THINKING SKILLS   **9694/11**

Paper 1 Problem Solving   **October/November 2014**

1 hour 30 minutes

Additional Materials: Multiple Choice Answer Sheet
                          Soft clean eraser
                          Soft pencil (type B or HB is recommended)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

There are **30** questions on this paper. Answer **all** the questions.

For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet. Ignore responses numbered 31 – 40 on the answer sheet.

DO **NOT** WRITE IN ANY BARCODES.

INFORMATION FOR CANDIDATES

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

International Examinations

[Turn over

1 Justin has been getting advice on how to invest his money. He has been told that he should calculate how much money he has left from his salary each month once he has paid his bills and then he should invest up to 60% of that amount.

Justin earns $1500 each month and has to pay $450 in rent. He has estimated that his other bills come to $900 per month.

What is the maximum amount that Justin is advised to invest each month?

A $90

B $150

C $360

D $690

2 Gemma is on a coach trip. After a short sleep, she has woken up just in time to see this sign on the side of the motorway:

Targen	7 km
Rybu	24 km
Pozta	32 km
Yxon	43 km
Larpe	59 km

The last thing she remembers seeing before she fell asleep is this sign:

Omiddan	11 km
Pepashir	20 km
Meradel	35 km
Targen	46 km
Rybu	63 km

How far has the coach travelled while Gemma has been asleep?

A 4 km

B 17 km

C 39 km

D 56 km

3 Cynthia is an old age pensioner living in Cheltenham. Half of the old age pensioners in Cheltenham have false teeth. 4 out of 5 have grey hair, and roughly 10% walk with a stick.

Which of the following statements is **not** true?

A Cynthia is more likely to have grey hair than to have false teeth.

B Cynthia is less likely to walk with a stick than to have false teeth.

C Cynthia is more likely to walk with a stick than to have grey hair.

D Cynthia is less likely to have false teeth than to have grey hair.
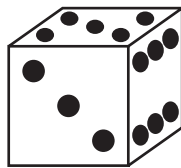
4 A standard die looks like this from one viewpoint.
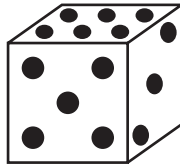
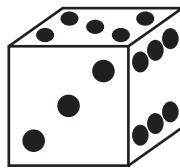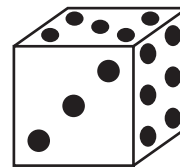Which of the following is another possible view of the die?
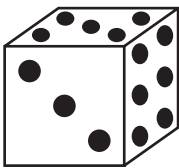
A	B	C	D

5 There were five competitors in the Beechwood Athletic Club's pentathlon. Competitors competed in up to five events. The scoring was 5 points for the winner, down to 1 point for 5th place. Anyone not competing in, or not finishing, an event scored no points.

At the end of the competition, each contestant's score was calculated by ignoring their worst event and adding together the points for the other four events.

The table below shows the finishing positions in the five events:

	High jump	100m	Javelin	Long jump	1500m
Petit	1st	4th	2nd	2nd	4th
Quincy	5th	3rd	5th	3rd	1st
Rubin	3rd	2nd	4th	DNS	3rd
Song	2nd	1st	3rd	1st	DNF
Thomas	4th	5th	1st	4th	2nd

(DNF = did not finish, DNS = did not start)

Who won?

A Petit

B Quincy

C Song

D Thomas

6 Sightseeing bus tours of Sydbourne depart from New Victoria Square every 40 minutes from 09:00 to 17:00 daily. Each tour takes 50 minutes to complete.

The drivers are all part-time workers, but on days when they do work they must drive at least 4 of the tours.

What is the earliest possible time that a driver can finish a day's work?

A 11:50

B 12:20

C 13:50

D 14:20

7 George's journey home from work involves travelling by underground railway to Euston and then by overground train. It takes him 5 minutes to change platforms on arriving at Euston. Overground trains leave Euston at 20-minute intervals and the train journey takes 8 minutes. His house is a five-minute walk from his local station. If he arrives at Euston at 4.15 pm he gets home at 4.50 pm.

At what time will he get home if he arrives at Euston at 5.00 pm?

A 5.10 pm

B 5.18 pm

C 5.30 pm

D 5.35 pm

8 A patch of mould appeared on a wall in my basement three weeks ago. It was square and had an area of $1\,cm^2$. Since then, it has grown at a consistent rate of $3\,cm^2$ per day and has retained its square shape.

Modelling the patch of mould as a perfect square throughout, which one of the following graphs shows how its width has increased during the last three weeks?

