

BOARD OF STUDIES  
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

1999  
**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)

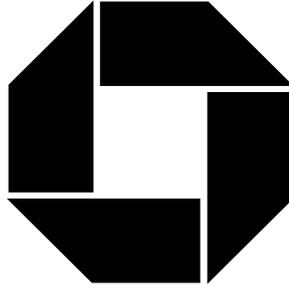
- This Section contains 30 multiple-choice questions.
- Attempt ALL questions.
- All questions are of equal value.
- Complete your answers in either blue or black pen on the Answer Sheet provided.
- Allow about one hour for Section I.

**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.



- 1 Below is the logo of the Chase Manhattan Bank.



What is the name given to the shaded shapes in this logo?

- (A) Rectangle (B) Parallelogram  
(C) Rhombus (D) Trapezium
- 

- 2 At a sale, a dress that normally sells for \$150 is marked down to sell at \$120.



The percentage discount is

- (A) 5% (B) 20% (C) 25% (D) 30%
- 

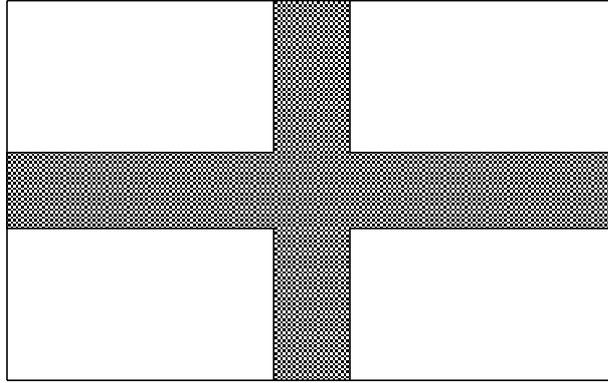
- 3 Jayde has 3 black T-shirts, 4 white T-shirts and 2 blue T-shirts in a drawer.

If she chooses one at random, what is the probability that it will be blue?

- (A)  $\frac{2}{9}$  (B)  $\frac{3}{9}$  (C)  $\frac{4}{9}$  (D)  $\frac{2}{7}$
-



- 6 By measuring and calculating, determine which of the following is closest to the area of the shaded cross.

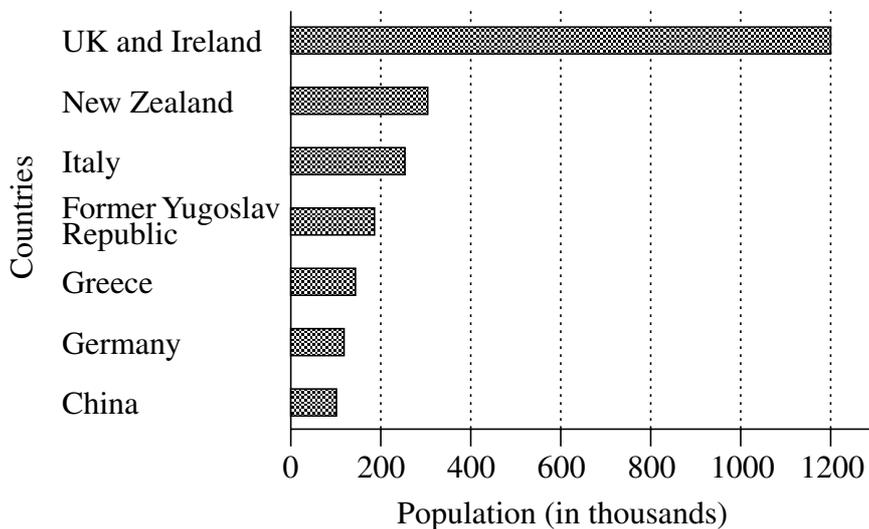


- (A)  $11 \text{ cm}^2$       (B)  $12 \text{ cm}^2$       (C)  $13 \text{ cm}^2$       (D)  $26 \text{ cm}^2$
- 

- 7 Which of the following is the highest interest rate?

- (A) 0.04% per day      (B) 0.27% per week  
 (C) 1.2% per month      (D) 14.5% per annum
- 

- 8 The graph below shows the main countries of birth of Australian immigrants.



The total number of immigrants from the UK, Ireland and New Zealand is greater than the number of immigrants from China by a factor of

- (A) 3      (B) 12      (C) 14      (D) 15
-



11 The Daily Star newspaper charges the following rates for classified advertising:

- first 10 words: 70 cents per word;
- additional words: 65 cents per word;
- border: add \$10.00.

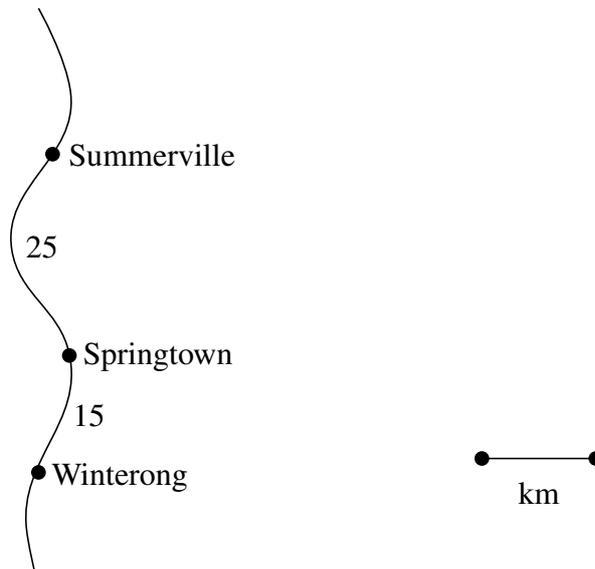
Candice advertised a garage sale in the Daily Star.

Monster garage sale.  
Moving house. Entire  
contents: furniture,  
whitegoods, china,  
glassware. All day Sat.  
and Sun. Shady Gully  
Farm, Carbury.

