BOARD OF STUDIES
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

1998

MATHEMATICS IN PRACTICE

2 UNIT

Time allowed—Two hours and a half
(Plus 5 minutes reading time)

DIRECTIONS TO CANDIDATES

- Only Board-approved calculators are to be used.

- The mark out of 80 will be converted to a mark out of 100.

Section I (30 marks)

- This Section contains 30 multiple-choice questions.

- Attempt ALL questions.

- All questions are of equal value.

- Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.

- Allow about one hour for Section I.

Section II (50 marks)

- Attempt ALL questions.

- All questions are of equal value.

- Answer the questions in the spaces provided in this paper.

- Write your Student Number and Centre Number in the spaces provided on the first page of each question.

- Show all necessary working.

- Marks may be deducted for careless or badly arranged work.

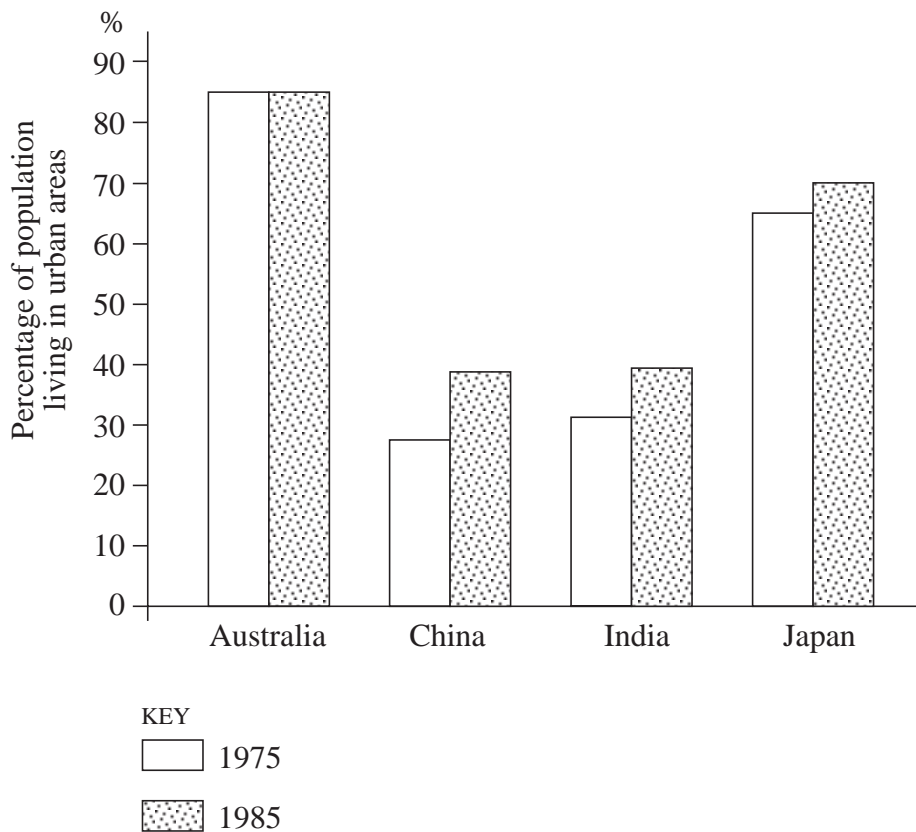- Allow about one hour and a half for Section II.

SECTION I

Attempt ALL questions.

All questions are of equal value.

Select the alternative A, B, C or D that best answers the question.

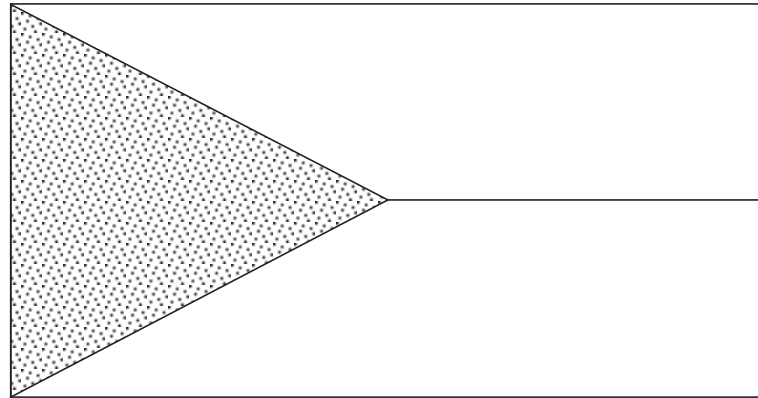Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.

1. The graph below shows the percentage of the population living in urban areas.

KEY
☐ 1975
▨ 1985

Which country had the greatest increase in percentage of population living in urban areas between 1975 and 1985?

(A) Australia   (B) China   (C) India   (D) Japan

2. What percentage of this flag is shaded?

(A) 20%   (B) 25%   (C) 30%   (D) 33%

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3. Ann has insured her car with Ostrich Insurance Company. She must pay an excess if she makes a claim.

> OSTRICH INSURANCE EXCESS CONDITIONS
>
> Basic excess: $300   (applies to all drivers)
>
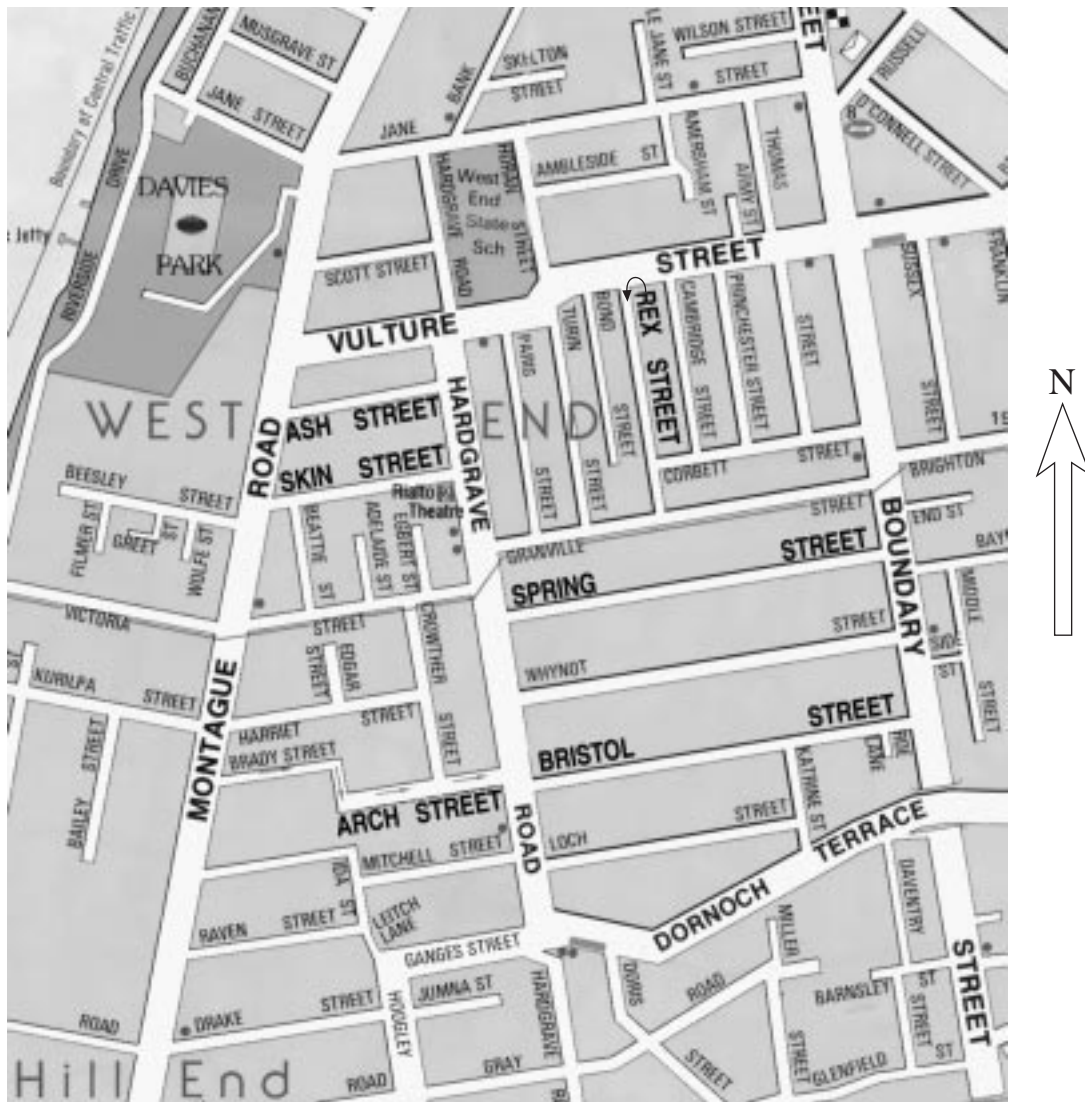> Additional age excess for under 25 drivers:
>
> $1000   (male drivers)
>
> $500   (female drivers)