PAPA CAMBRIDGE
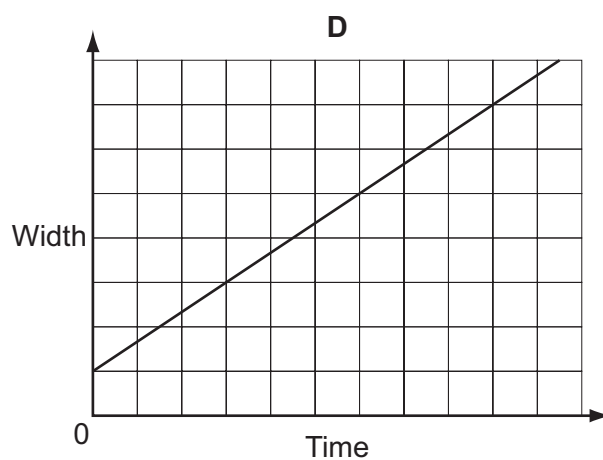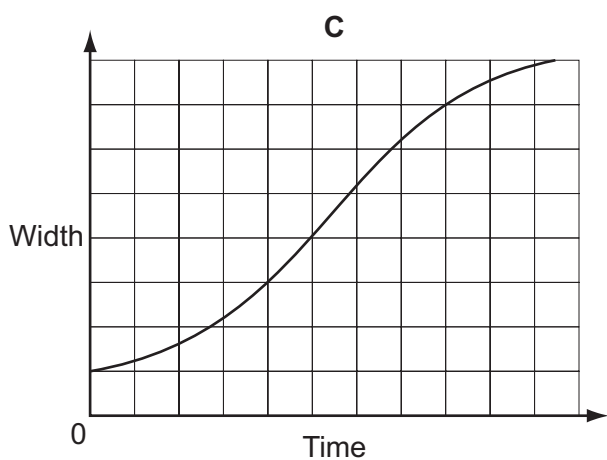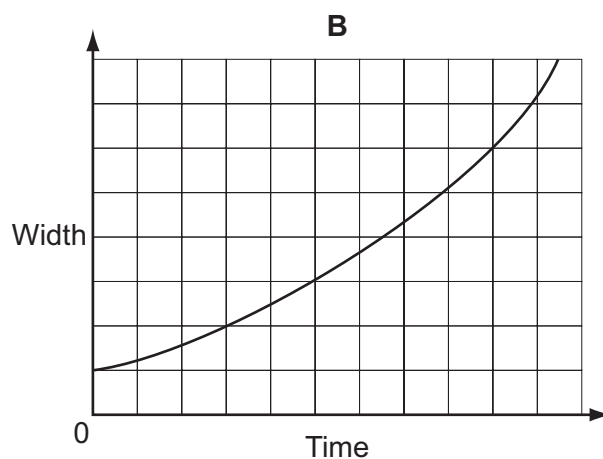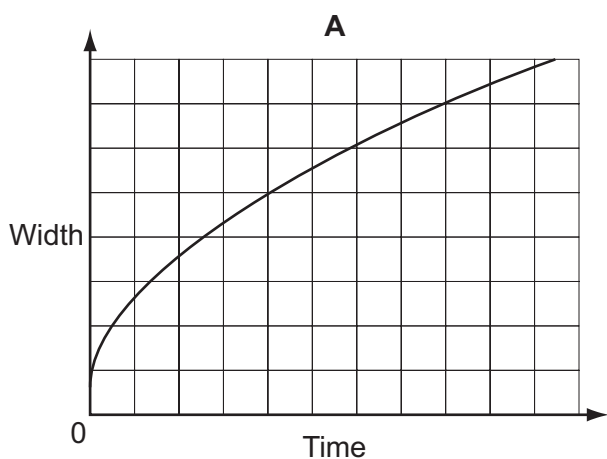
9 I am going on holiday and want to make sure that I take enough batteries for my camera. The camera only needs one battery and I know that a new battery will work the camera for between 10 and 12 hours. I plan to use the camera on at least 9 days of my holiday but no more than 12. On each day I will use the camera for between 5 and 7 hours.

What is the smallest number of batteries that I should take to make sure that I do not run out?

A 6

B 7

C 8

D 9

10 Paola has designed a pattern using nine tiles. There are three types of tile and Paola has used three of each type of tile. The positions of five of the tiles are shown below.
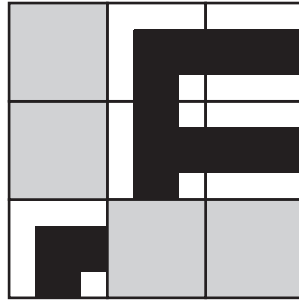
The tiles can be rotated before they are placed, but at any edge where two tiles join, the black and white sections must match. There are two positions which would allow the whole pattern to be determined if the tile in that position was known.