The cost for placing this advertisement was

- (A) \$13.50      (B) \$14.00      (C) \$23.50      (D) \$24.00
- 

12



Jordan drives from Summerville to Springtown at an average speed of 80 km/h. How long does the trip take (to the nearest minute)?

- (A) 11 minutes      (B) 19 minutes      (C) 30 minutes      (D) 31 minutes
-

13 A real-estate agent's charges for selling a property are as follows:

- \$500 advertising fee;
- 2.5% of the first \$150 000 of the sale price;
- 0.5% of the remainder of the sale price.

How much does the agent charge on a sale worth \$210 000?

- (A) \$4050                      (B) \$4550                      (C) \$5250                      (D) \$6350
- 

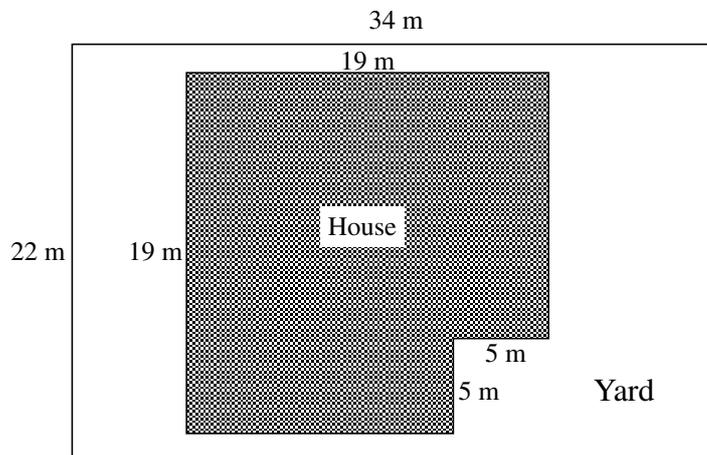
14 The frieze below is made using repetitions of one pattern.



Which one of the following patterns can be used to make this frieze?

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

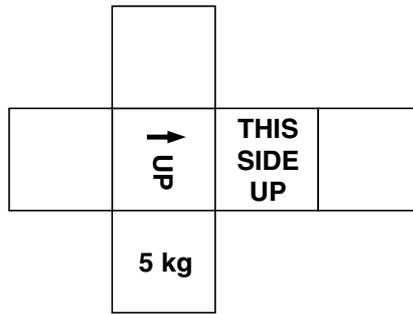
15



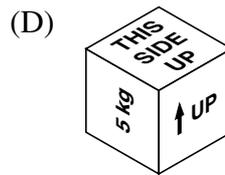
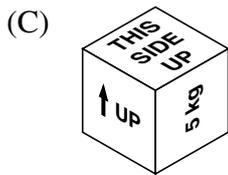
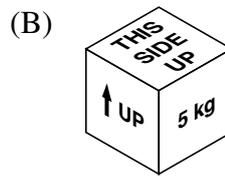
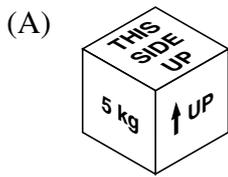
Calculate the approximate percentage of land area covered by the house on this block of land.

- (A) 45%                      (B) 48%                      (C) 52%                      (D) 68%
-

- 16 This is a net of a carton.



Which carton matches the net?



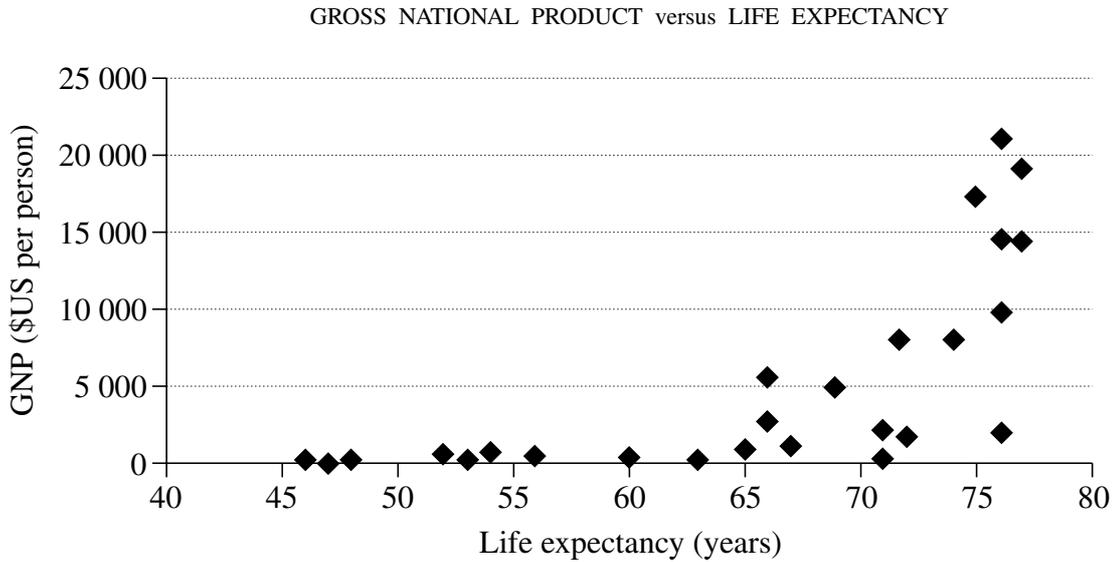
17

WATER BILL—USAGE INFORMATION		
<i>Water Meter Details</i>	<i>Date Read</i>	<i>Reading</i>
This reading	28/10	2936 kilolitres
Last reading	27/7	2849 kilolitres
Number of days between readings = 93		

For the period covered by this bill the average water consumption per day was closest to

- (A) 935 litres      (B) 1069 litres      (C) 31.6 kilolitres      (D) 62.2 kilolitres

- 18 The graph below shows the Gross National Product (GNP) and life expectancy for a number of different countries. Each  $\blacklozenge$  represents one country.