Ann is 22 years old when she has an accident and causes damage to her car worth $3750.

How much will Ostrich pay towards the repairs?

(A) $2950   (B) $3250   (C) $3450   (D) $3750

USE THE FOLLOWING MAP TO ANSWER QUESTIONS 4 AND 5.

Map reproduced with permission of the Royal Automobile Club of Queensland

4.   Anthony is travelling south along Hardgrave Road from Vulture Street.

Which statement is correct?

(A)   Anthony will pass Arch Street after he passes Skin Street.

(B)   Anthony would have to turn left to be in Ash Street.

(C)   Anthony will cross Montague Road.

(D)   Bristol Street is north of Spring Street.

5.   Rex Street runs off Vulture Street. It is 390 metres long.

What scale is used on this map?

(A)   1 : 130   (B)   1 : 1300   (C)   1 : 13 000   (D)   1 : 130 000

6. Sarah's telephone bill for the period ending 15 September was $125·30. The following additional information was included in her account.

Calling patterns compared with last bill		
Local calls	down by	$17·50
STD calls	up by	$10·30
Calls to mobiles	up by	$0·75
0011 International	down by	$5·40

Use this information to calculate the total of her last bill.

(A) $91·35   (B) $113·45   (C) $137·15   (D) $159·25

---

7. Stan decides to purchase a new stereo system. The cash price is $749. The store offers a 'deferred payment plan' of $100 deposit plus six equal monthly instalments of $140. Stan decides to use the payment plan.

How much more than the cash price will he pay?

(A) $91   (B) $191   (C) $840   (D) $940

8.
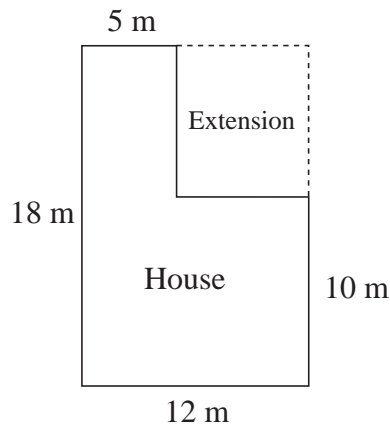
An extension is to be made to the house as shown.

A timber extension will cost $160 per square metre and a brick extension will cost $190 per square metre.

What will be the cost of building a brick extension?

(A) $8000   (B) $8960   (C) $9500   (D) $10 640

9. A bag contains 10 red, 15 yellow, 8 green and 2 pink lollies. Johnny picks out a green lolly and eats it. He then randomly selects another lolly.

What is the probability that the second lolly is green?
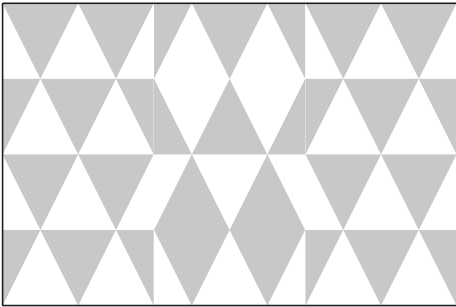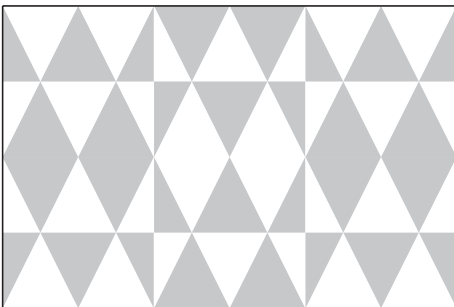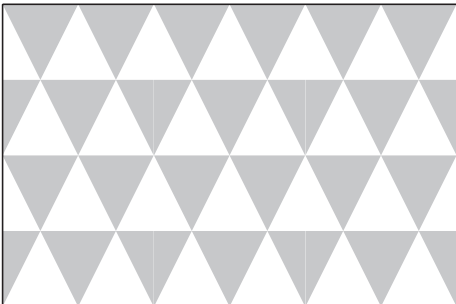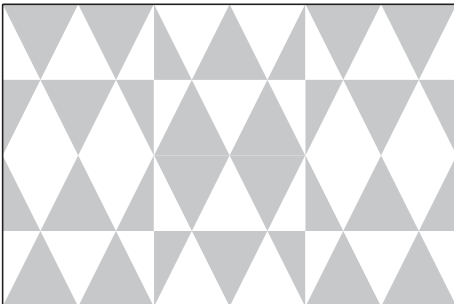
(A) $\dfrac{8}{35}$ 　　　　 (B) $\dfrac{8}{34}$ 　　　　 (C) $\dfrac{7}{35}$ 　　　　 (D) $\dfrac{7}{34}$

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10. Cary designed the following tile.
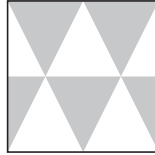
Six of these tiles were used to make each of the patterns shown below.

Which pattern required a tile to be cut in half?

(A)

(B)

(C)

(D)

11.

T-MART

ONE DAY SALE!

15% off all
regular prices

Jodie attends the one-day sale at T-Mart and buys a sofa. The regular price of this sofa is $325·00.

How much did Jodie save by shopping on the sale day?

(A) $15·00   (B) $48·75   (C) $276·25   (D) $310·00

12. A family drives from home to Bathurst. The distance between Bathurst and their home is 270 km. They leave home at 11:00 am and stop for a half-hour lunch break.

If they drive at an average speed of 90 km/h, at what time will they arrive in Bathurst?

(A) 1:30 pm   (B) 2:00 pm   (C) 2:30 pm   (D) 3:00 pm

13. London is to the west of Sydney. The time difference between London and Sydney is 10 hours.

Alexander lives in Sydney and his friend Jeanette lives in London.

At 9:45 pm (Sydney time) Alexander rings Jeanette and they talk for 45 minutes.

What time was it in London when the phone conversation ended?

(A) 8:30 am   (B) 11:45 am   (C) 10:30 pm   (D) 12:30 pm

USE THE GRAPH TO ANSWER QUESTIONS 14 AND 15.