Which of the following sets of information about the four unknown tiles would **not** be sufficient to determine the whole pattern?

A The two corner tiles

B The two tiles at the middle of an edge

C The two tiles that are missing on the left

D The two tiles that are missing at the bottom

11 The tortoise challenged the hare to a race over a distance of 800 metres.

When the starting pistol was fired, the tortoise began immediately and covered the course at a steady speed of 0.1 metres per second.

Confident of victory, the hare didn't bother to start until exactly 2 hours later, when he set off at a leisurely 4 metres per second. After 360 metres, however, he pulled a muscle, and was only able to continue at 0.5 metres per second.

How far behind was the hare when the tortoise crossed the finishing line?

A 60 metres

B 85 metres

C 160 metres

D 170 metres

12 A motor centre carries out servicing of cars, which includes the replacement of parts. Three service technicians can each do 5 services per day. Normally they work Monday to Friday, but sometimes one technician will also work on Saturday.

Each car requires 1 air filter, 1 oil filter, 1 quantity of engine oil and 4 spark plugs.
The parts are purchased in bulk, and come in boxes containing the quantities shown below.

Air filter   8 per box
Oil filter   20 per box
Engine oil   4 per box
Spark plugs   80 per box

How many boxes of each item is it necessary to buy each week, if the motor centre is to carry out the maximum possible number of services?

A 4 air filter, 2 oil filter, 7 engine oil, and 2 spark plugs

B 4 air filter, 2 oil filter, 8 engine oil, and 2 spark plugs

C 10 air filter, 4 oil filter, 19 engine oil, and 4 spark plugs

D 10 air filter, 4 oil filter, 20 engine oil, and 4 spark plugs

13 In a local soccer league where a win counts for 3 points and a draw 1 point, the leaders at the end of March were Yoxall, with 40 points. They had lost 1/3 of their games, drawn half as many as they had lost and won three times as many as they had drawn. At the end of the season, the number of games they had lost had doubled, and their final total was 42 points.

How many games did they play between the end of March and the end of the season?

A 8

B 10

C 12

D 14

14 Three buses make the same journey every day on a route that has bus stops at exactly equal distances apart. The buses all travel at constant (but different) speeds. At the first stop after the starting point, if you just miss the fast bus (Fbus), then you wait 20 minutes for the medium-speed bus (Mbus), or 30 minutes for the slow bus (Sbus). At the second stop, missing Fbus would result in a wait of 30 minutes for Mbus, or 1 hour 10 minutes for Sbus.

Which of the following departure times from the start of the route could explain these waiting times?

A Fbus 07:30, Mbus 07:40, Sbus 07:50

B Fbus 07:40, Mbus 07:50, Sbus 07:30

C Fbus 07:50, Mbus 07:30, Sbus 07:40

D Fbus 07:40, Mbus 07:30, Sbus 07:50

15 Four methods for roasting a chicken are:

1   Place in the oven for 1 hour per kg.

2   Place the chicken in a tray with 3 cm of water, cook in the oven for 30 minutes plus 30 minutes per kg.

3   Cover the chicken with foil. Cook in the oven for 20 minutes per kg. Remove the foil, cook for a further 40 minutes.

4   Place the chicken in the microwave for 20 minutes per kg. Allow it to stand for 15 minutes then place it in the oven for 15 minutes.

Which one of the following statements is true?

A All methods take an equal time to cook a chicken weighing 1 kg.

B Method 1 is the quickest for chickens weighing more than 3 kg.

C Method 3 is always slower than method 4.

D Methods 2 and 3 will take the same time to cook a 2 kg chicken.

**16** Angela runs her life according to a strict schedule:

Every third day, she practises her violin.
Every fourth day, she has a bath.
Every fifth day, she eats ice cream.
Every sixth day, she runs in the park.

On a particular Monday, she does **all** of these things.

On which day of the week will she next do all of these things?

A Tuesday

B Thursday

C Friday

D Saturday

17 A hollow cube has holes drilled through each face in the patterns shown to represent the numbers 0 to 5:
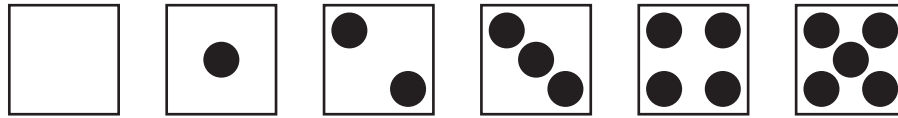
When the cube is placed on the table it is possible to see holes in the bottom face if they are directly beneath the ones in the top face. Three views of the cube from the top are shown here.
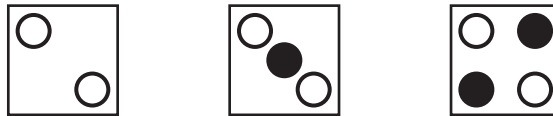
○ represents a hole where there is another hole directly beneath it.

