total weight, in kilograms, of two boxes, each with six bottles of wine is

$$14w - 2.$$

_____

_____

_____[3]

(ii) The total weight of the two boxes and their bottles is 19 kg.

Write down an equation in w and solve it to find the weight of one bottle of wine.

.....

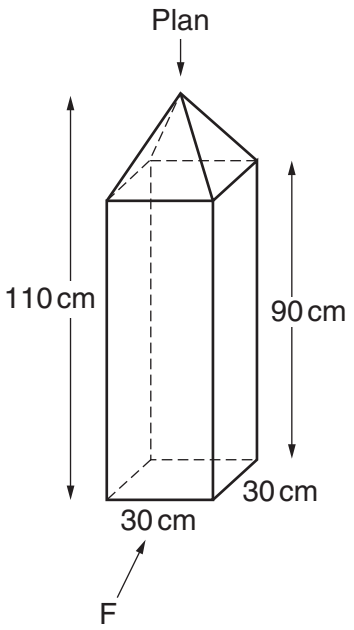
.....

.....

.....

(b)(ii) _____ kg [2]

**7** A gate-post is a cuboid topped by a pyramid.
The cuboid has a square base of side 30 cm and height 90 cm.
The total height of the gate-post is 110 cm.




Use a scale of 1 cm to 10 cm to draw, on the grids below,

**(a)** the plan of the gate-post, [2]

**(b)** the elevation of the gate-post viewed from F. [2]

**(a)**

**(b)**

**8** **(a)** Multiply out the brackets.

$$6(5x - 1)$$

.....

**(a)** _____[1]

**(b)** Factorise.

**(i)** $12a + 15$

.....

**(b)(i)** _____[1]

**(ii)** $x^2 - 7x$

.....

**(ii)** _____[1]

**(c)** Simplify.

$$p^{12} \div p^4$$

.....

**(c)** _____[1]

---

**9** Megan invested £2000 for 3 years at 5% Compound Interest.

Calculate the **interest** Megan received.

.....

.....

.....

.....

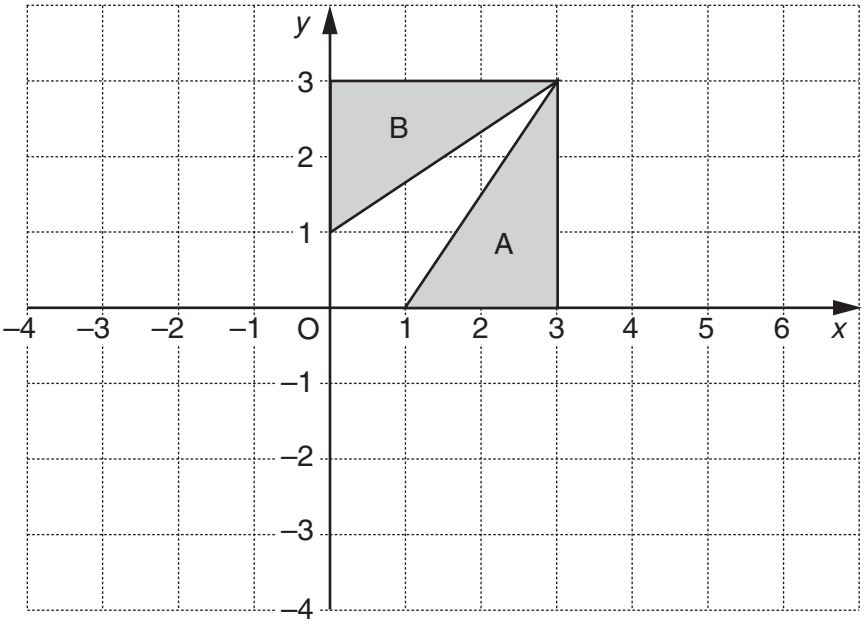
.....

.....

£ _____[3]

---

**10**




**(a)** Rotate **shape A** 90° clockwise about the origin. Label the image P. [3]

**(b)** Translate **shape A** by $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. Label the image Q. [2]

**(c)** Describe fully the **single** transformation which maps shape A onto shape B.

_____

_____[2]

_____

**11** Use your calculator to work these out.

**(a)** $\dfrac{3 \times 10.53}{6.75 - 2.93}$

Give your answer correct to two decimal places.

.....

**(a)** _____[2]

**(b)** $\sqrt{8.7^2 - 2.8^3}$

Give your answer correct to two significant figures.

.....

**(b)** _____[2]

**(c)** $\frac{3}{8} \div 3\frac{3}{4}$

Give your answer as a fraction.