Jill and Jack made the following statements about the graph:

JILL: 'The graph shows that a life expectancy greater than 75 years only occurs in countries with a GNP greater than \$5000.'

JACK: 'The overall trend is that as a country's GNP increases, so does the life expectancy of its people.'

- (A) Both statements are true.  
 (B) Only Jill's statement is true.  
 (C) Only Jack's statement is true.  
 (D) Both Jill and Jack are wrong.

19

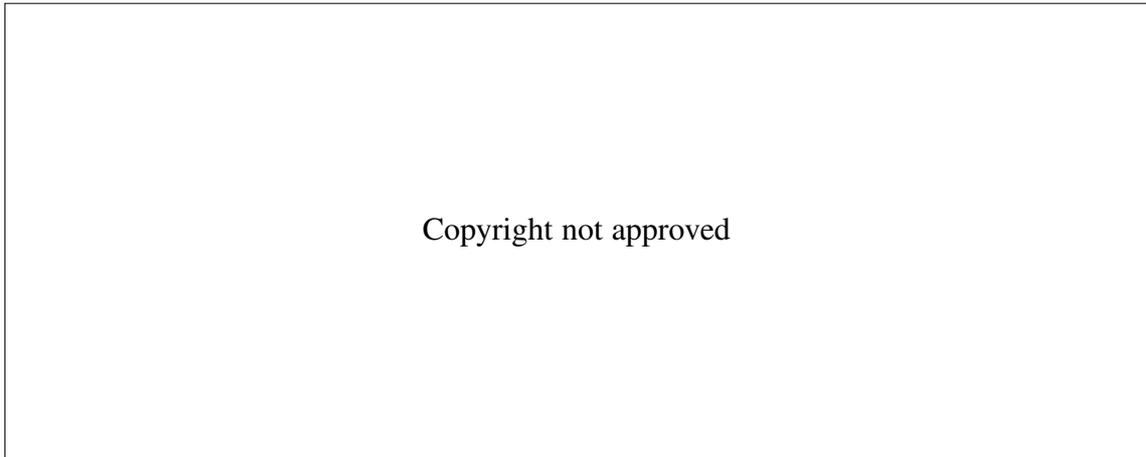
**ANTARCTICA**  
**ICEBREAKING EXPEDITIONS**  
 Inclusive price: \$US 5680 per person

The exchange rate is  $\$A1 = \$US0.625$ .

If Sebastian and his wife go on this expedition, how much will it cost them in Australian dollars?

- (A) 7 100                      (B) 9 088                      (C) 11 360                      (D) 18 176

- 20** The graph below is based on the results of surveys in which people living in Sydney were asked whether they were likely to leave Sydney during the 2000 Olympic Games.



The population of Sydney is approximately 3 800 000. Based on the Winter 1998 results of the surveys, how many Sydneysiders are 'very likely' to leave during the 2000 Olympics?

- (A) 19                      (B) 20                      (C) 722 000                      (D) 760 000
- 

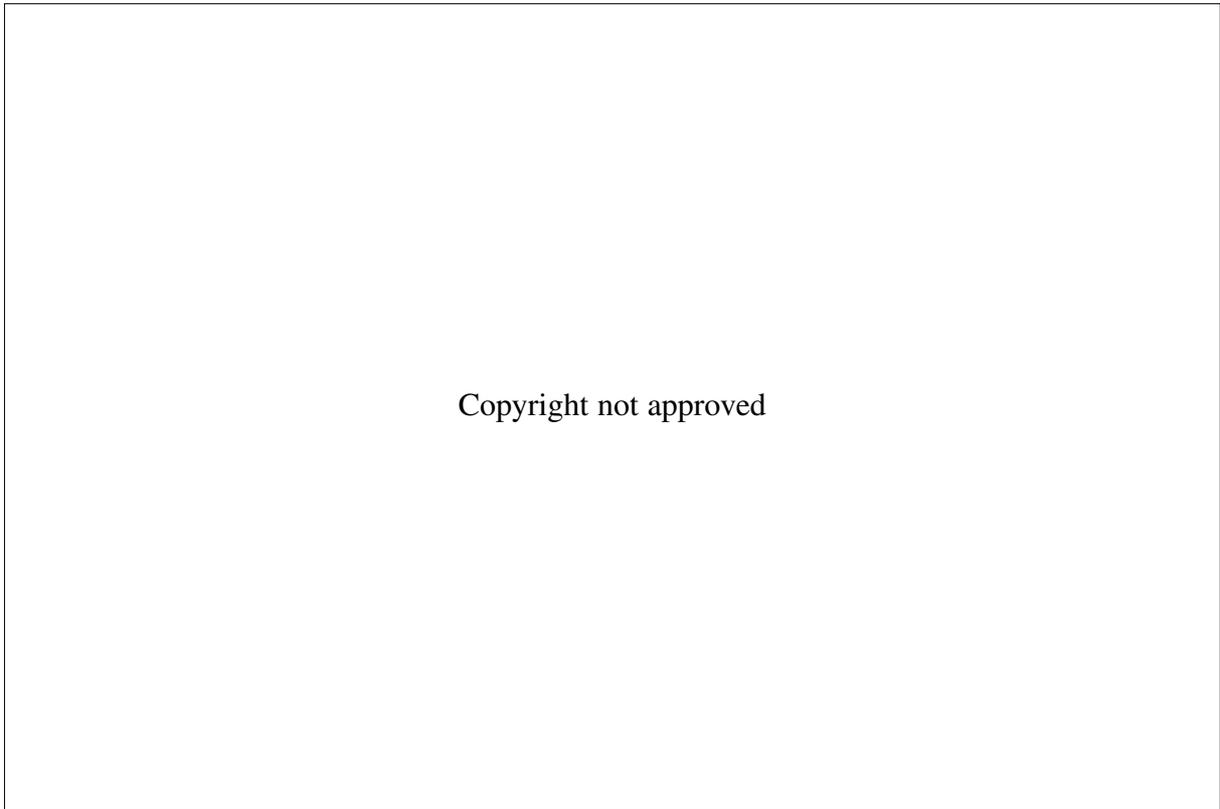
- 21** When it is 11 am in Perth, the time in Christchurch is 3 pm on the same day.