● represents a hole in the top face without another hole directly beneath it.

What number is on the face opposite the 5?

A   0

B   1

C   2

D   3

18 A restaurant serves between 100 and 200 people every evening. Each customer buys either the "Meal of the day" at $20 or the "Gourmet meal" at $40. No more than 25% of the customers on any evening buy the "Gourmet meal". All drinks cost $5, and everybody has at least one drink, but nobody ever has more than four.

On the basis of this information, what is the difference between the smallest total amount and the largest total amount customers might spend in any evening?

A $6000

B $6500

C $7000

D $9500

PAPA CAMBRIDGE

19
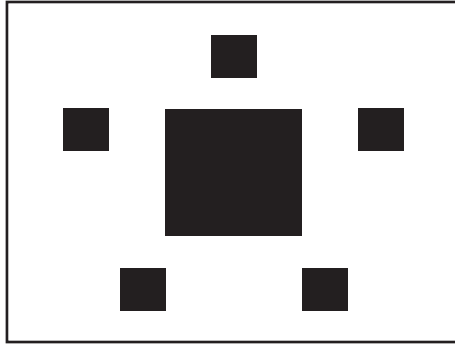
This is the flag of the Republic of Pentaria. It has six black squares on a white background.

The five small squares represent the five states that make up the Republic. The length of each of these squares is a tenth of the flag's length and an eighth of its height. The large, central square represents the Republic itself, and its length is three times the length of each of the small squares.

What percentage of the Pentarian flag is black?

A 10%

B 12.5%

C 15%

D 17.5%

20 Some college students were asked whether they own a games machine or a laptop computer. 75% of the group said that they owned a games machine. 25% of the group said that they owned both a games machine and a laptop computer.

Which one of the following statements can be deduced from the information given?

A All the students own at least one of a games machine and a laptop computer.

B At most half of the students own a laptop computer.

C 50% of the students who own a games machine also own a laptop computer.

**D** 25% of the students own a laptop computer, but not a games machine.

21 The number of boxes of apples that can be harvested from a tree depends on its age. The following graphs show the expected yield from *Todd's Tastiest* variety.

Yield in year

Cumulative yield
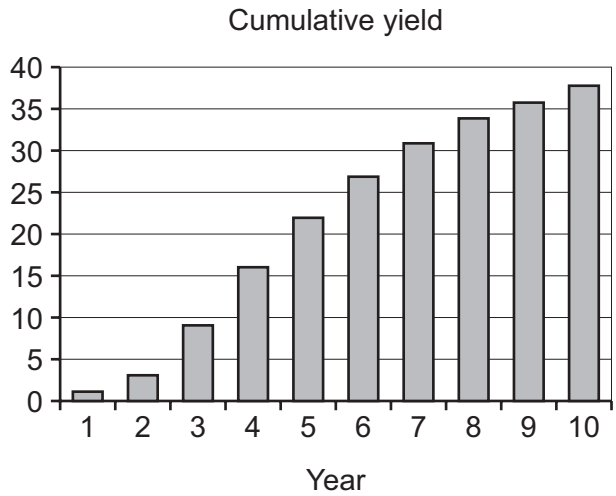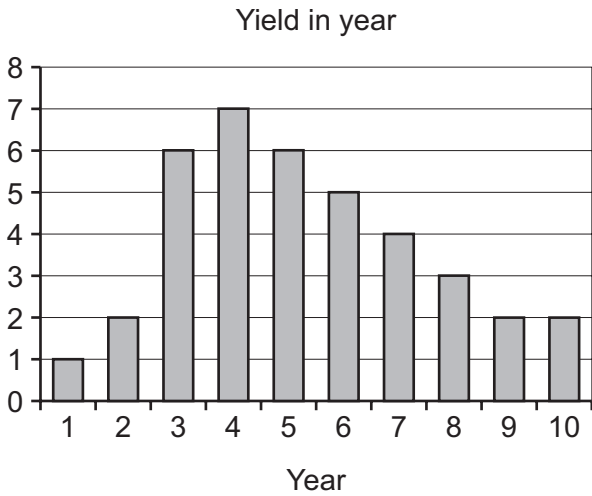
To get the greatest average yield, how often should these trees be replaced?

