UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

THINKING SKILLS **9694/12**

Paper 1 Problem Solving **May/June 2011**

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.

INFORMATION FOR CANDIDATES

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

This document consists of **20** printed pages.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1   The table below shows the prices for travel by train between Gardentown and Workto

Day return journey travelling Monday to Friday.	$4.00
Day return journey travelling Saturday or Sunday.	$3.00
5 day rover ticket. Travel as many times as you like any specific Monday to Friday.	$17.50
7 day rover ticket. Travel as many times as you like on seven consecutive days.	$21.50

Charlie commutes from Gardentown to Workton for work. He makes the journey every day Monday to Friday, and also has to go to work every third Saturday. He never goes to Workton on Sundays, and nor does he ever go apart from going to work.

If Charlie buys the tickets that keep his travel costs as low as possible, how much will this cost him for a three-week period?

A $52.50

B $55.50

C $56.50

D $58.00

2   When many students get a question wrong in the same way, it sometimes reflects that the teacher has not been entirely clear. However, when almost everyone gets the answer wrong the first check must be whether there is an error in the printing of the question.

For example, there was a test where what should have been 10/(2+2) had 10 as a common answer, and for 15/(3+5) most people gave 25. This suggests that a symbol has been consistently misprinted.

A third question was intended to be 6/(2+3).

What would we expect most people to have given as an answer for the third question?

A   6/5

B   5

C   6

D   9

3 Amy and Bahula are sharing out some sweets. They take a handful each and there in the box. Amy has the most so she gives Bahula as many as Bahula already has. Ba gives Amy as many as Amy now has. They now have the same number.
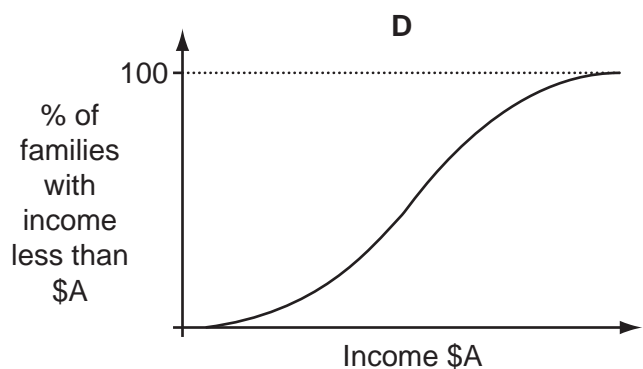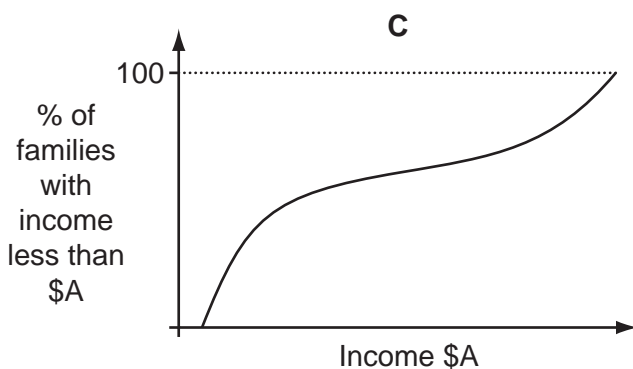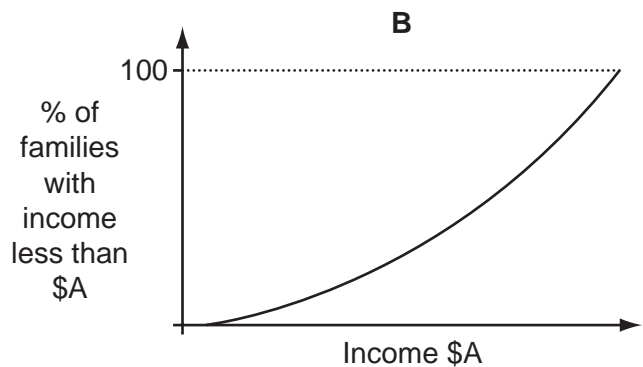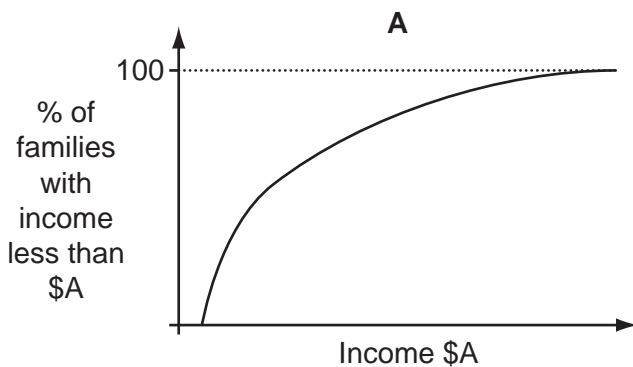
What is the smallest number of sweets there could have been in the box originally?