The graph below shows the world's population.
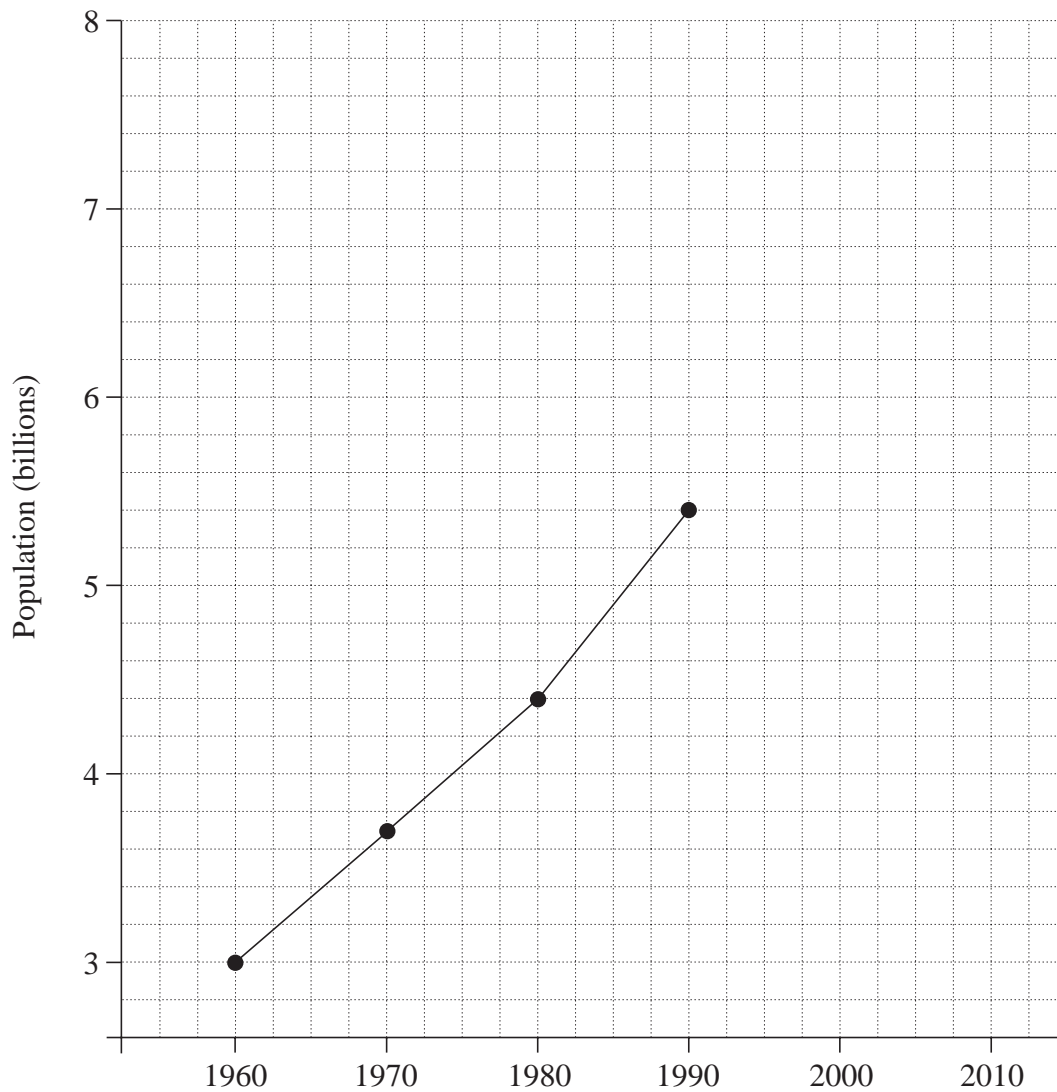
14. The percentage increase in the world's population between 1980 and 1990 was closest to

(A) 19 (B) 23 (C) 24 (D) 29

15. If the population continues to increase at the rate it increased between 1980 and 1990, what will the population be in 2005?

(A) 6·4 billion (B) 6·6 billion (C) 6·9 billion (D) 7·4 billion

16. Below is a table that shows a real-estate agent's fees for selling property.

Value of sale	Agent's fee
Up to and including $50 000	4%
From $50 001 to $100 000	$2000 plus 2% for each $1 over $50 000
Over $100 000	$3000 plus 1% for each $1 over $100 000

The agent sells a house for $180 000.

What is the agent's fee?

(A) $3800   (B) $4600   (C) $4800   (D) $7200

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17. The diagram shows one wall of a room with a window.
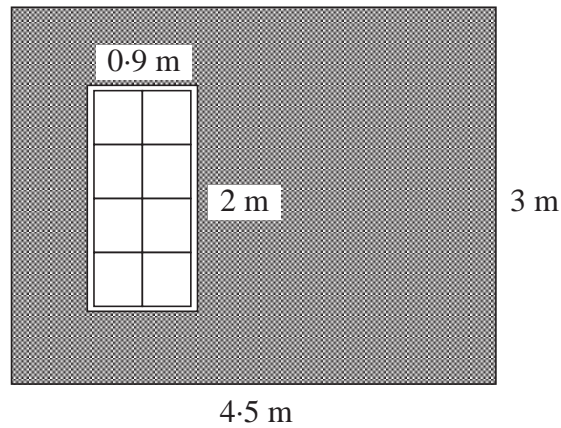
The wall is to be repainted. How many square metres needs to be painted?

(A) 4·6   (B) 11·7   (C) 13·5   (D) 15·3

18. Below is a section of a television guide.

FRIDAY DECEMBER 12

SEVEN

9.30 **The Crew** (PG). 5657
10.00 **Home Court** (PG). 6386
10.00 *[Pr] Infobreak International.*
10.30 **News.** 4305
10.30 *[Pr] Today Tonight (S).*
11.00 **Pacific Blue** (PG). 59015
12.00 **MOVIE: The Return Of The Man From U.N.C.L.E** (PG, 83, R). Two anti-espionage agents come out of retirement to battle their arch-enemy. 887183
2.00 **Ricki Lake** (PG, R). 40367
3.00 **The Pursuit Of Happiness** (PG). 3760
3.00 *[Pr] Big Weekend.*
3.30 **Power Rangers.** 8837

NINE

9.30 **The Wackiest Ship In The Army** (R). 358541
9.30 *[N] Free Willy.* 7744
9.30 *[W] Telemall (R).* 7744
10.00 *[N/W] Humphrey.* 273251
10.30 **News.** 281270
10.30 *[N] McKenna.* 369657
11.00 **What's Cooking.** 299299
11.30 **Entertainment Tonight** (PG). 292386
12.00 **The Best of Midday 1997** (PG). Highlights. 340638
1.30 **Days of Our Lives.** 727657
2.30 **The Young And The Restless** (PG). 721473
3.30 **Dave's World.** 654102
4.00 **The Gift** (S). 655831
4.30 **Perfect Strangers.** 382396

TEN

9.00 **Good Morning Australia With Bert Newton** (PG). 6291102
11.30 **News.** 290928
12.00 **The Love Boat** (R). 708522
1.00 **Judge Judy** (PG). 639893
1.00 *[Nthn/Cap] Celebrity Home Shopping.*
1.30 **The Oprah Winfrey Show: Follow-Up Show** (PG). 725299
2.30 **Monday To Friday** (PG). With Greg Evans. 729015
3.30 **C.O.P.S. (R).** 652744
4.00 **Ocean Girl.** 653473
4.30 **The Bold And The Beautiful.** 182378
5.00 **News.** 179096

The Sun – Herald

Sam wishes to record the following programs:

- MOVIE: The Return of the Man from U.N.C.L.E (Channel 7)
- The Young and the Restless (Channel 9)
- The Bold and the Beautiful (Channel 10).

What is the shortest videotape required to record all THREE programs?

(A) 120 minutes (B) 180 minutes (C) 240 minutes (D) 300 minutes

19. The table below shows distances in kilometres for a trip from Brisbane to Cairns.

Town	Intermediate	Total
Brisbane	0	0
Maryborough	255	255
Gladstone	272	527
Rockhampton	114	641
Mackay	334	975
Townsville	396	1371
Innisfail	258	1629
Cairns	88	1717

Robert is travelling from Brisbane to Cairns. He leaves his credit card at a petrol station in Rockhampton and does not realise this until he reaches Mackay. He goes back to pick up the card before continuing his trip to Cairns.

What is the total distance he travels?