Danielle lives in Perth and wishes to watch a live telecast of a test match played in Christchurch. The first section of the match commences at 10:30 am (Christchurch local time) and lasts for 2 hours.

What time will it be in Perth when the first section of the match finishes?

- (A) 6:30 am                      (B) 8:30 am                      (C) 2:30 pm                      (D) 4:30 pm
-

USE THE MAP BELOW TO ANSWER QUESTIONS 22 and 23.



**22** Which of the following is the best approximation for the distance by road from Connellan Airport to Uluru (Ayers Rock)?

- (A) 10 km            (B) 25 km            (C) 200 km            (D) 250 km

**23** The direction of Connellan Airport from Kata Tjuta (The Olgas) is

- (A) north-east      (B) south-east      (C) north-west      (D) south-west

---

**24** A brick wall is 17 m long and 1.8 m high. One side of this wall is to be painted using 2 coats of paint. One tin of paint will cover 6 square metres of the wall. How many tins of paint will be needed?

- (A) 5                    (B) 6                    (C) 10                    (D) 11
-

- 25 The table below shows data for land use in Australia.

<i>Land use</i>	<i>Percentage</i>
Arable land	6%
Permanent crops	1%
Permanent pastures	54%
Forests and woodland	19%
Other uses	20%
TOTAL	100%

Joe wishes to draw a pie chart using the percentages given in the table. The correct size for the angle of the *permanent pastures* sector is closest to

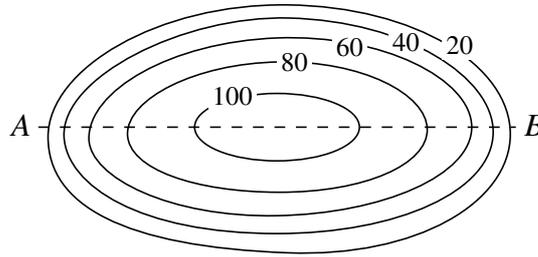
- (A)  $4^\circ$                       (B)  $54^\circ$                       (C)  $97^\circ$                       (D)  $194^\circ$
- 
- 26 Temperature can be measured in degrees Fahrenheit or degrees Celsius. The formula for changing a temperature in degrees Fahrenheit (F) to a temperature in degrees Celsius (C) is

$$C = \frac{5}{9}(F - 32).$$

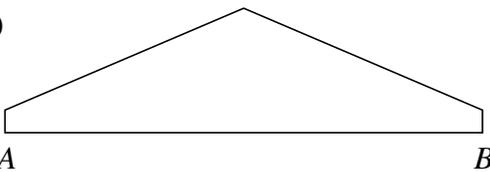
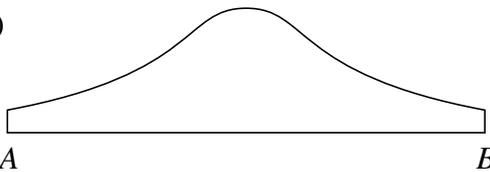
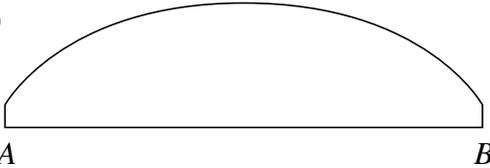
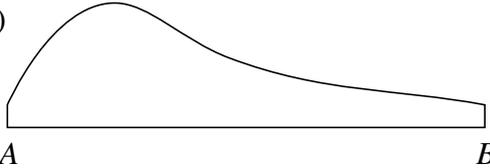
Use this formula to convert  $113^\circ\text{F}$  to degrees Celsius.

- (A)  $30.8^\circ\text{C}$                       (B)  $45^\circ\text{C}$                       (C)  $62.8^\circ\text{C}$                       (D)  $145.8^\circ\text{C}$
-

- 27 Contour lines in a topographical map are lines joining places of equal elevation above sea-level. The diagram shows the contour lines of a hill. The number on each contour line is the height above sea-level.



Which one of the following best represents the shape of the cross-section *AB* of the hill?

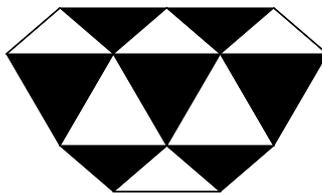
- (A) 
- (B) 
- (C) 
- (D) 

- 28 Property values in a country town are predicted to decrease at a rate of 6% p.a.

If this prediction is correct, how much will a property valued at \$275 000 be worth in 2 years time?

- (A) \$242 000      (B) \$242 990      (C) \$258 500      (D) \$263 000

- 29



In this diagram, the area of a large triangle is twice the area of a small triangle.

What fraction of the design is shaded black?

- (A)  $\frac{7}{13}$       (B)  $\frac{6}{13}$       (C)  $\frac{5}{9}$       (D)  $\frac{4}{9}$

**30** Dave the builder bases his quote for building a new house on the floor area of the house.

Dave quotes \$183 750 to build a new house with a floor area of 420 m<sup>2</sup>.

What will Dave quote for a house with a floor area of 470 m<sup>2</sup>?

- (A) \$164 202      (B) \$183 800      (C) \$203 298      (D) \$205 625
-

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Q.31

STUDENT NUMBER

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1999  
HIGHER SCHOOL CERTIFICATE EXAMINATION  
MATHEMATICS IN PRACTICE  
2 UNIT

CENTRE NUMBER

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**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) Ross and Rachel pay a family premium of \$34.50 per week for private health insurance.

(i) What is the cost of their private health insurance per year?

.....  
.....