**A** 5

B 8

C 16

D 30

4 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?

A

% of families with income less than $A

Income $A

B

% of families with income less than $A

Income $A

C

% of families with income less than $A

Income $A

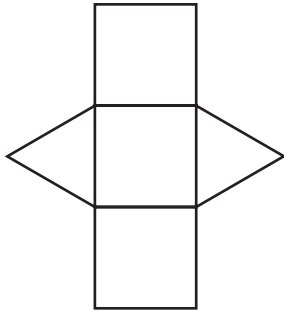**D**

% of families with income less than $A

Income $A

5 Packaging for chocolates is in the form of a prism, as shown below. The prism is made up card from a net.
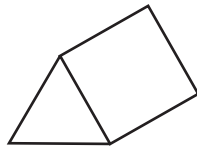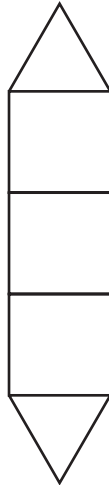
Which one of the nets below will **not** fold into the prism?
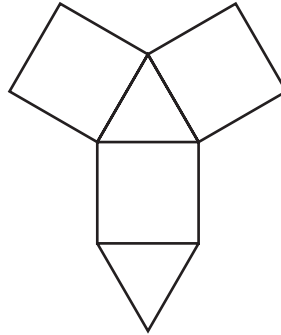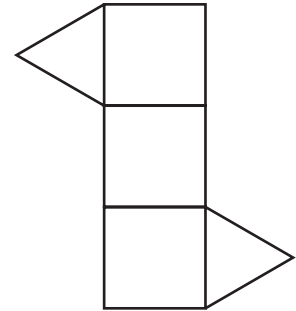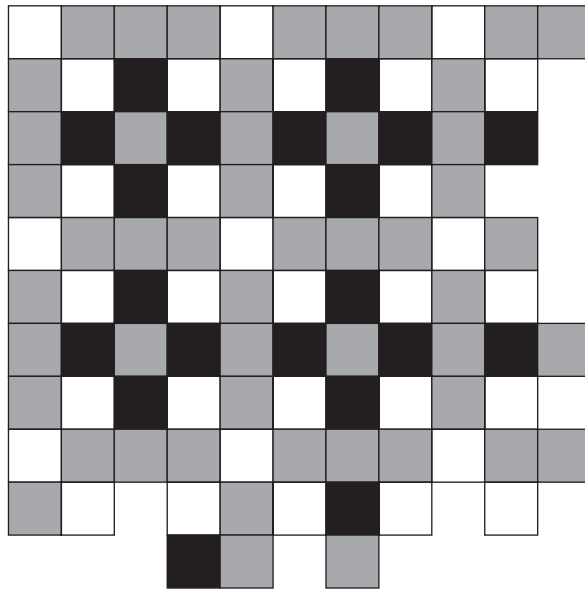
A	B	C	D

6 The diagram below shows the start of the tiling arrangement for a large floor. The ⬚⬚⬚ colours of tile (white, grey and black), all the same size. Several thousand tiles will be ⬚ make the whole floor.

