FOR OFFICIAL USE

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| | | | | | |

Total mark

# X101/102

NATIONAL QUALIFICATIONS 2007

TUESDAY, 15 MAY
1.00 PM – 1.35 PM

# MATHEMATICS INTERMEDIATE 1

Units 1, 2 and Applications of Mathematics
Paper 1
(Non-calculator)

**Fill in these boxes and read what is printed below.**

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

1 **You may NOT use a calculator.**

2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.

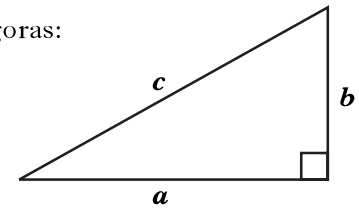
3 Full credit will be given only where the solution contains appropriate working.

4 Before leaving the examination room you must give this book to the invigilator. If you do not you may lose all the marks for this paper.

**FORMULAE LIST**

Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi rh$

Theorem of Pythagoras:




$a^2 + b^2 = c^2$

DO NOT WRITE IN THIS MARGIN

*Marks*

**ALL questions should be attempted.**

**1.** (*a*) Find 8·52 + 10·7.

**1**

(*b*) Find 3·76 ÷ 8.

**1**

(*c*) Change 0·057 into a fraction.

**1**

(*d*) Find 90% of £320.

**2**

**2.** Shona wants to insure her jewellery for £8000.
The insurance company charges an annual premium of £7·65 for each £1000 insured.
Work out Shona's annual premium.

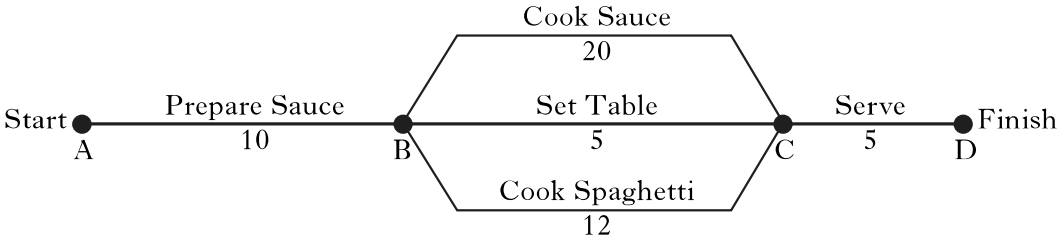
**2**

DO NOT WRITE IN THIS MARGIN

*Marks*

**3.** The network diagram shows the time it takes to make a meal of Spaghetti Bolognese.

All times are in minutes.




(*a*) How long does it take to cook the spaghetti?

**1**

(*b*) How long does it take altogether to make the meal from start to finish?

**1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**4.** The number of minutes that patients had to sit in the waiting room before seeing their doctor was recorded one day.

The results are shown in the frequency table below.

| Number of minutes | Frequency | Number of minutes × Frequency |
|---|---|---|
| 5 | 4 | 20 |
| 6 | 7 | 42 |
| 7 | 8 | 56 |
| 8 | 13 | 104 |
| 9 | 12 | |
| 10 | 6 | |
| | Total = 50 | Total = |

Complete the table above **and** find the mean number of minutes.

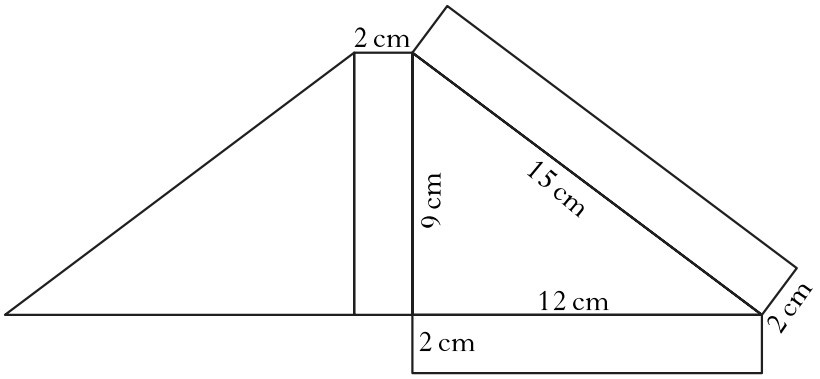
**3**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**5.** The diagram below shows the net of a triangular prism.