(ii) Their premium is to be reduced by 30% because of a government rebate. How much will they save per year because of this rebate?

.....  
.....

(iii) Ross and Rachel pay an annual Medicare levy of 1.5% of their taxable income. Find the Medicare levy if their taxable income is \$72 000.

.....  
.....

(iv) Ross and Rachel's total health care costs consist of private health insurance plus the Medicare levy.

Find the percentage reduction in their total health care costs as a result of the 30% rebate.

.....  
.....



QUESTION 31 (Continued)

- (c) The table below shows the monthly repayments for each \$1000 borrowed, for three different types of loans.

TYPE OF LOAN	PERIOD OF LOAN				
	<i>5 years</i>	<i>10 years</i>	<i>15 years</i>	<i>20 years</i>	<i>25 years</i>
First home loan	\$19.33	\$11.10	\$8.44	\$7.20	\$6.44
Second mortgage loan	\$19.80	\$11.61	\$9.00	\$7.75	\$7.07
Personal loan	\$20.28	\$12.13	\$9.56		

- (i) Kim takes out a second mortgage on her house for \$85 000, to be repaid over 10 years.

1 Use the table to find Kim’s monthly repayment.

.....  
 .....

2 Find the total amount that Kim will repay over 10 years.

.....  
 .....

3 How much interest will Kim pay on this loan?

.....  
 .....

- (ii) Ergun can afford to pay \$900 per month for a first home loan over 20 years. What is the maximum amount Ergun can borrow?

.....  
 .....

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Q.32

**STUDENT NUMBER**

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**1999  
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MATHEMATICS IN PRACTICE  
2 UNIT—SECTION II**

**CENTRE NUMBER**

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**QUESTION 32 Travel**

Annabel and Barbara are two adults who live in Sydney. They plan to travel to Los Angeles together for a holiday, leaving Sydney on 18 January.

- (a) The table below shows the cost of return airfares, flying President Airlines.

[Empty table area with text: Copyright not approved]

- (i) How much do Annabel and Barbara each pay for their airfare on President Airlines?

.....  
.....

- (ii) What percentage of an adult's airfare is a child's airfare?

.....  
.....

**Question 32 continues on page 22**

QUESTION 32 (Continued)

(b) President Airlines has the following cancellation charges.

CANCELLATION CHARGES (per person)	
15 days or more prior to departure	\$200
8–14 days prior to departure	\$200 plus 40% of airfare
Up to 7 days prior to departure	100% of airfare

(i) What is the latest date on which Annabel and Barbara can cancel their trip and only be charged \$200 each?

.....

.....

(ii) If they cancelled their trip on 6 January, what would each person be charged?

.....

.....

(c) The table below shows the distance, in miles, flown by President Airlines, between various cities.

Chicago	–								
London	3950	–							
Los Angeles	1746	5442	–						
New York	721	3458	2459	–					
Paris	4142	682	5654	4091	–				
San Francisco	1851	5358	330	2572	5574	–			
Sydney	9255	10595	7509	9968	10536	7436	–		
Toronto	436	3553	2174	352	3739	2260	9683	–	
Vancouver	1769	4713	1071	2437	5824	800	8580	2085	–
	Chicago	London	Los Angeles	New York	Paris	San Francisco	Sydney	Toronto	Vancouver

QUESTION 32 (Continued)

- (i) What is the distance travelled (in miles) by President Airlines between Sydney and Los Angeles?

.....  
 .....

- (ii) One mile is equal to 1.67 km. Convert the distance in part (i) to kilometres.

.....  
 .....

- (iii) The flight time between Sydney and Los Angeles is 15 hours. Find the average speed of a President Airlines plane in km/h.

.....  
 .....

- (d) Annabel plans to take \$A3000 spending money. How many US dollars will she have to spend if the exchange rate is \$A1 = \$US0.625?

.....  
 .....

- (e) Annabel and Barbara plan to stay 12 nights at the Bayview Plaza Hotel at Santa Monica Beach.

	COST PER ROOM PER NIGHT (\$A)		
	<i>Single</i>	<i>Twin</i>	<i>Triple</i>
01 Jan. – 15 Jun.; 16 Sep. – 26 Dec.	147	147	169
16 Jun. – 15 Sep.; 27 Dec. – 31 Dec.	160	160	182

- (i) How much will each person pay for the 12 nights if they choose to share a room?

.....  
 .....

QUESTION 32 (Continued)

(ii)

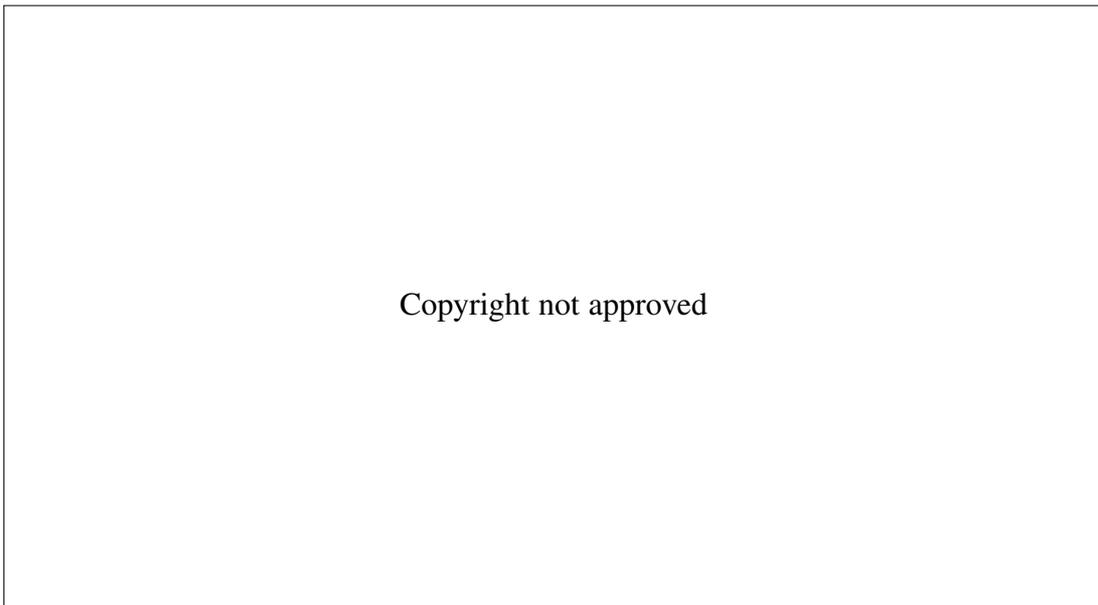
**SPECIAL . . .**  
Buy 3 nights,  
get the 4th night  
**FREE.**  
(Valid January and  
February *only*.)