Approximately what proportion of the three tile colours are needed to make up the floor?

A 5 grey : 3 white : 2 black

B 7 grey : 5 white : 4 black

C 13 grey : 8 white : 4 black

D 40 grey : 25 white : 16 black

7 The Monstrosity is a very popular ride at Happy Daze theme park. Each ride lasts for 5 minutes and can accommodate 36 people. There is a 3 minute period between rides for unloading and reloading.

There has been a huge queue for The Monstrosity all day, and with exactly 1 hour to go before closing time there are still 564 people waiting. No ride will start unless it can finish before closing time.

The ride currently in progress set off 4 minutes ago.

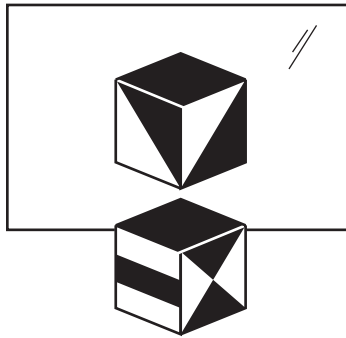How many of these 564 people will **not** be able to ride The Monstrosity today before closing time?

A 132

B 252

C 276

D 312

8 The Bolandian currency consists of the following coins below $1:

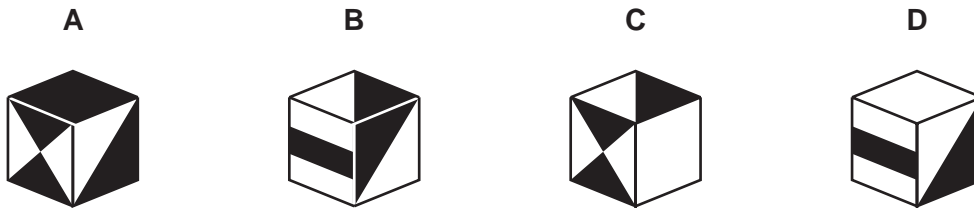1¢ 2¢ 5¢ 10¢ 25¢ 50¢

What is the most money you can have in coins and not be able to pay exactly $1?

A $0.99

B $1.03

C $1.19

D $1.23

9 The diagram shows a solid cube and its reflection in a mirror.

The bottom face of the cube is white.

Which one of the following could be a view of the cube from another direction?

A   **B**   **C**   **D**

10 School photographs of individual children are generally offered in packages containing [...] various sizes and prices. The smallest pictures are offered in batches, because it's eas[...] many copies of the same picture on a sheet of photographic paper.

For practical reasons, they need to be in a rectangular array, lined up with the sides of the pap[...] even if it might be possible to squeeze in more by some other arrangement.

The smallest pictures are 20 mm by 25 mm, and there needs to be 4 mm between adjacent pictures and between pictures and the edge of the paper. The paper is 202 mm by 254 mm.

How many of the smallest pictures can be printed on a single sheet?

A   60

B   64

C   84

D   90

11 In a rather wet spring a farmer harvests his barley at 20% water content by weight. He has to dry it partially to deliver to the maltings at 12% water content.

How much barley must he harvest to deliver 1 tonne (1000 kg) to the maltings?

A   1080 kg

B   1100 kg

C   1400 kg

D   1667 kg

12 An hourly tram service connects the town of Upperville with the popular beach of Lo~~~

At ten past each hour the tram sets off from Upperville, covering the 8 km route at a c~~~ speed of 40 km/h.

At half past the hour it begins its return journey, which, because it is uphill all the way, it covers at a constant speed of 24 km/h.

Which one of these graphs, suitably labelled, shows the tram's progress from Upperville to Lowsands and back?