(A)   1945 km   (B)   2051 km   (C)   2157 km   (D)   2385 km

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20.
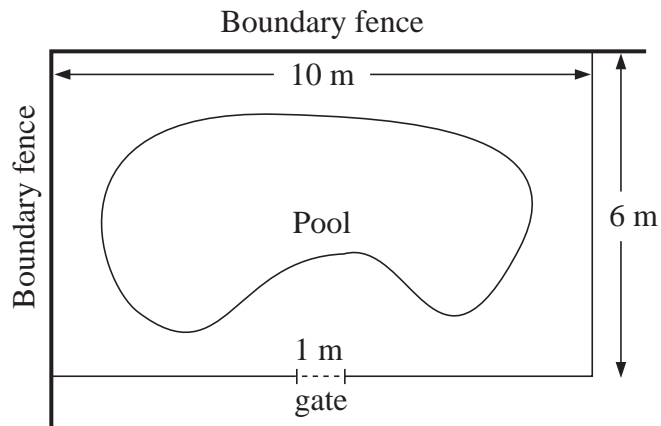
Boundary fence

The boundary fences of this pool are already in place. Fencing costs $24·50 per metre. The gate costs $85.

Find the cost of completing the pool enclosure.

(A) $367·50   (B) $392·00   (C) $452·50   (D) $477·00

21.

> ## Papunya Tours
>
> Next camel trek
>
> Departs 23 May
>
> 8 am

A group of tourists has booked to leave on this camel trek from Alice Springs to Uluru, a distance of 360 km. They will travel 30 km each day except for rest days. The group rests every sixth day.

On which date will they reach Uluru?

(A)   3 June   (B)   4 June   (C)   5 June   (D)   6 June

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22.   The bar graph below shows average rainfall in Sydney, and the line graph shows average temperature.
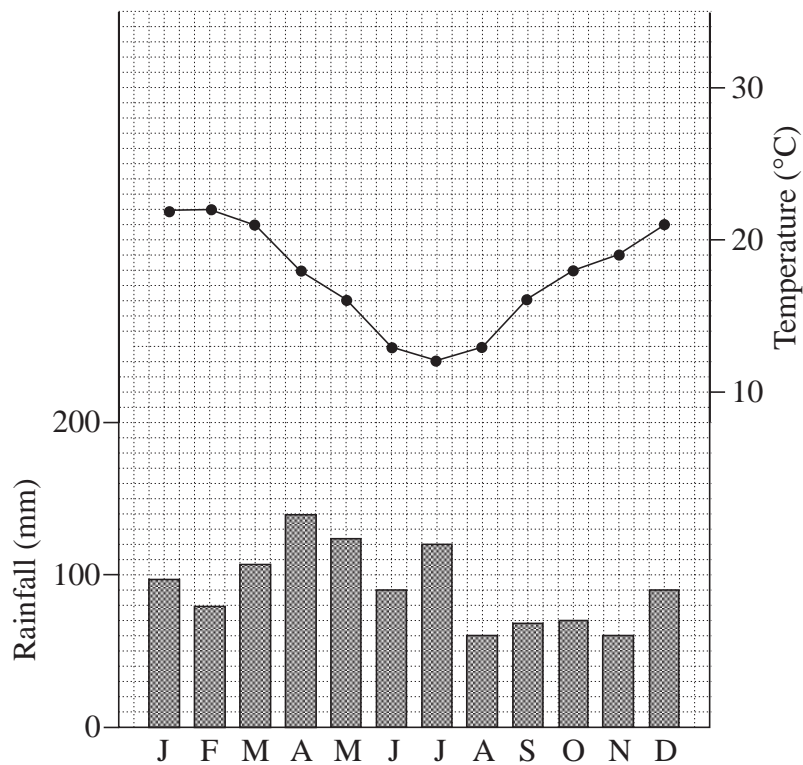
Which of the following statements is true?

(A)   The coldest month in Sydney is August.

(B)   The hottest month has the highest rainfall.

(C)   In most months the average rainfall is greater than 100 mm.

(D)   There are three months in the year in which the average temperature is less than 15°C.

23. Sue changed $A2000 (Australian dollars) into American dollars for her trip to the United States. She spent $US1190 while she was in the United States.

The exchange rate was $A1 = $US0·70.

How many Australian dollars did she receive when she exchanged her remaining American dollars?

(A) $147   (B) $210   (C) $300   (D) $567

24.
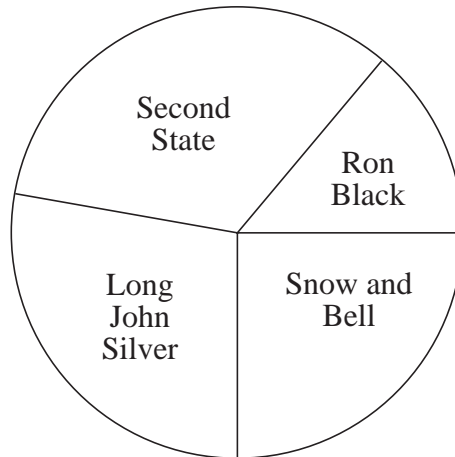
180 houses were sold in the Penrith area in one week by four real-estate agencies. The graph above shows the proportion sold by each agency.

Which agency sold 50 houses?

(A) Long John Silver   (B) Ron Black

(C) Second State   (D) Snow and Bell

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25. A bank charges 21·26% p.a. interest rate on outstanding amounts on credit cards.

Tina has an outstanding amount of $127·50 on her credit card for 22 days.

How much interest is she charged?

(A) $1·23   (B) $1·63   (C) $7·43   (D) $27·11

26. Three friends share expenses equally on a short holiday.

The costs of the holiday are shown in the table.

Car hire	4 days at $54 per day
Petrol	$45
Cabin hire	3 nights at $75 per night

How much does each person pay?

(A) $162   (B) $207   (C) $312   (D) $486

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27. The population of Australia is 18 million and the population density is 2·5 people/km^2. The population of Japan is 130 million. The surface area of Japan is 372 000 km^2.

Which of the following statements is true?

(A) The area of Australia is 720 000 km^2.

(B) The population density of Japan is 34·9 people/km^2.

(C) The population density of Japan is 7 times that of Australia.

(D) The population density of Japan is 140 times that of Australia.

---

28. When fully packed, the cardboard box shown below holds exactly 18 'Rice Treats'.

Which of the following could be the dimensions of a single Rice Treat?

(A)   8 cm $\times$ 3 cm $\times$ 4 cm

(B)   12 cm $\times$ 3 cm $\times$ 4 cm

(C)   6 cm $\times$ 3 cm $\times$ 4 cm

(D)   16 cm $\times$ 3 cm $\times$ 2 cm

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29. Year 11 students at a particular school voted for their prefects. Voting was not compulsory.

The table below shows the results for five of the students.

Student	Number of votes
Eli	42
Paolo	31
Naomie	24
Skye	12
Assunta	9

There are 164 students in Year 11 and 26 of them did not vote.
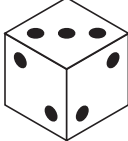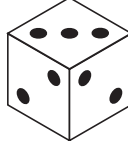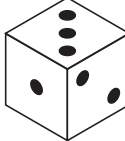
What percentage of votes did Naomie receive?

(A) 15%   (B) 17%   (C) 20%   (D) 26%

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30. The net of a special die is shown.
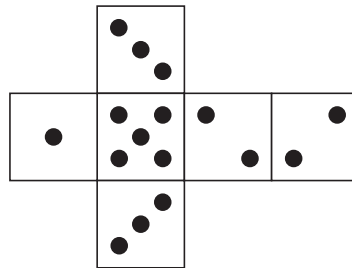
Which of the following views of the die is NOT possible?

(A)   (B)   (C)   (D)

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STUDENT NUMBER

1998
HIGHER SCHOOL CERTIFICATE EXAMINATION
MATHEMATICS IN PRACTICE
2 UNIT

CENTRE NUMBER

SECTION II

Attempt ALL questions.