The Bayview Plaza Hotel has this special for overseas travellers.

How much will Annabel and Barbara each save on their accommodation bill because of this special rate?

.....  
.....

(f) The map below shows time zones in the United States.



(i) What is the time difference between the Pacific Time Zone and the Central Time Zone?

.....  
.....

(ii) If it is 5 am in Los Angeles, what time is it in New York?

.....  
.....

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Q.33

STUDENT NUMBER

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1999  
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2 UNIT—SECTION II

CENTRE NUMBER

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**QUESTION 33 Accommodation**

(a) A scale drawing of a rectangular block of land is shown below.



The scale used is 1 : 500.

(i) What are the actual dimensions of the block of land?

.....  
.....

(ii) What is the area of the land?

.....  
.....

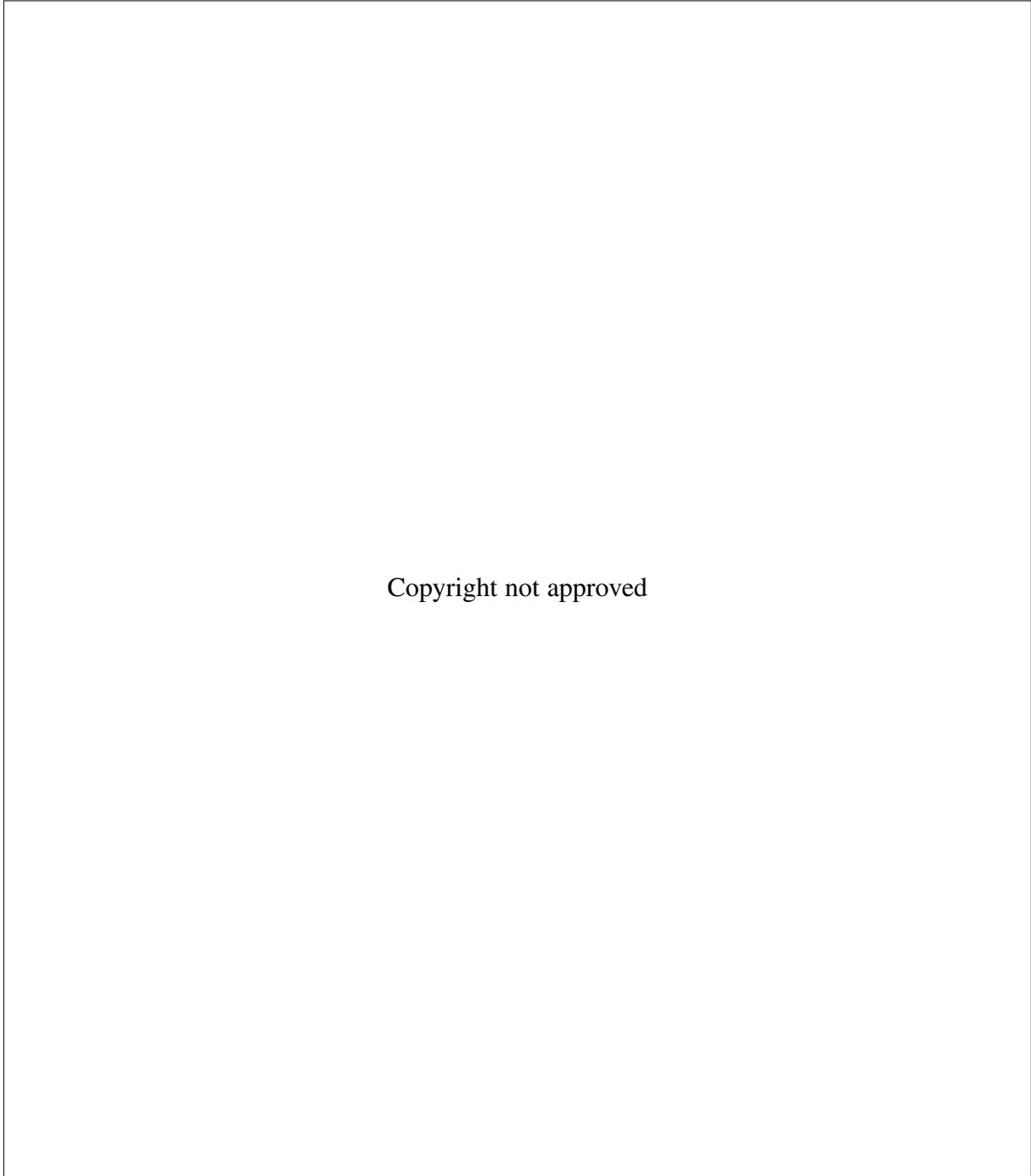
(iii) 65% of the land may be used for building a house. What is the maximum floor area of a house for this block of land?

.....  
.....

**Question 33 continues on page 26**

QUESTION 33 (Continued)

- (b) The plan shows a three-bedroom house with optional fourth bedroom and rumpus room incorporated in the design.



QUESTION 33 (Continued)

The cost of building the three-bedroom house (without options) is \$95 000. The additional bedroom costs \$5000 to build, and the rumpus room costs \$8000.