A

B

C

D
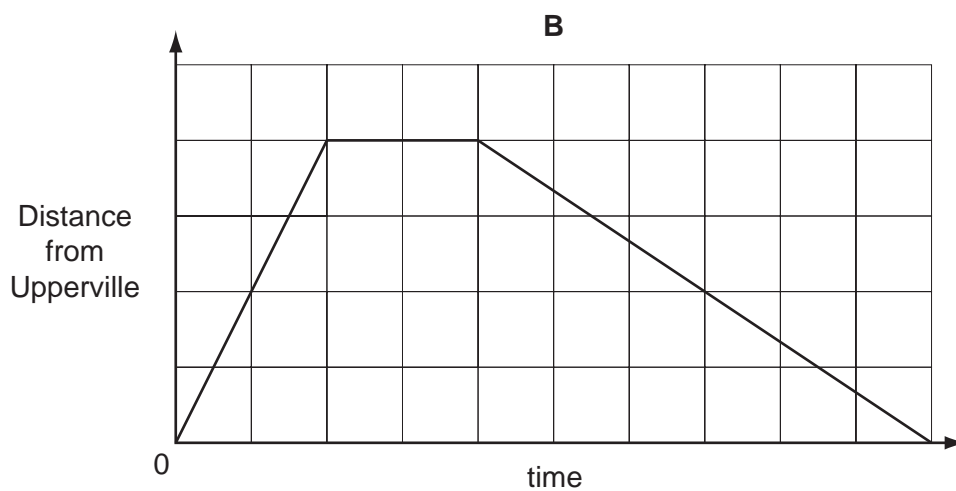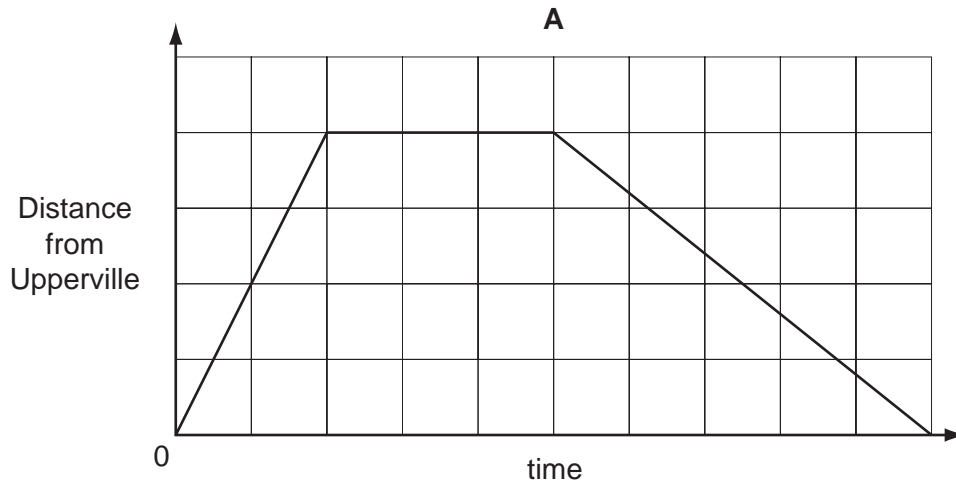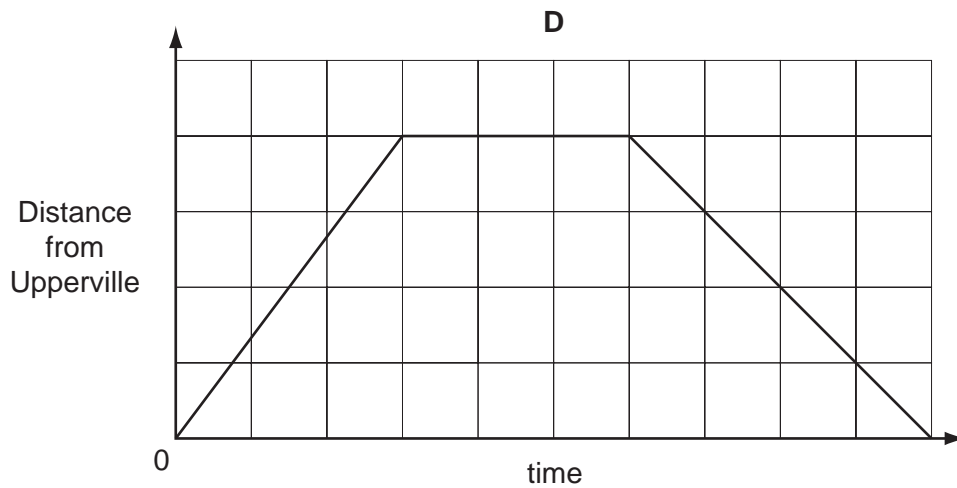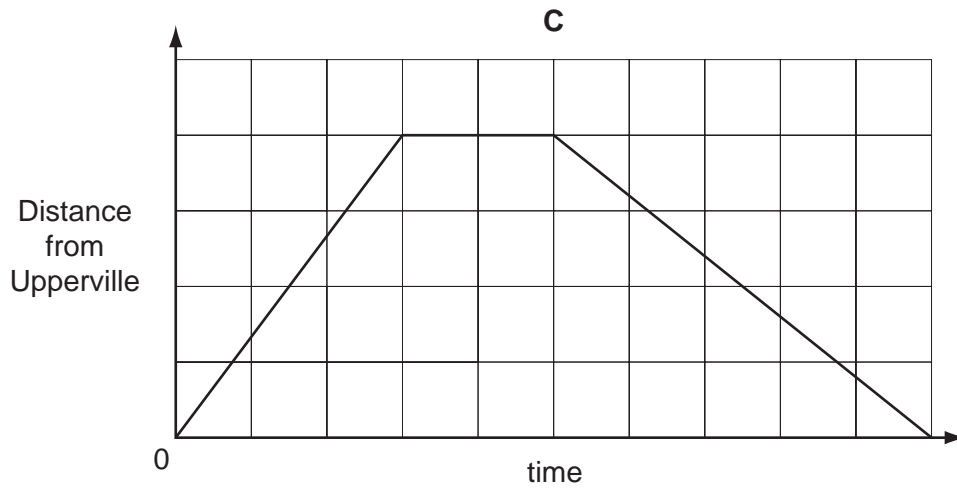
13 Buses run between Alphatown and Betatown, a distance of 25 km. The company running the service prides itself upon its reliability and keeping to the timetable. Buses set off from Alphatown every 20 minutes at 0, 20 and 40 minutes past each hour. The return journey from Betatown also goes every 20 minutes, starting at 10, 30, and 50 minutes past each hour. The buses travel at a steady 60 km per hour both ways. It is noted that in Hornville, on the route, buses going opposite ways pass and the drivers acknowledge each other.