A After year 3

B After year 4

C After year 5

D After year 6

22 At a theme park, the paths are laid out around 16 squares of grass, as shown below.
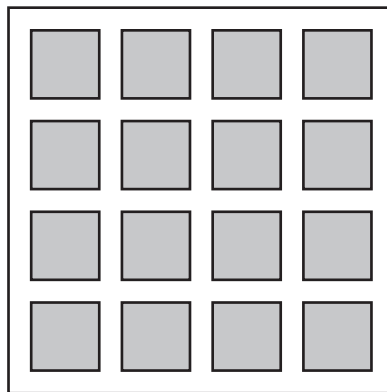
Every square of grass is 100 metres by 100 metres.

Litter bins have to be placed on the paths so that you never have to walk more than 100 metres along a path to reach a bin.
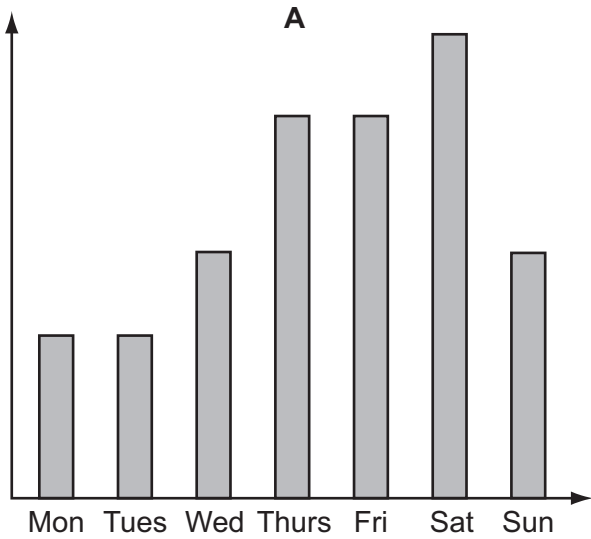
What is the smallest number of bins that can be used?

A 4

B 8

C 12

D 13

PAPA CAMBRIDGE

23 Henry is the manager of a theme park. The number of customers that he is allowed to admit to the park is related to the number of supervisors that he has working on that day. For each supervisor working he can have 30 customers, but he is allowed to add an extra 20 customers if there are at least 3 supervisors working. The maximum capacity of the park is 150 customers.

There are two supervisors who work on all seven days of the week. In addition, Joe works every day from Wednesday to Saturday, Susan works every day from Friday to Sunday, and Zoe works on Thursdays and Saturdays.

Which of the bar charts represents the number of customers that can be admitted on each day?


A

Mon Tues Wed Thurs Fri Sat Sun

B

Mon Tues Wed Thurs Fri Sat Sun

C

Mon Tues Wed Thurs Fri Sat Sun

D

Mon Tues Wed Thurs Fri Sat Sun
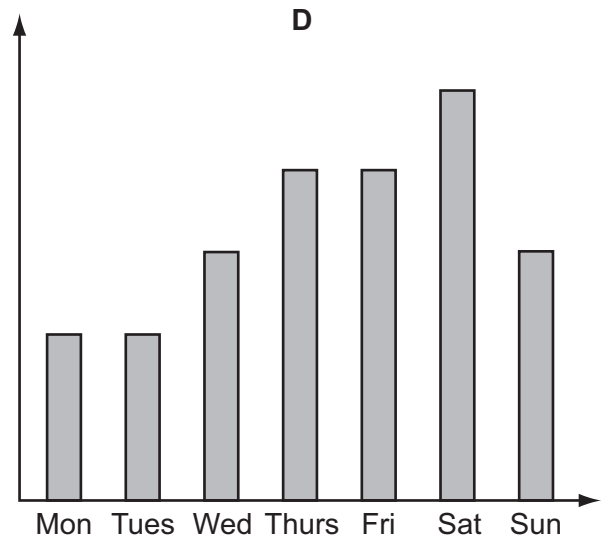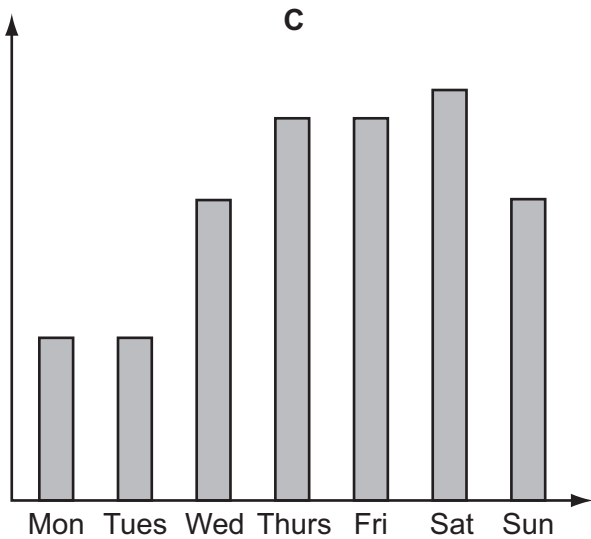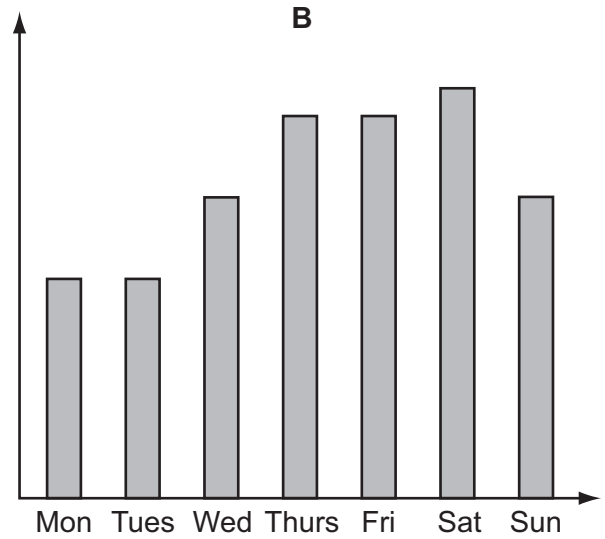
24 I am designing a pattern that I will use to tile a rectangle which measures 1.2 m by 0.8 m. All of the tiles are rectangular and measure 60 cm by 20 cm. Every tile has the same pattern. One tile is drawn below:
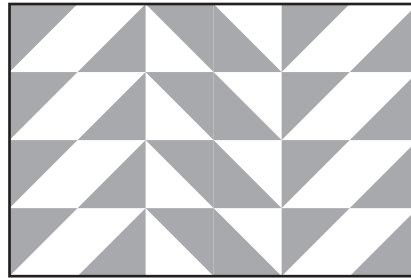