All questions are of equal value.

Answer the questions in the spaces provided.

Show all necessary working.

Write your Student Number and Centre Number in the spaces provided
on the first page of each question.

QUESTION 31. The Consumer

(a)   The following is an extract from a 'Car Loan Repayment' schedule showing *fortnightly* repayments.

Amount borrowed ($)	FORTNIGHTLY REPAYMENTS			
	12 months ($)	*24 months* ($)	*36 months* ($)	*48 months* ($)
12 500	512	271	191	151
13 000	532	282	199	157
13 500	553	293	206	163
14 000	573	303	214	169

Gillian buys a car for $13 500. She pays $500 deposit and borrows the rest. She intends to repay the loan over two years.

(i)   How much will she repay each fortnight?

....

....

(ii)   What is the total of Gillian's repayments for the two years?

....

....

Question 31 continues on page 18

QUESTION 31. (Continued)

    (iii)   How much interest will Gillian pay on this loan?

        ....

        ....

    (iv)   If Gillian had chosen instead to pay her loan off in thirty-six months, how much extra would she pay in total?

        ....

        ....

(b)   Pauline's water bill is shown.

Account for residential property

Charges	1 Jan 98 – 31 Mar 98	$
Water service		20·00
Sewerage service		70·10

Usage charge	16 Oct 97 – 15 Jan 98	
Water	142 kilolitres at 80·0 cents per kilolitre	113·60

Your average daily usage   **Total amount due $203·70**

1000 litres
=
1 kilolitre

'Good enough to bottle. Too good to waste.'

This bill: 1560 — Last bill: 833 — Same time last year: 1021 (Litres)
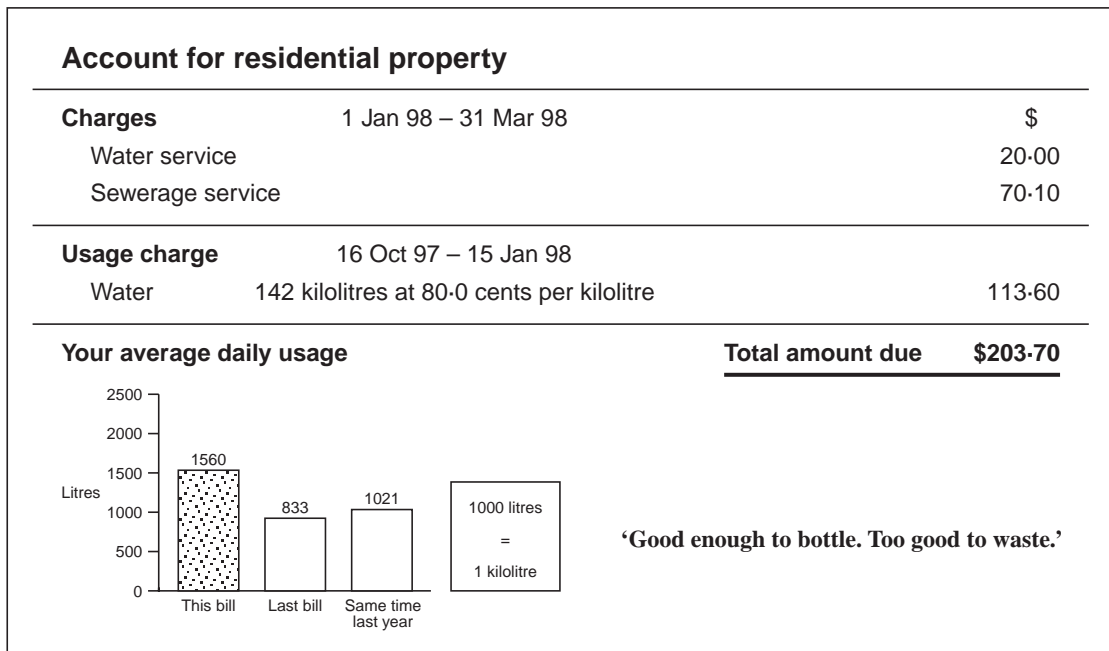
© *Sydney Water*

    (i)   Using the 'average daily usage' graph shown, calculate the increase in average daily water use for this bill compared with the last bill.

        ....

        ....

QUESTION 31. (Continued)

(ii)   Use your answer to part (i) to calculate the *percentage* increase in average daily water use for this bill compared with the last bill.

....

....

(iii)   If Pauline had used 30% less water than she actually did, what would have been the total amount due?

....

....

....

(c)   A department store is offering 12 months interest free on purchases over $500, with one-third deposit and 12 equal instalments.

(i)   Ian buys a stereo worth $1269. How much deposit must he pay?

....

....

(ii)   The remaining amount must be paid in 12 equal monthly instalments. How much is each instalment?

....

....

(iii)   Ian is 10 days late with the final payment. He is charged interest on this final payment at the rate of 0·05% per day. How much interest is Ian charged?

....

....

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QUESTION 32. Travel

(a)   This is a train timetable for Penrith to Central.

STATION	TIME	
	Slow Train	Fast Train
Penrith	7:20	7:33
Kingswood	7:23	
Werrington	7:26	
St Marys	7:28	
Mt Druitt	7:32	
Blacktown	7:42	7:47
Seven Hills	7:45	
Westmead	7:51	
Parramatta	7:54	7:57
Granville	7:57	8:00
Strathfield	8:07	8:10
Redfern	8:18	
Central	8:21	8:23

(i)   Find the time taken for the fast train to travel from Penrith to Central.

....

....

(ii)   Find the difference in travel time between the slow train and the fast train from Penrith to Parramatta.

....

....

Question 32 continues on page 22

QUESTION 32. (Continued)

(b)
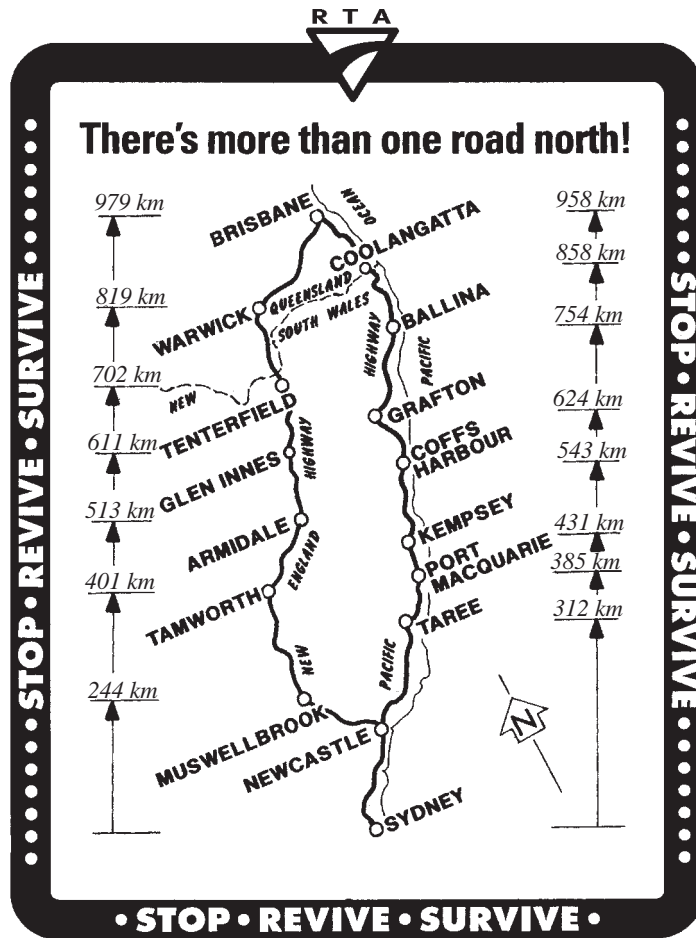
Roads & Traffic Authority

Kim travels from Sydney to Brisbane via the Pacific Highway and returns to Sydney via the New England Highway.