Which one of the following would explain why the buses meet in Hornville?

A   Hornville is either 5 km from Alphatown or 5 km from Betatown.

B   Hornville is either 7.5 km from Alphatown or 7.5 km from Betatown.

C   Hornville is either 10 km from Alphatown or 10 km from Betatown.

D   Hornville is 12.5 km from Alphatown and 12.5 km from Betatown.

14 One of the exhibits in the Hirmin Gallery of Modern Art is called "Pot Luck". It con... ...t pots in 9 stacks, each stack containing a different number of pots between 1 and 9 inclu...
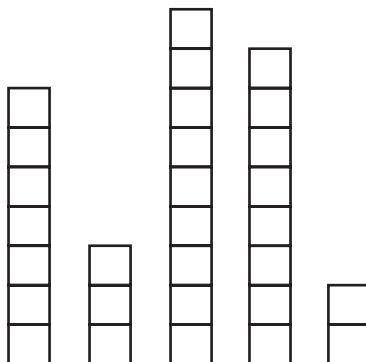
From above its appearance is:
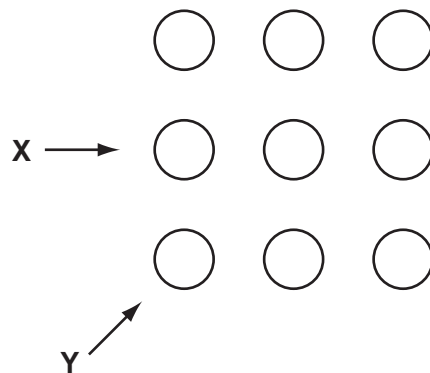
Side-on, from directions **X** and **Y**, it appears as follows:

from **X**
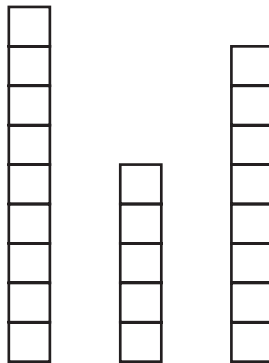
from **Y**

How many pots are there in the stack nearest to the viewer in the appearance from direction **Y**?