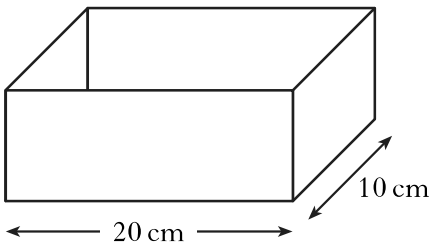

Find the total **surface area** of the triangular prism.

**3**

DO NOT WRITE IN THIS MARGIN

*Marks*

**6.** Shown below is a container in the shape of a cuboid.




When full, the container holds 1600 cubic centimetres of water.
Work out the height of the container.

**3**

**7.** Work out the answers to the following.

(*a*) $2 \times (-2) \times 2$

**1**

(*b*) $11 - (-6)$

**1**

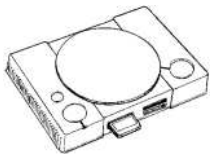
**[Turn over**

*Marks*

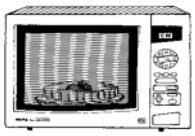
**8.** Naveed has six electrical appliances in his student lodgings.
The power, in watts, used by each appliance is shown below.

Lamp 100 watts

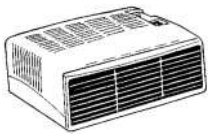
Computer 200 watts



Games Machine
400 watts



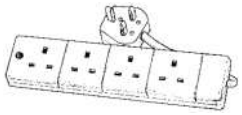
Microwave 700 watts



Heater 1000 watts

Kettle 2300 watts

Naveed uses a 4-way extension lead for the appliances.



The instructions state that the maximum power used through the extension lead should not be more than 3000 watts.
One combination of **four** appliances that Naveed can safely use through the extension lead is shown in the table below.

| *Lamp*<br>100 watts | *Computer*<br>200 watts | *Games Machine*<br>400 watts | *Microwave*<br>700 watts | *Heater*<br>1000 watts | *Kettle*<br>2300 watts | *Total Watts* |
|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | | ✓ | | 1700 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Complete the table to show **all** the possible combinations of **four** appliances that Naveed can safely use through the extension lead. **3**

DO NOT WRITE IN THIS MARGIN

*Marks*

**9.** The number of goals scored by each of twelve football teams in a season is shown below.

38 33 35 57 60 53 50 52 55 73 80 62

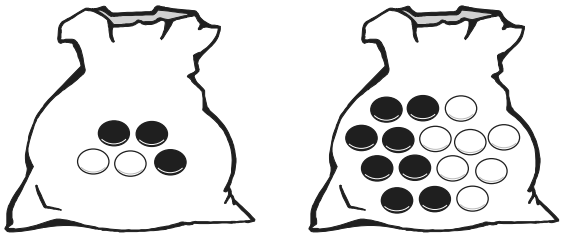
(*a*) Find the upper quartile.

**2**

(*b*) Calculate the interquartile range.

**2**

**10.** Black and white counters are placed in two bags as shown below.



Bag 1 Bag 2

One counter is selected at random from **each** bag.
Which bag gives a greater probability of selecting a black counter?
**Explain your answer.**

**3**

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

## ADDITIONAL SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

**ADDITIONAL SPACE FOR ANSWERS**

DO NOT WRITE IN THIS MARGIN

**ADDITIONAL SPACE FOR ANSWERS**

FOR OFFICIAL USE

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

Total mark

# X101/104

NATIONAL QUALIFICATIONS 2007

TUESDAY, 15 MAY
1.55 PM – 2.50 PM

# MATHEMATICS INTERMEDIATE 1

Units 1, 2 and Applications of Mathematics
Paper 2

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Forename(s)

Surname

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Number of seat

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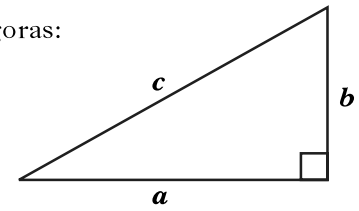