.....

**(c)** _____[2]

**(d)** $5.8 \times 10^{-4} - 2.7 \times 10^{-5}$

Give your answer in standard form.

.....

**(d)** _____[2]

**12** **(a)** Complete the table below for

$$y = x^2 + 2x - 1.$$

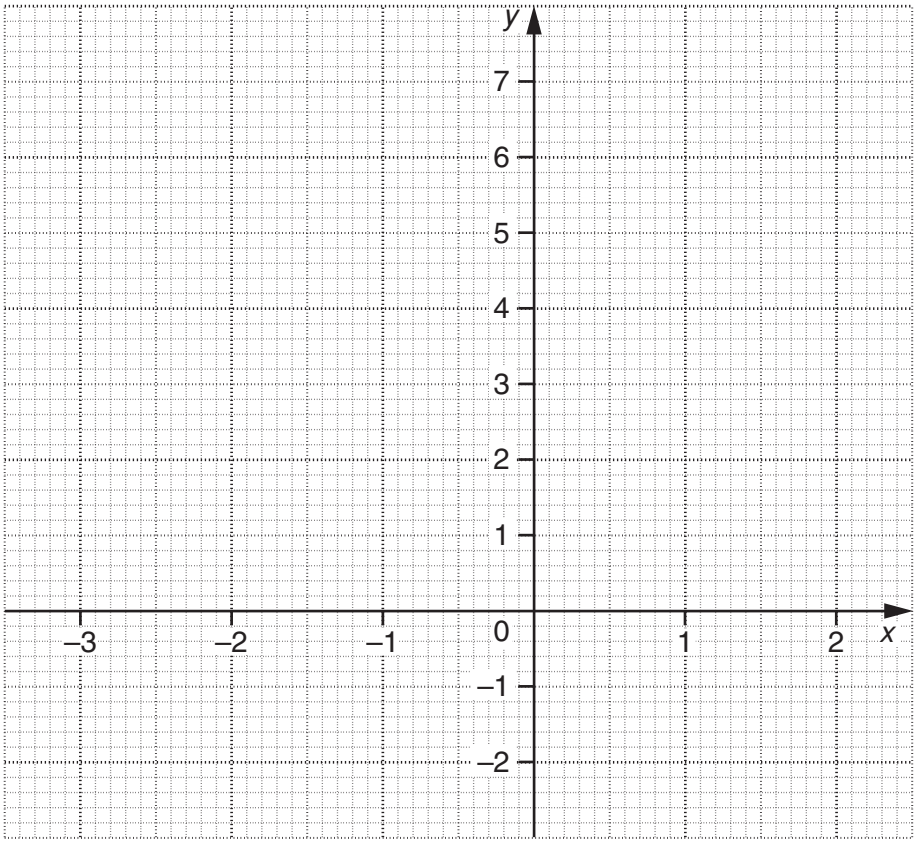
.....

.....

| $x$ | –3 | –2 | –1 | 0 | 1 | 2 |
|---|---|---|---|---|---|---|
| $y$ | 2 | –1 | | –1 | 2 | |

[2]

**(b)** Draw the graph of $y = x^2 + 2x - 1$.




[2]

**(c)** Use your graph to solve the equation

$$x^2 + 2x - 1 = 0.$$

**(c)** _____[2]

**13 (a)** Majid asked 120 people, "How long did you spend listening to the radio yesterday?"

His results are summarised in the table below.

| Time ($t$ hours) | Frequency |
|---|---|
| $0 \leqslant t < 1$ | 70 |
| $1 \leqslant t < 2$ | 26 |
| $2 \leqslant t < 3$ | 14 |
| $3 \leqslant t < 4$ | 10 |

Calculate an estimate of the mean time.

Take 0.5 as the midpoint of the first interval.

.....

.....

.....

.....

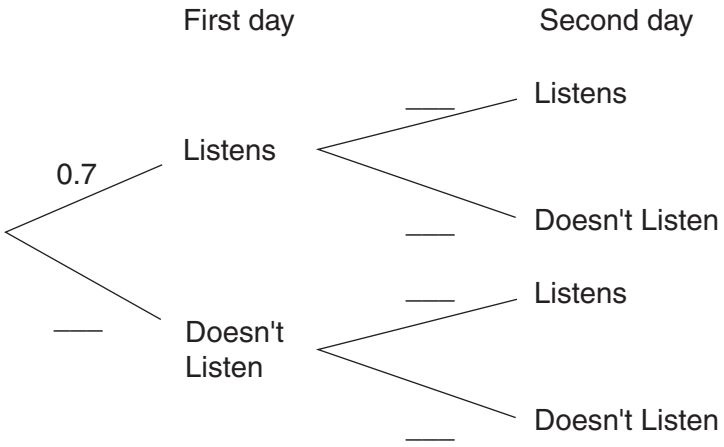
.....