A 1

B 4

C 6

D 9

15 This was the Magmatian Premier Football League table before today's matches.

	Played	Won	Drawn	Lost	Goals Scored	Points
Tolima	15	10	2	3	36	34
Hekla	15	10	3	2	40	33
Vesuvius	15	9	2	4	38	33
Cumbal	15	10	2	3	39	32
Surtsey	15	9	1	5	38	32
Antisana	15	6	0	9	31	24
Stromboli	15	5	3	7	24	21
Fujiyama	15	5	4	6	20	19
Etna	15	4	3	8	17	18
Cotopaxi	15	4	2	9	12	15
St. Helens	15	2	5	8	10	11
Ubinas	15	1	3	11	7	9

Today's results:

Home team		Away team	
Cotopaxi	2	Vesuvius	2
Etna	3	Cumbal	4
Hekla	2	Antisana	1
Stromboli	0	Ubinas	0
Surtsey	3	St. Helens	0
Tolima	0	Fujiyama	2

Points are awarded in this league as follows:

	Home Team	Away Team
Win by 2 goals or more	3 points	4 points
Win by 1 goal	2 points	3 points
Draw	1 point	2 points
Lose by 1 goal	0 points	1 point
Lose by 2 goals or more	0 points	0 points

Where two (or more) teams are level on points, positions are decided by the number of goals scored.

Which team has replaced Tolima at the top of the table?

A   Cumbal

B   Hekla

C   Surtsey

D   Vesuvius

16 Igor Toreadors is the leader of the Great National Party (G), the largest party in the _____ Parliament which has 123 seats. The allocation of seats between all the parties is sho____ (initial letters for the parties are used).
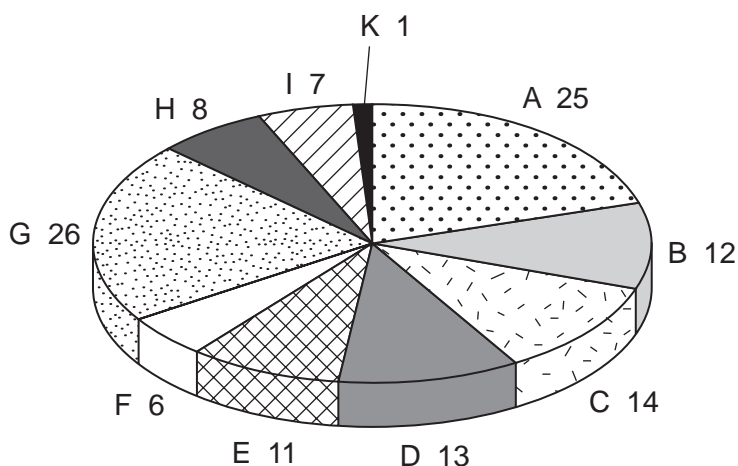
He needs to ally his party with other parties to form a coalition government with a majority in parliament (more than half the seats) but will not ally his party with the second largest party because they have incompatible policies. He also wants to have the fewest number of partners in his government 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

17 A train leaves the station at 13:10 and 13:40 and then every 30 minutes until 22:10. When Tom leaves work it either takes him 5 minutes or 40 minutes to reach the station, depending on whether he visits his friend on the way. Sometimes Tom gets to the station 5 minutes before a train leaves, and sometimes 20 minutes before.

Which one of the following could explain this?

A Tom finishes work at 16:45 every day.

B Tom finishes work at 17:00 every day.