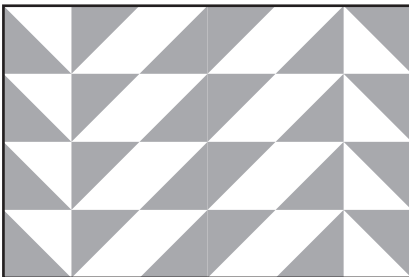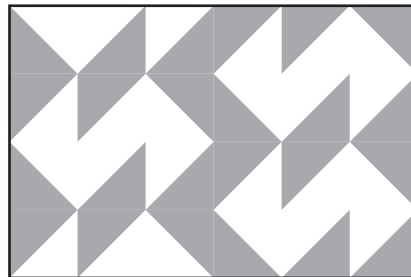Which of the designs below can **not** be created with these tiles?

A

B

C


D

   **[Turn over**

PAPA CAMBRIDGE
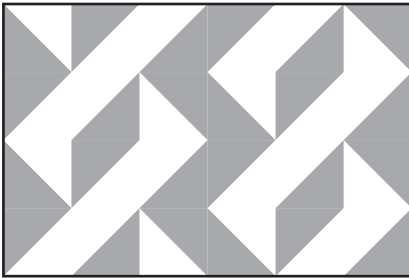
25 The table below shows the distribution of annual family income in Erewhon.

Income range ($)	Less than $15 000	Between $15 000 and $30 000	Between $30 000 and $45 000	Between $45 000 and $60 000	More than $60 000
Number of families	1500	3020	6101	4111	490

Which one of the graphs below could also be a representation of the distribution of annual family income in Erewhon?