.....

**(a)** _____hours [3]

**(b)** On any day, the probability that Elaine listens to the car radio on her way to work is 0.7.

**(i)** Complete the probability tree diagram to show the probabilities of Elaine listening to the car radio on two consecutive days.




[2]

**(ii)** Find the probability that Elaine listens to the radio on **only one** of the two days.

.....

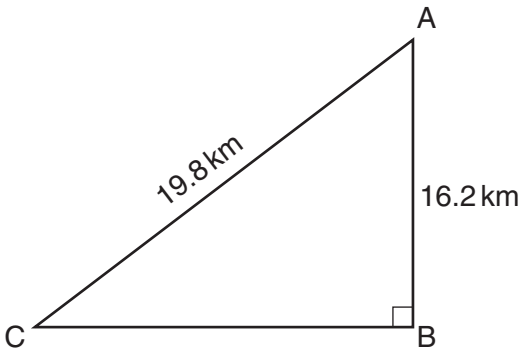
.....

.....

.....

**(b)(ii)** _____[3]

**14 (a)**




NOT TO SCALE

Town A is 16.2 km north of town B. Town C is 19.8 km from A and is due west of B.
Calculate the distance of C from B.

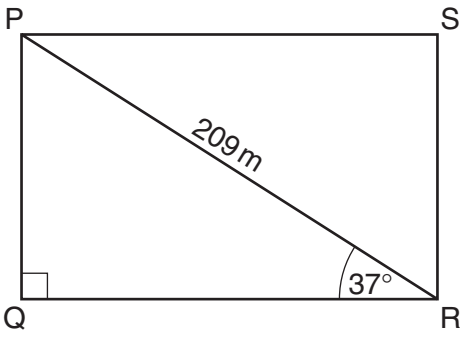
.....

.....

.....

**(a)** _____km [3]

**(b)**




NOT TO SCALE

PR is a diagonal of a rectangular field PQRS.
The length of PR is 209 m and angle PRQ is 37°.

Find QR. Give your answer to an appropriate degree of accuracy.

.....

.....

.....

.....

**(b)** _____m [4]

**15** **(a)** Each apple in a bag weighs 90 g, correct to the nearest 10 g.

**(i)** Write down the greatest possible weight of one of these apples.

**(a)(i)** _____g [1]

**(ii)** Find the least possible total weight of six of these apples.

.....

.....

**(ii)** _____g [1]

**(b)** A greengrocer sells cooking apples for £1.17 per bag.
He makes 80% profit on the price he paid for the apples.

How much did he pay for a bag of cooking apples? Give your answer in pence.

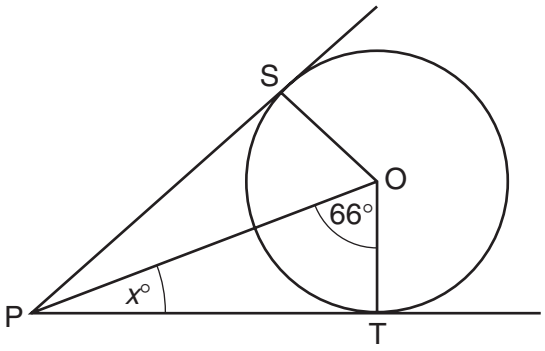
.....

.....

**(b)** _____p [3]

---

**16**




NOT TO SCALE

PS and PT are tangents to a circle, centre O. Angle TOP = 66°.

**(a)** Find the value of *x*. Give reasons for your answer.

.....

*x* = _____ because _____

_____[2]

**(b)** Find angle SPT.

.....

**(b)** _____° [1]

---

**17** **(a)** Solve algebraically these simultaneous equations.

$$2x - y = 5$$
$$3x + 2y = 4$$

.....

.....

.....

.....

.....

.....

.....

.....

**(a)** $x =$ _____ $y =$ _____[3]

**(b)** Factorise.

$$x^2 - 25$$

.....

**(b)** _____[1]

**(c)** **(i)** Factorise.

$$x^2 - 8x + 12$$

.....

.....

**(c)(i)** _____[2]

**(ii)** Hence solve.

$$x^2 - 8x + 12 = 0$$

.....

.....

**(ii)** _____[1]

**BLANK PAGE**

BLANK PAGE