C Tom finishes work at 16:45 every day, but leaves 10 minutes later if he is visiting a friend.

D Tom finishes work at 17:00 every day, but leaves 5 minutes earlier if he is visiting a friend.

18 Yesterday I received a mysterious letter. Inside was a strip of paper with a series of [illegible]
    and no explanation. I tore the paper up and threw it away.

    Today I received an invitation to a friend's party. The party is to have the theme "Secret Ag[illegible]
    and guests must give the correct 7-letter password to be allowed in. Attached to the invita[illegible]
    was this document.

△△△ = A	◇△△ = J	□△△ = S
△△◇ = B	◇△◇ = K	□△◇ = T
△△□ = C	◇△□ = L	□△□ = U
△◇△ = D	◇◇△ = M	□◇△ = V
△◇◇ = E	◇◇◇ = N	□◇◇ = W
△◇□ = F	◇◇□ = O	□◇□ = X
△□△ = G	◇□△ = P	□□△ = Y
△□◇ = H	◇□◇ = Q	□□◇ = Z
△□□ = I	◇□□ = R	

    Realising now the meaning of yesterday's communication, I sifted through my waste-paper
    basket and tried to reconstruct the password, as follows:

    However, I couldn't find the two end pieces.

    What is the 5th letter of the password?

    A E

    B G

    C N

    D T

19 The manager of a train company calculates the price of a ticket by charging a fixed amount plus
    an extra amount per kilometre of travel. Last year, when prices needed to go up, the fixed amount
    was kept the same, but the cost per kilometre was increased by 2¢. This resulted in the price for
    a 30 kilometre journey going up by 2.5%. This year the manager has chosen to increase the fixed
    amount by 10% instead. The price for a 50 kilometre journey is now $2.50 more than it was
    before the first change.

    What is the cost of a ticket for a 50 kilometre journey after this latest increase?

    A $30.00

    B $31.00

    C $31.50

    D $32.50

20 Borgonia was badly served for roads, without any motorways in 2000. The follow... ...
shows the number of kilometres of new motorway built in Borgonia in each of the subse...
years. Motorways are expected to last at least 20 years.
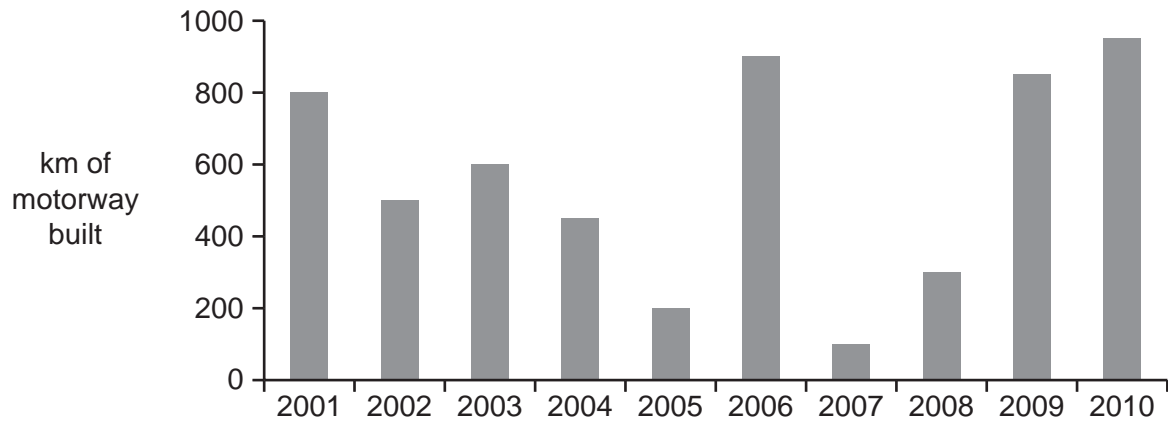
Which column in the following table could represent the total number of kilometres of motorway in Borgonia at the end of each year?