- (i) What is the total cost of building the house, including the fourth bedroom and the rumpus room?

.....  
.....

- (ii) What is the total area of the four bedrooms?

.....  
.....

- (iii) The garage floor is to be sealed with a waterproofing agent at a cost of \$12 per square metre. How much will this cost?

.....  
.....

- (iv) The cost of outfitting both the bathrooms in the house is as follows:

- Tiling the floors           \$2000
- Tiling the walls           \$1800
- Bath                         \$450
- Toilets                     \$200 each
- Vanity units               \$800 each
- Taps and accessories     \$1200

What percentage of the total cost of the house is the cost of outfitting the bathrooms?

.....  
.....  
.....  
.....

QUESTION 33 (Continued)

(c) Rocksolid Real Estate predicted that house prices in Graniteville would rise by 16% during 1999.

(i) In January 1999, a house in Graniteville was valued at \$180 000. What does Rocksolid predict that the house will be worth at the end of 1999?

.....  
.....

(ii) The prices are then predicted to rise by another 7% by the end of the year 2000. What will be the value of the house then?

.....  
.....

(iii) By how much is the value of the house predicted to increase from January 1999 to the end of the year 2000?

.....  
.....

(iv) What is the predicted percentage increase in the value of the house over this two-year period?

.....  
.....

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Q.34

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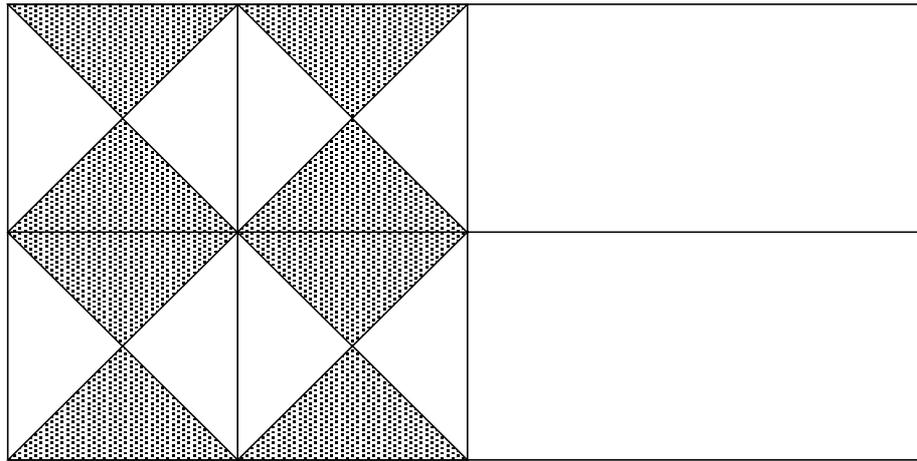
CENTRE NUMBER

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**1999  
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2 UNIT—SECTION II**

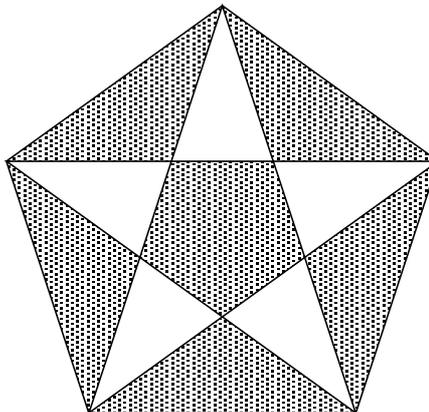
**QUESTION 34 Design**

(a)



Continue the pattern to fill in the rest of the space in the rectangle.

(b)



This design is made using three differently shaped tiles. Two of the shapes are isosceles triangles.

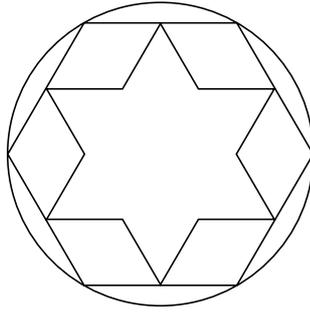
Name the third shape.

.....

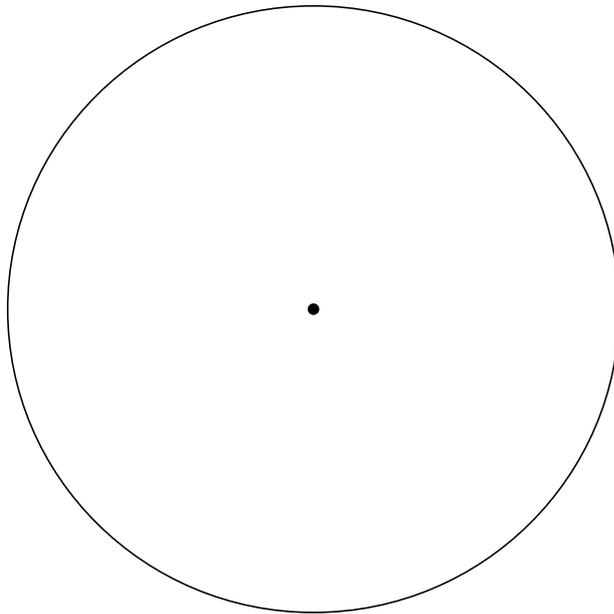
**Question 34 continues on page 30**

## QUESTION 34 (Continued)

(c)

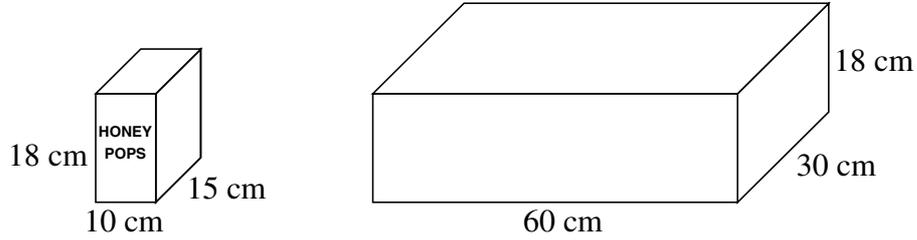


Enlarge this design to fit into the circle of radius 4 cm.