(i) What is the total distance Kim travels?

....

....

(ii) What is the distance between Coffs Harbour and Ballina?

....

....

(iii) Kim's car consumes petrol at a rate of 12 litres per 100 kilometres. Petrol costs 72 cents per litre.

Find the cost of the petrol Kim used to travel from Sydney to Brisbane.

....

....

QUESTION 32. (Continued)

(c)

All distances in kilometres

NRMA Drive Travel
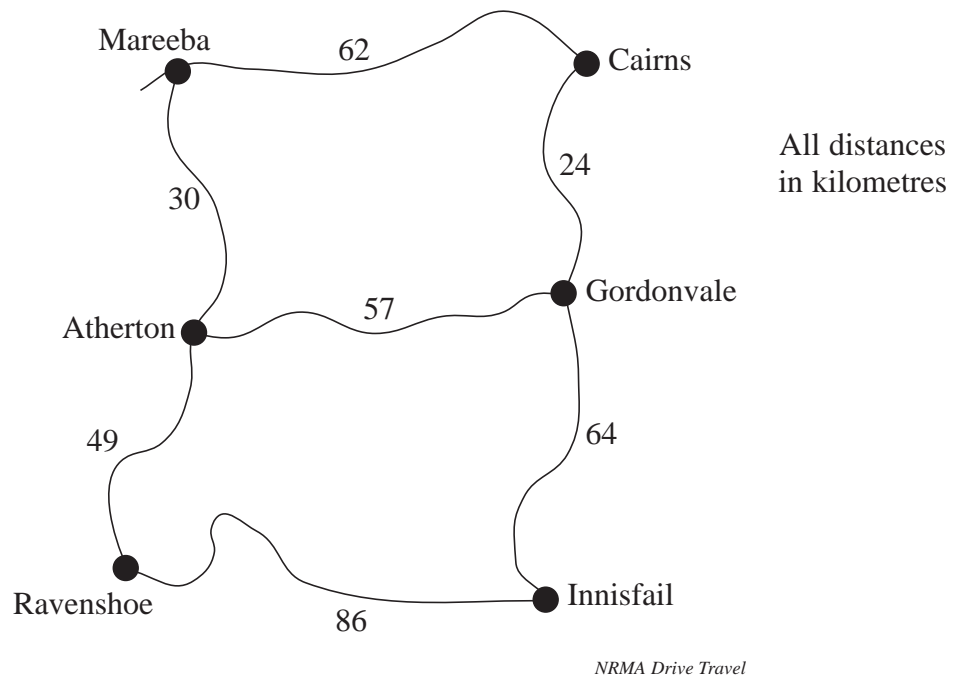
Majid and Maria fly to Cairns for a holiday. In Cairns they hire a car for three days in order to visit local towns.

They drive the round trip:

Cairns→Gordonvale→Innisfail→Ravenshoe→Atherton→Mareeba→Cairns.

(i)   Find the distance Majid and Maria drove on this round trip.

....

....

(ii)   The car hire fees were $55 per day plus 40 cents per kilometre.

Find the total cost of hiring the car.

....

....

Question 32 continues on page 24

QUESTION 32. (Continued)

(d) The table shows the price *per person* for an eight-day tour of New Zealand.

	Low Season	*High Season*	*Winter Special*
From Sydney	$1547	$1847	$1397
Supplements: Breakfast $100 Dinner $168			

Flynn and Elly take this tour to New Zealand at the Winter Special price. They purchase the breakfast and dinner supplements.

(i) Find the total cost for this tour.

....

....

(ii) How much extra would this tour cost at High Season price?

....

....

(iii) Flynn and Elly had $2500 (Australian) spending money.

The exchange rate at the time was $A1 = $NZ1·15.

How much spending money did they have in New Zealand dollars?

....

....

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MATHEMATICS IN PRACTICE
2 UNIT—SECTION II

QUESTION 33. Accommodation

(a) Below are the details of some properties offered for auction in Sydney.

Suburb	Features	Highest bid	Result
Ashbury	3 br h	$427 500	Sold
Bankstown	2 br h	$138 200	Sold
Balgowlah Heights	3 br h	$546 000	Passed in
Bondi	2 br u	$690 000	Sold
Chatswood	3 br h	$425 000	Sold
Concord	3 br h	$585 000	Passed in
Eastwood	3 br h	$308 000	Sold

   (i) Two of these properties were not sold. In which suburbs were they situated?

....

....

   (ii) Of the properties listed, what was the highest price paid for a three-bedroom house?

....

....

   (iii) What was the median price of the properties sold?

....

....

   (iv) If house values increase by 5%, what will be the value of the house at Eastwood?

....

....

QUESTION 33. (Continued)

(b)   This is a house floor plan.

S.G. Door

Bed 1
3·0 × 3·4

Family
3·4 × 3·0

WC

WM   T

Kitchen
2·7 × 3·5

Bath

Laundry
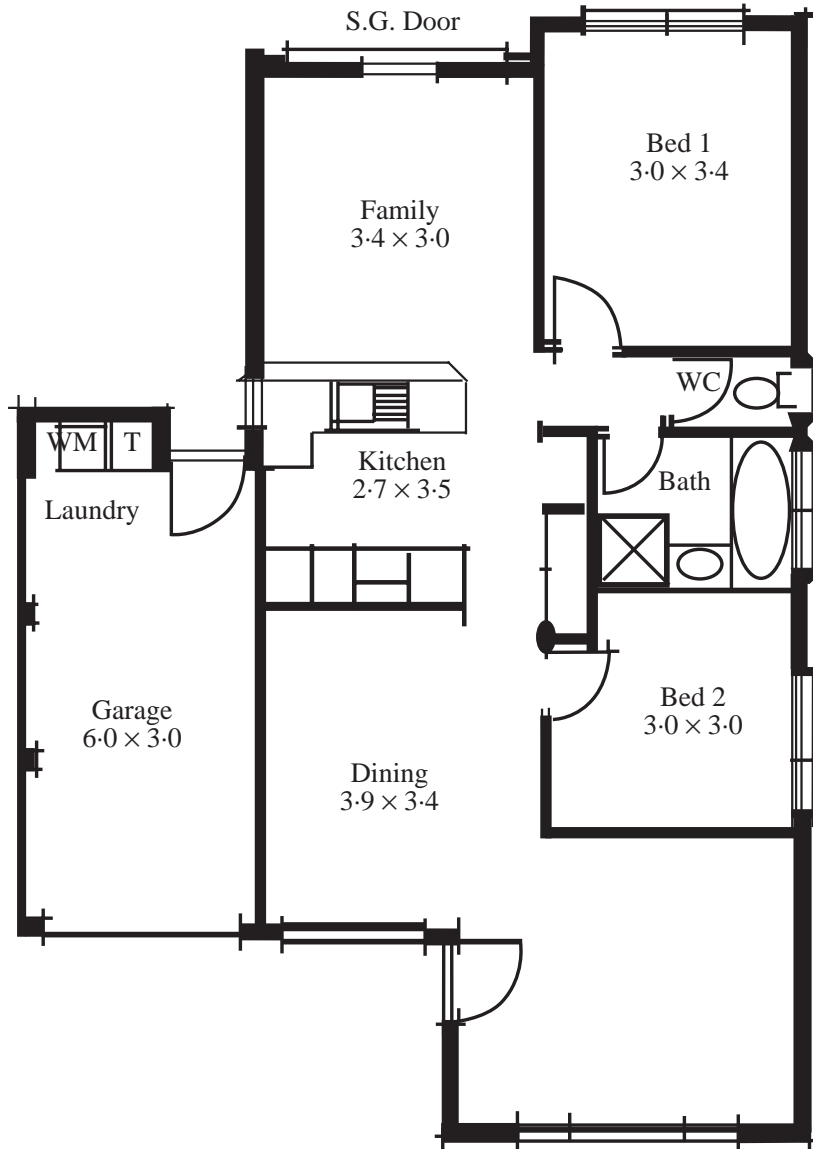
All dimensions
in metres

Garage
6·0 × 3·0

Bed 2
3·0 × 3·0

Dining
3·9 × 3·4

Pioneer Home Australia

QUESTION 33. (Continued)

(i) How many hinged doors are indicated on the plan?