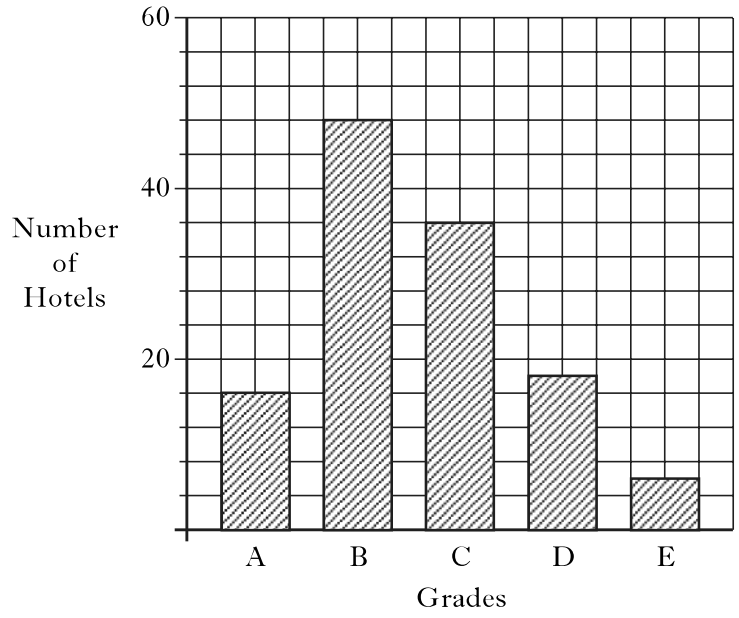

$a^2 + b^2 = c^2$

DO NOT WRITE IN THIS MARGIN

Marks

**ALL questions should be attempted.**

**1.** The bar graph shows the number of hotels in Southbay awarded grades A to E by the local tourist board.




(*a*) How many hotels were awarded an A grade?

**1**

(*b*) Write down the modal grade.

**1**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

Marks

**2.** The distance travelled (in miles) by a lorry driver each day is recorded in the spreadsheet below.

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | | Monday | Tuesday | Wednesday | Thursday | Friday | Total Distance |
| 2 | Week 1 | 110 | 80 | 90 | 80 | 60 | |
| 3 | Week 2 | 100 | 90 | 100 | 70 | 70 | |
| 4 | Week 3 | 90 | 100 | 90 | 100 | 80 | |
| 5 | Week 4 | 120 | 90 | 80 | 90 | 70 | |
| 6 | | | | | | | |

(*a*) What formula would be used to enter the total distance travelled in week 1 in cell G2?

**1**

(*b*) The result of the formula =AVERAGE(B2..B5) is to be entered in cell B6.

What would appear in cell B6?

**1**

**3.** An aeroplane took off from Edinburgh at 0753 and landed in Shetland at 0908. The distance flown by the aeroplane was 295 miles.

Calculate the average speed of the aeroplane in miles per hour.

**3**

DO NOT WRITE IN THIS MARGIN

*Marks*

**4.** Wayne is a mechanic.
He earns £329·70 for a basic 35 hour week.

(*a*) Calculate his hourly rate.

**1**

(*b*) One week Wayne also works 3 hours overtime.
His overtime rate is time and a half.
How much does he earn **altogether** for that week?