PAPA CAMBRIDGE
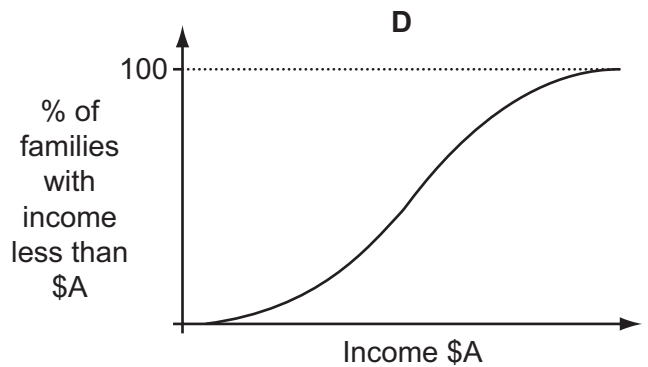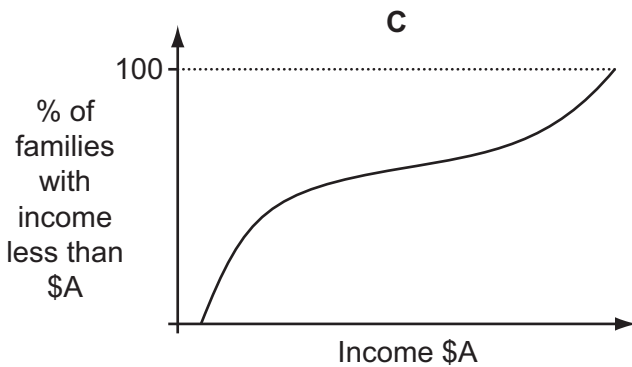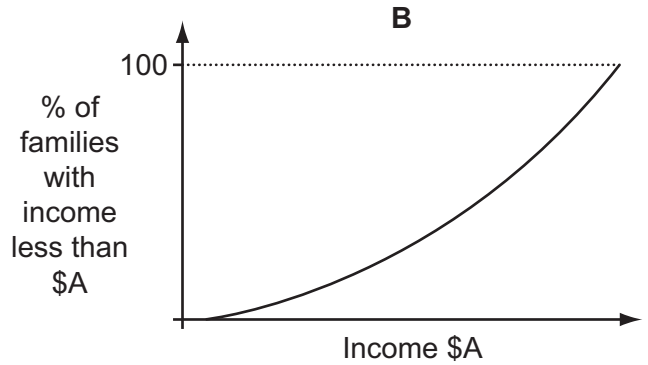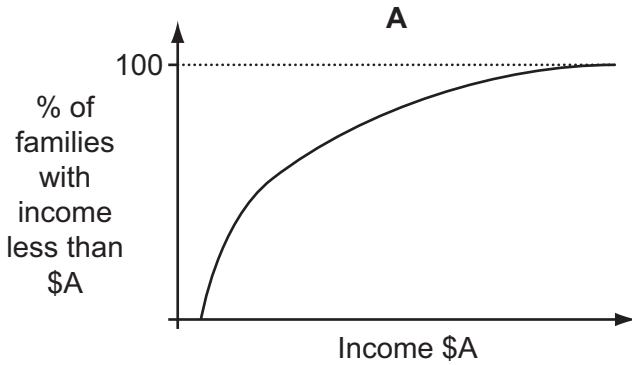
26 Igor Toreadors is the leader of the Great National Party (G), the largest party in the Bognovian Parliament which has 123 seats. The allocation of seats between all the parties is shown below (initial letters for the parties are used).
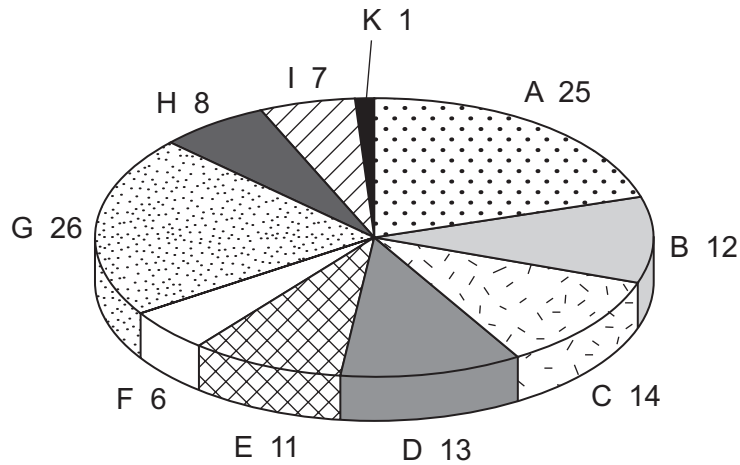
He needs to ally his party with other parties to form a coalition government with a majority in parliament (more than half the seats) but will not ally his party with the second largest party because they have incompatible policies. He also wants to have the fewest number of partners in his government as experience shows that the more parties are involved, the more likely the government is to break down. However, while having the fewest number of parties, he also wants to have the smallest government possible, so that his party will dominate it.

With which parties should Igor attempt to form an alliance?

A B, I, E and F

B D, C and B

C B, E and D

D E and A

PAPA CAMBRIDGE

27 The postcodes in Canada and the UK differ from similar systems in other countries (e.g. the US Zone Improvement Plan (ZIP) codes) because they include both letters and numbers. Codes are formed from two groups of characters, separated by a space. Each character is either a letter A–Z or a digit 0–9. We can describe the postcodes using a template, where we write:

> **L** for any single letter
> **#** for any single letter or single digit
> **9** for any single digit

> Optional characters are enclosed in brackets **[ ]**.

Canadian codes follow a fixed pattern, whereas those in the UK have a more complicated structure to accommodate the pre-existing system of postal districts in major cities.

A Canadian code has the template **L9L 9L9**. An example would be K9B 4U2.

The UK codes are of the form **L[L]9[#] 9LL**.
For example: N2 1AB, GL1 3EV, SW2A 6FF or CH45 5PQ.