QUESTION 34 (Continued)

(d) Boxes of Honey Pops are to be packed into the carton shown.



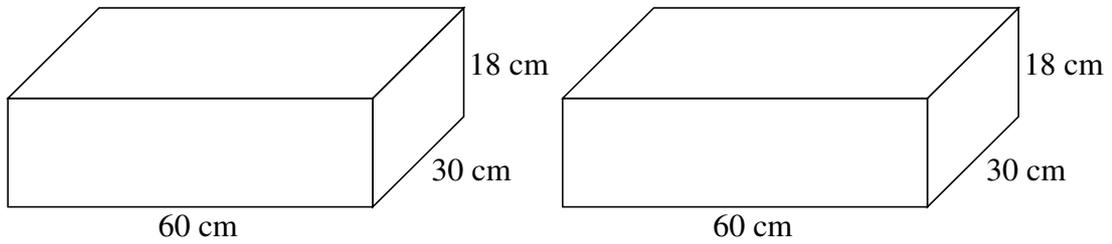
(i) What is the maximum number of boxes of Honey Pops that will fit into the carton?

.....  
 .....

(ii) What is the surface area of the carton?

.....  
 .....

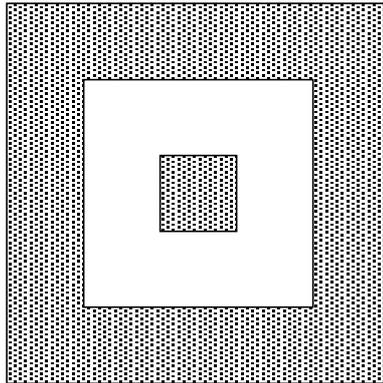
(iii) On the diagram below, show two different ways of packing the maximum number of boxes of Honey Pops into the carton.



(iv) Sketch the net of a Honey Pops box.

## QUESTION 34 (Continued)

(e)



This is a scale drawing of the flag used to represent the letter W in the international flag alphabet.

What fraction of the flag is shaded?

.....

.....

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Q.35

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**CENTRE NUMBER**

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2 UNIT—SECTION II**

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**QUESTION 35 Social Issues**

- (a) To win a game of 'Losso', Sally must correctly choose six numbers from the numbers 1 to 42. There are 5 245 786 different combinations of six numbers.

What is the probability that Sally chooses the winning numbers?

.....

- (b) Jan searched the Internet to get a four-day weather forecast for Sydney. The website gave the following information.

Thursday	Friday	Saturday	Sunday
Partly cloudy	Mostly cloudy	Partly cloudy	Sunny
Humidity 26%	Humidity 24%	Humidity 25%	Humidity 23%
High 29°C	High 26°C	High 27°C	High 30°C
Low 22°C	Low 21°C	Low 20°C	Low 22°C

- (i) Which day in the above weather forecast is predicted to be least humid?

.....

- (ii) What does '°C' stand for?

.....

- (iii) On which days is the maximum temperature expected to exceed 27°C?

.....

- (iv) Calculate the average 'High' temperature over this four-day period.

.....

**Question 35 continues on page 34**

QUESTION 35 (Continued)

(c) The table below shows demographic data for four countries.

<i>Country</i>	<i>Population per doctor</i>	<i>Average life expectancy</i>	<i>Population</i>
Australia	400	77	18 107 200
Fiji	2750	66	773 000
Japan	589	79	125 156 000
Oman	1200	68	2 256 000
<i>All figures based on data from 1993–1995</i>			

(i) Calculate the number of doctors in Oman.

.....  
 .....

(ii) Which country has the greatest number of doctors per person?

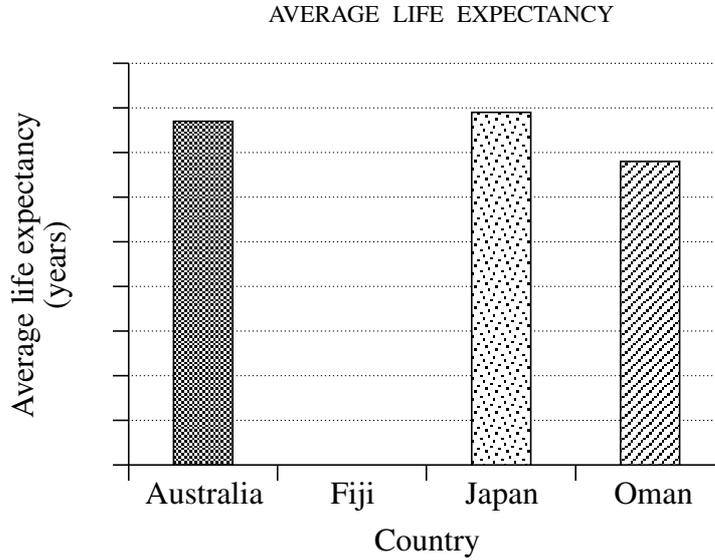
.....

(iii) What is Australia’s population as a percentage of Japan’s population?

.....  
 .....

QUESTION 35 (Continued)

- (iv) The column graph below is based on the data for average life expectancy. Draw the column for Fiji on this graph.



- (d) In the United States of America there are 99 million households with TV sets. Regular surveys are conducted to determine the number of households that watch particular TV shows. One company that conducts these surveys uses a random sample of 50 000 households.

- (i) What percentage of households with TV sets is surveyed?

.....

.....

- (ii) Briefly explain why each household has an equal chance of being selected for this survey.

.....

- (iii) Of the households surveyed, 30 000 watched a music awards telecast. Based on this sample, how many of the 99 million households watched these awards?

.....

.....

**End of paper**

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