**3**

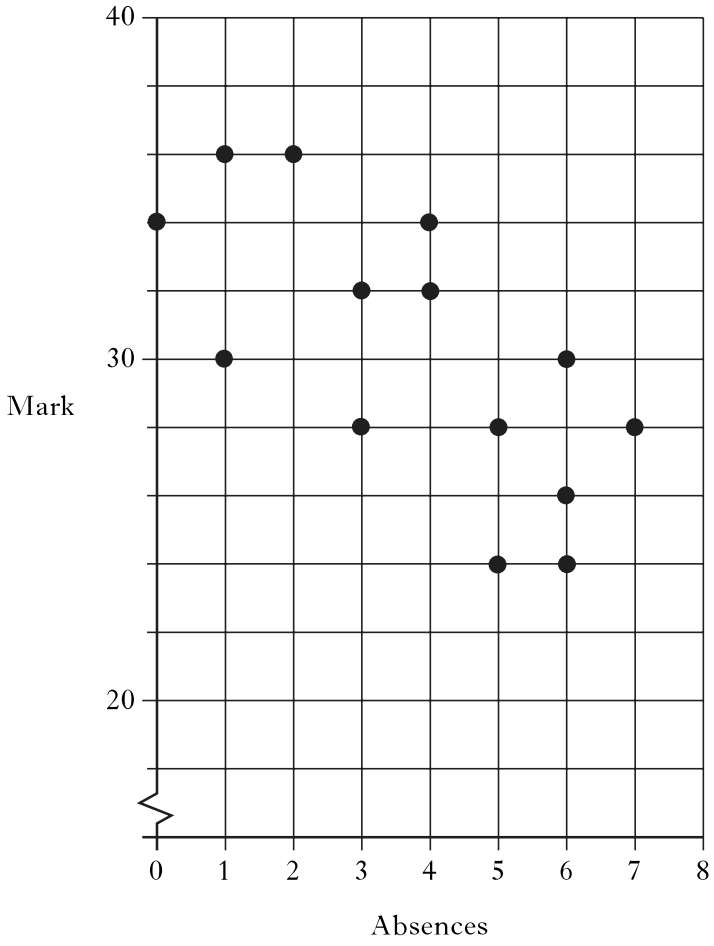
**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**5.** A teacher records the number of absences and end of term test mark for each of her students.

The scattergraph shows the results.




(*a*) Draw a line of best fit through the points on the graph. **1**

(*b*) Use your line of best fit to estimate the mark of a student who had 8 absences. **1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**6.** The table below shows the **monthly payments** to be made when money is borrowed from a loan company.

Payments can be made with or without payment protection.

| | WITHOUT PAYMENT PROTECTION | | |
|---|---|---|---|
| **Loan Amount** | **12 months** | **36 months** | **60 months** |
| £ 2000 | £184·47 | £70·56 | £48·25 |
| £ 5000 | £442·61 | £160·35 | £104·31 |
| £10 000 | £882·94 | £318·76 | £206·68 |
| £15 000 | £1324·41 | £478·14 | £310·02 |

| | WITH PAYMENT PROTECTION | | |
|---|---|---|---|
| **Loan Amount** | **12 months** | **36 months** | **60 months** |
| £ 2000 | £200·38 | £87·08 | £66·68 |
| £ 5000 | £480·78 | £197·88 | £144·15 |
| £10 000 | £959·08 | £393·38 | £265·62 |
| £15 000 | £1438·63 | £590·06 | £428·42 |

Gail borrows £5000 over 3 years **with payment protection**.

(*a*) State her monthly payment.

**1**

(*b*) Calculate her total payments.

**1**

(*c*) Calculate how much this loan cost Gail.

**1**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**7.** The weights of two groups of ten people are to be compared.
Listed below are the weights (in kilograms) of the ten people in group A.

64 71 73 66 69 78 77 75 76 71

(*a*) Find the median.

**2**

(*b*) Find the range.

**2**

(*c*) For the ten people in group B the median is 76 and the range is 20.
Make **two** comments comparing the weights of the people in group A and group B.

**2**

DO NOT WRITE IN THIS MARGIN

*Marks*

**8.** Sam invests £7600 in a bank account.

- The rate of interest is 4·8% per annum.
- The bank deducts 20% tax from the interest.

Calculate the interest Sam receives for one year after tax has been deducted.