....

(ii) The following is a price list for doors.

- Interior hinged doors: $45 each
- Exterior hinged doors: $74 each
- Sliding glass door (rear of house): $258
- Roller door (front of garage): $185

What is the cost of supplying all of the doors for the house?

....

....

(iii) Building costs for this house are:

- Materials: $35 480
- Labour: $21 580
- Site costs: $6 940

What percentage of the building cost is the labour cost?

....

....

....

(iv) What is the area of the family room?

....

....

(v) Wooden flooring costs $96 per square metre.

What is the cost of a wooden floor in the family room?

....

....

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Q.34

**1998
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MATHEMATICS IN PRACTICE
2 UNIT—SECTION II**

QUESTION 34. Design

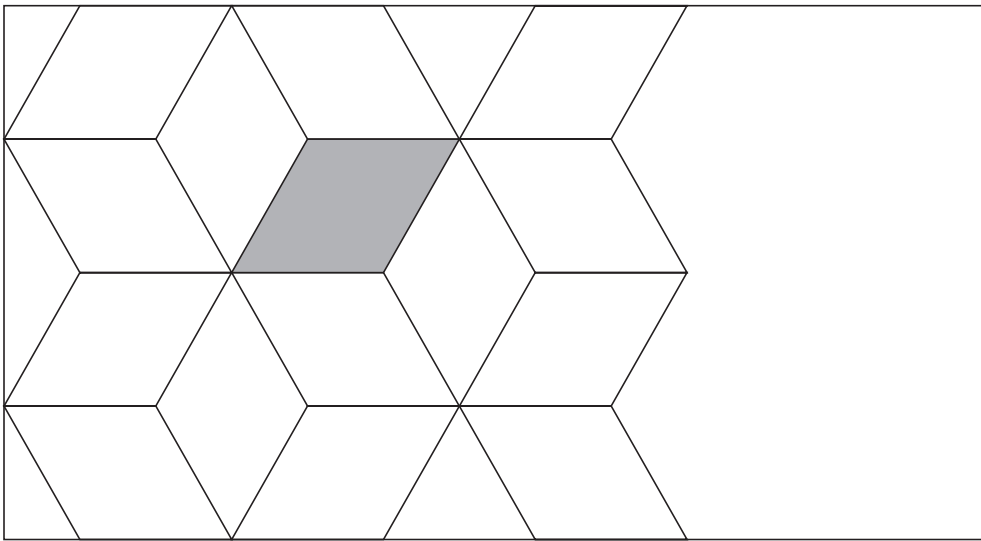(a)   The diagram below shows a section of a tessellation.

   (i)   What is the name given to the shape of the shaded tile?
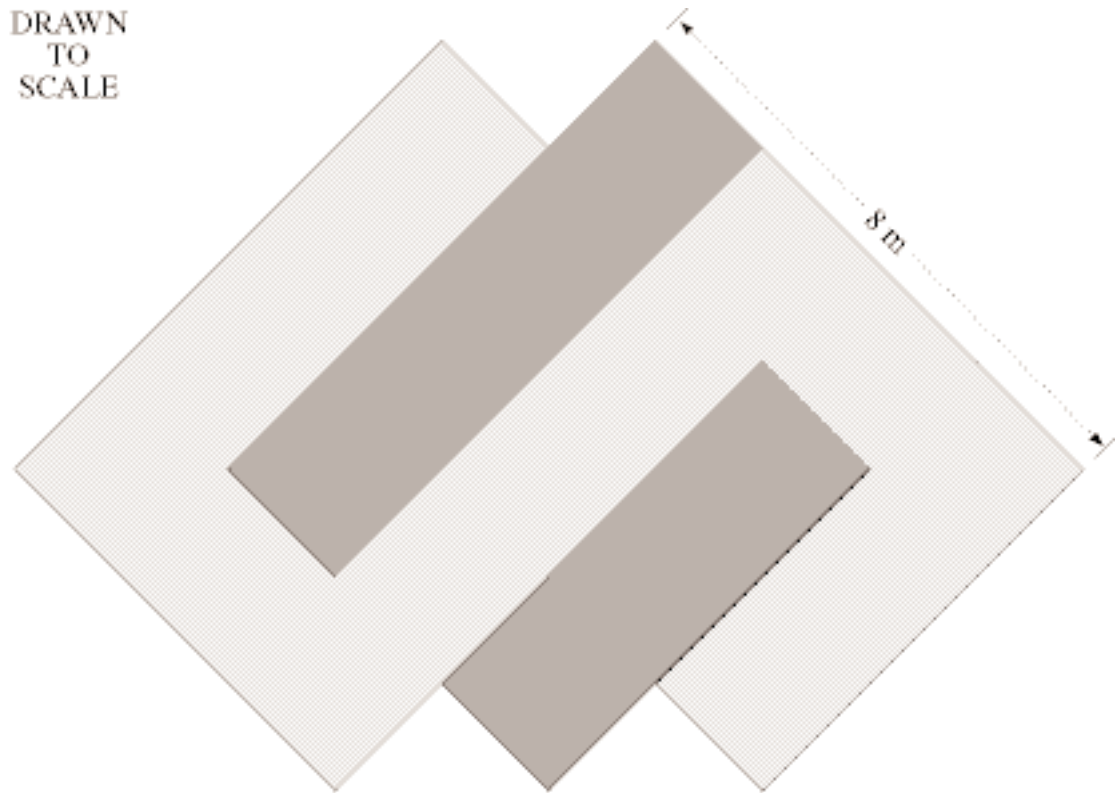
   ....

   (ii)   Use a ruler to continue the tessellation, filling in the rest of the space in the rectangle above.

QUESTION 34. (Continued)

(b)   The following company logo is used on the side of one of its buildings.

DRAWN
TO
SCALE

8 m

(i)   Find the actual area of the logo (in square metres).

....

....

(ii)   One litre of paint for this logo covers an area of four square metres.

How many litres of paint are needed to paint the logo?

....

....

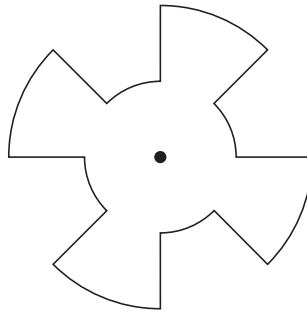(iii)   Paint for the logo can only be bought in four-litre tins costing $49 each.

How much will it cost to buy the paint required for this logo?

....

....
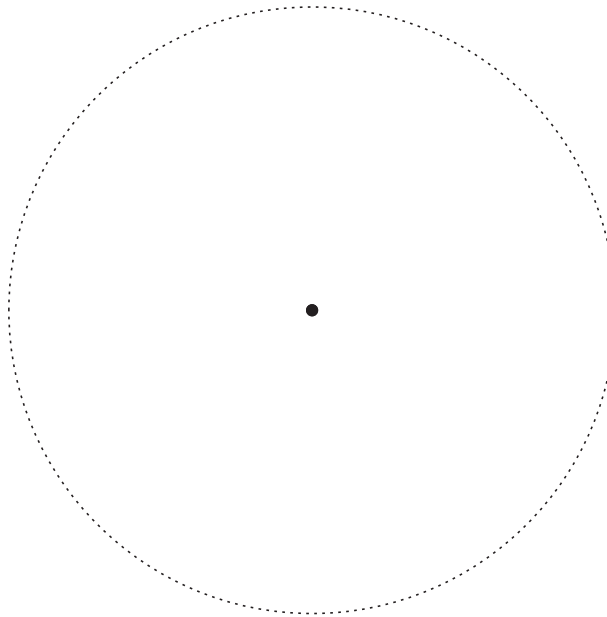
QUESTION 34. (Continued)

(c)

Enlarge the above design so that it fits exactly in the dotted circle below.