Which one of the following would be sufficient but **not** necessary to determine that a given code is from the UK rather than from Canada?

A   There are six characters (not counting the space).

B   The last character of the first group is a letter.

C   The second character is a letter.

D   The last character is a letter.

28 An electrician charges a call-out fee (which is a whole number of dollars) plus a rate for each hour (which is a multiple of 10¢ and more than the national minimum wage of $4.08 per hour), rounded up to the nearest hour.

Brijan has just received a bill for $40.50 which shows only the actual total to pay, not the time for which the electrician worked or the call out fee. He wants to know how long the electrician has charged him for. He has a previous bill from the same electrician for $54.60.

How many hours did the electrician charge him for on the bill just received?

A   4

B   5

C   8

D   9

29 Using six digits to represent a date can be done in different ways. The international standard system (ISO 8601) is to use the order year-month-day (YYMMDD), so 1st February '03 would be 030201. This makes them easiest to sort. The normal usage in some countries, including Britain, is DDMMYY, giving 010203 instead. In Belize, the United States, and Palau the form MMDDYY is used, giving 020103 for the same date.

What is the largest possible difference (in the same century) between dates corresponding with a 6-digit date that would be valid in all three systems?

A   10 months and 20 days

B   11 months and 11 days

C   29 years 11 months and 1 day

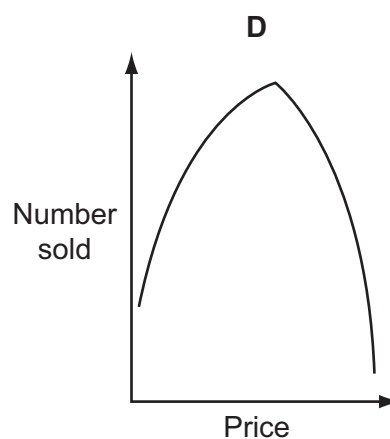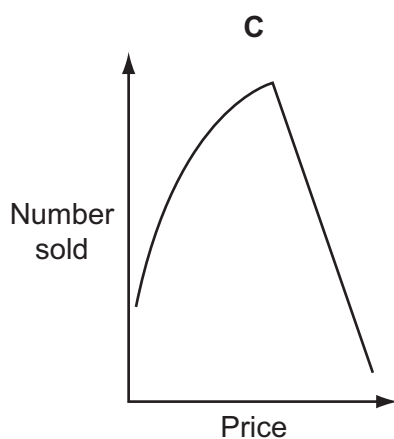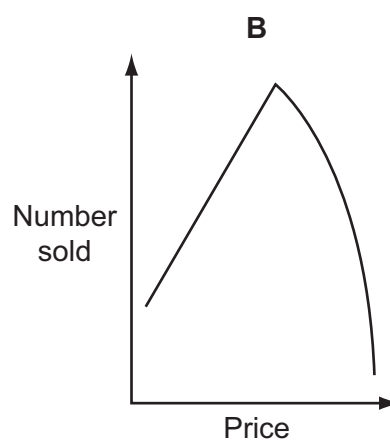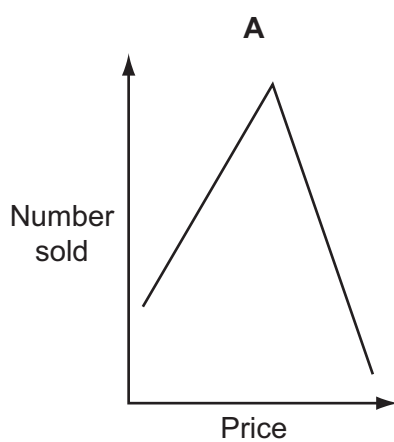**D**   30 years and 30 days

PAPA CAMBRIDGE

30 Suspecting that people tend not to buy things that are too cheap (probably because they suspect poor quality), as well as things that are too expensive, Alistair conducted an experiment in pricing.

He arranged for 15 shops to sell the same sunglasses at different prices for one month.

These are the results:

Shop descriptor	Price	Number sold
SGA	$14	75
SGB	$6	51
SGC	$26	31
SGD	$12	71
SGE	$24	43
SGF	$2	25
SGG	$16	78
SGH	$30	6
SGI	$22	55
SGJ	$18	80
SGK	$4	41
SGL	$20	68
SGM	$8	59
SGN	$28	19
SGO	$10	66

Which one of the following best fit lines illustrates Alistair's results?

A

Number sold

Price

B

Number sold

Price

C

Number sold

Price

D

Number sold

Price

PAPA CAMBRIDGE

BLANK PAGE

BLANK PAGE

PAPA CAMBRIDGE