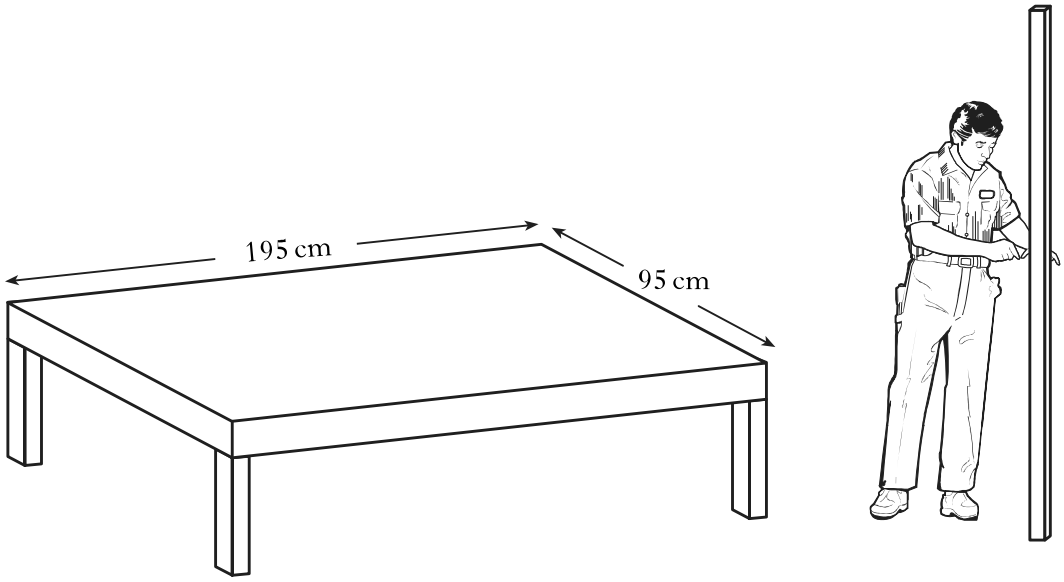
**3**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**9.** Phil is making a wooden bed frame.
The frame is rectangular and measures 195 centimetres by 95 centimetres.




To make the frame rigid, Phil is going to add a piece of wood along one of its diagonals.
He has a piece of wood 2·2 metres long.
Is this piece of wood long enough to fit along the diagonal?
Give a reason for your answer.
**Do not use a scale drawing.**

**4**

DO NOT WRITE IN THIS MARGIN

*Marks*

**10.** Curtis flew from New York to London where he changed 1400 dollars into pounds.

He spent £650 in London and then changed the rest into euros before travelling to Paris.

How many euros did Curtis receive?

**Exchange Rates**

| | |
|---|---|
| $ | £1 = 1·75 dollars |
| € | £1 = 1·38 euros |

**3**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**11.** Jill is taking part in an orienteering competition.
She starts at checkpoint A as shown below.
She then runs due east for 900 metres to checkpoint B.

(*a*) Show the position of checkpoint B in a scale drawing.
**Use a scale of 1 cm to 100 m.**


**1**

(*b*) Checkpoint C lies on a bearing of:

- 055° from checkpoint A
- 320° from checkpoint B.

Complete the scale drawing to show the position of checkpoint C. **3**

DO NOT WRITE IN THIS MARGIN

*Marks*

**12.** Pamela paid £40 for a concert ticket.

She was unable to go to the concert, so she sold her ticket on the Internet for £26.

Express her loss as a percentage of what she paid for the ticket.

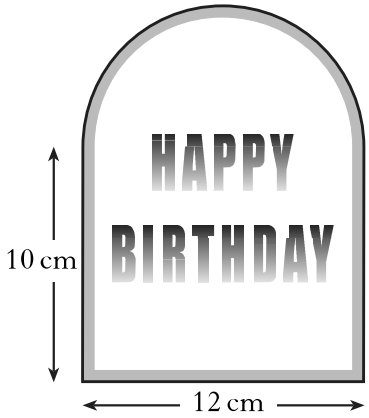
**4**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**13.** The diagram below shows a birthday card.




The card consists of a rectangle and a semi-circle.
There is gold ribbon all round the border of the card.
Calculate the total length of gold ribbon needed for this card.
Give your answer to the **nearest centimetre**.

**5**

DO NOT WRITE IN THIS MARGIN

Marks

**14.** The tariffs shown below are available when buying a mobile phone.

| **Pay As You Go** | **Monthly Contract** |
|---|---|
| **Calls:** 14p per minute | **Rental:** £18 per month<br>**Calls:** 6p per minute |

(*a*) Find the cost of using 200 minutes of calls each month on the:

(i) Pay As You Go tariff;

(ii) Monthly Contract tariff.

**2**

(*b*) Nick and Amy have mobile phones.

Nick is on Pay As You Go and Amy has a Monthly Contract.

In April:

- the cost to each was exactly the same
- Nick used the same number of minutes as Amy.

How many minutes was this?

**3**

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIIS MARGIN

**ADDITIONAL SPACE FOR ANSWERS**