(d)   A signal flag is shown below.
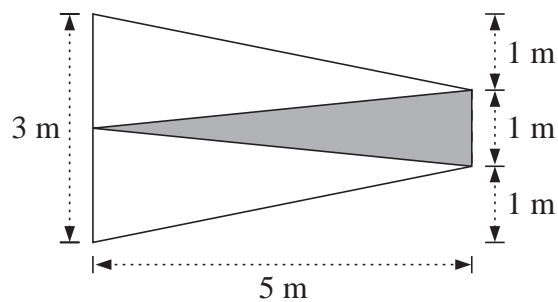
(i)   Calculate the area of the shaded part of this flag.

....

(ii)   What fraction of the flag is shaded?

....

....

QUESTION 34. (Continued)

(e)   A new chocolate is to be packaged in a box like the one shown below.
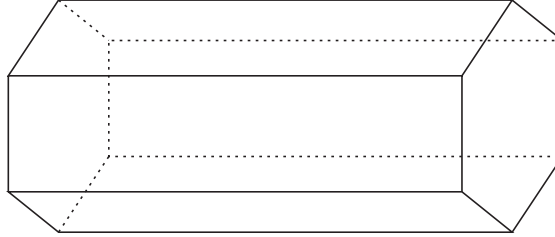
Draw a sketch of the net of this box in the space below.

1998
HIGHER SCHOOL CERTIFICATE EXAMINATION
MATHEMATICS IN PRACTICE
2 UNIT—SECTION II

QUESTION 35. Social Issues

(a)   In February 1998, 2060 people were asked: 'Do you think Australia should become a republic?'.

55% of the people surveyed said 'yes', 35% said 'no', and 10% didn't know.

Complete the pie chart below to represent the results of this survey. (Use your protractor and ruler.)
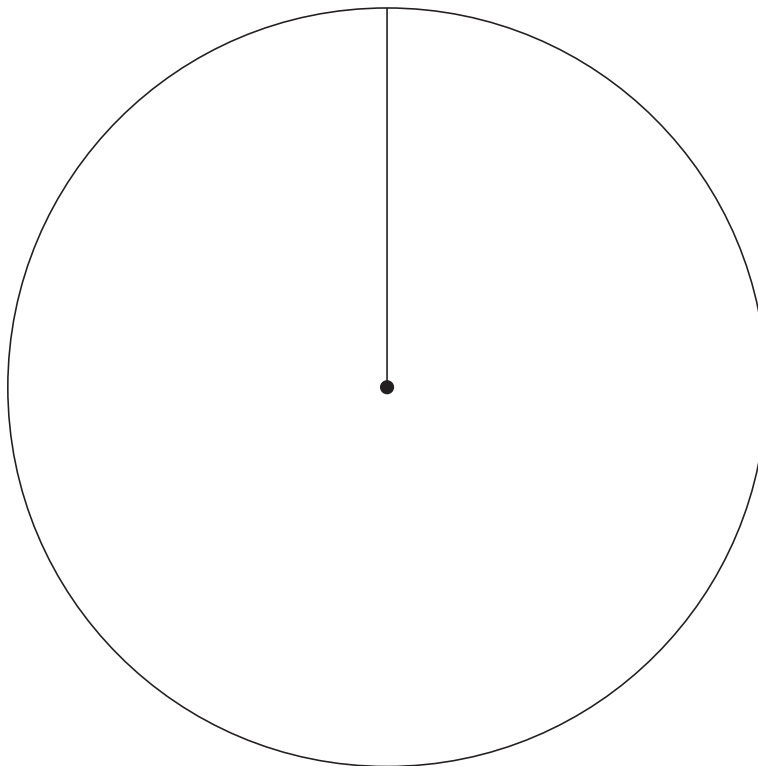
Question 35 continues on page 34

QUESTION 35. (Continued)

(b) Advertising space in a newspaper is generally measured in 'centimetre-columns' (cmcols). A cmcol is one centimetre high and one column wide.

In the Springfield Courier newspaper, a page of classified advertisements is 27 cm wide and has six columns.

The Simpsons wish to place the following advertisement in the Springfield Courier.

```
┌─────────────────────────────────┐
│          GARAGE SALE            │
│                                 │
│     1642 EVERGREEN TERRACE      │
│                                 │
│          SPRINGFIELD            │
│                                 │
│      SATURDAY 19 DECEMBER       │
└─────────────────────────────────┘
```
Actual size of advertisement

   (i)   How wide is each column in the Springfield Courier newspaper?

....

  (ii)   How many columns wide is the Simpsons' advertisement?

....

....

 (iii)   What is the size of the Simpsons' advertisement in cmcols?

....

....

 (iv)   The cost of advertising in the Springfield Courier is \$4·99 per cmcol. How much will the Simpsons' advertisement cost?

....

....

QUESTION 35. (Continued)

(c) In Kyoto in December 1997 the industrialised nations came to an agreement regarding carbon dioxide (CO_2) emissions.
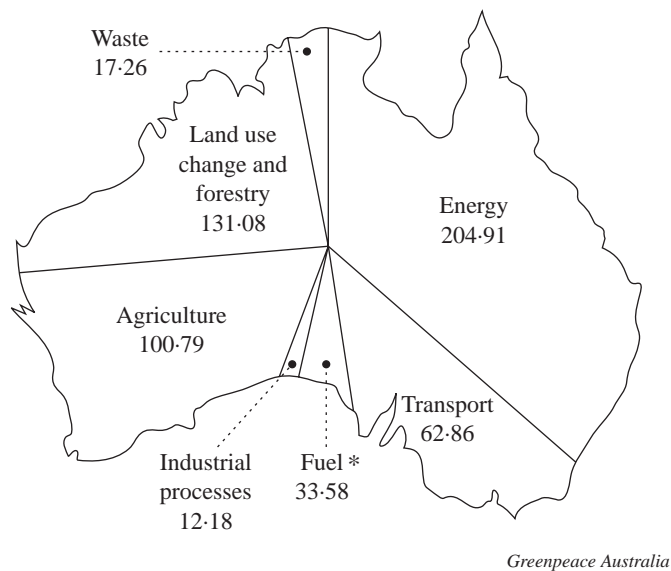
The following table gives some statistics relating to CO_2 emissions.

	CO_2 emissions in 1990 (millions of tonnes)	% change in CO_2 emissions 1990–2012 agreed in Kyoto	CO_2 emissions in 2012 (millions of tonnes)	Population in 1990 (millions)	CO_2 emissions per person in 1990 (tonnes)
Australia	268	+8%		17	
Japan	1238	−6%	1164	123	10·1

Fill in the missing figures in the table.

(d) Greenhouse gases include CO_2, methane, nitrous oxide and perfluorocarbons.

The following diagram shows the sources of greenhouse gas emissions in mainland Australia in 1990 (in millions of tonnes).

Waste
17·26

Land use change and forestry
131·08

Energy
204·91

Agriculture
100·79

Industrial processes
12·18

Fuel *
33·58

Transport
62·86

Greenpeace Australia

What percentage of mainland Australia's greenhouse gas emissions is due to transport?

....

....

....

*Note: **Fuel 33.58** should read **Fugitive 33.58** emissions.*

Question 35 continues on page 36

QUESTION 35. (Continued)

(e) In a local council election the following primary votes were recorded.

Candidate	Number of votes
Hassan	9 170
Jones	8 280
Wong	11 350

The voting system was preferential.

Seventy per cent of Jones' preferences went to Hassan and thirty per cent to Wong.

Complete the following table to show the result after preferences were distributed.

Candidate	Number of votes
Hassan	
Wong	

End of paper