Year	Total length of motorways (km)			
	A	**B**	**C**	**D**
2001	800	800	800	800
2002	1300	1300	1300	1300
2003	1900	1900	1900	1900
2004	2350	2350	2350	2350
2005	2550	2550	2550	2550
2006	3450	3450	3450	3450
2007	3550	3350	3550	4550
2008	3850	3550	3850	4850
2009	4700	4200	4700	5200
2010	5650	4750	4900	5650

21 I am planning to buy a book on computer programming. I need the book to be a [...]
programming language and I need it to include a section on working with databases.
will give me a 10% discount on some of the books. I only have $20 to spend, but I want to
most expensive book that I can afford. The table shows the books that I could choose from:

Book title	Cost ($)	Languages covered	Includes databases?	10% discount available?
A first guide to programming	10	BASIC and C	Yes	Yes
Programming: A beginner's guide	25	C	No	No
Simple programming tips	15	C	Yes	Yes
The programmer's guide	20	BASIC	Yes	No

Which book should I buy?

A   A first guide to programming

B   Programming: A beginner's guide

C   Simple programming tips

D   The programmer's guide

22 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

23 The Jones family's last year's electricity bills are summarised below. The bill is made ⟨...⟩ charge for each three-month period plus a charge per kWh of electricity used. The ch⟨...⟩ have not changed during the year.

| Period	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec
kWh used	1900	1500	400	700
Amount to pay	$220	$180	$70	$110

One of the bills is wrong. Which one is it?

A Jan – Mar

B Apr – Jun

C Jul – Sep

D Oct – Dec

24 The town council did a survey to find out what new facility the local residents would most like to have built in the town. The results are as shown in the table:

Facility	Votes
Leisure centre	513
Library	271
Museum	150
Swimming pool	128
Other suggestions	18

The results were also shown on a pie chart, but the regions were not labelled.

Which one of the following correctly represents the results?

A	B	C	D
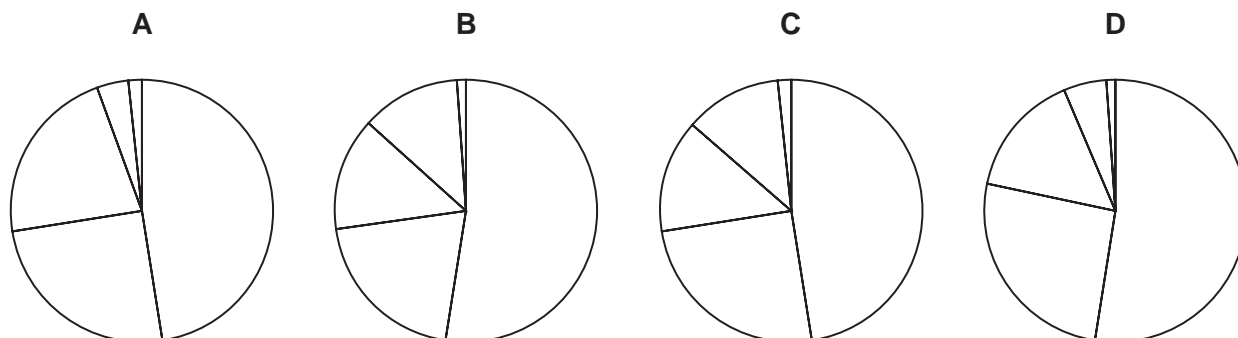
25 When my mobile phone is not being used it displays the time and the date. Shortly a̶f̶t̶e̶r̶ ̶I̶ ̶s̶e̶t̶
it I noticed this display, with nine different digits visible.

It set me wondering when I could expect to see all ten different digits simultaneously. I was
surprised to discover that this will not occur until June 2034.

When all ten different digits eventually do become visible simultaneously on this phone for the
first time, what time of day will it be?

A Between 00:00 and 06:00

B Between 06:00 and 12:00

C Between 12:00 and 18:00

D Between 18:00 and 00:00

26 The diagram below represents a net from which a dice with four faces can be made to use in a
children's game. When assembled the dice becomes a tetrahedron (a regular triangular-based
pyramid).
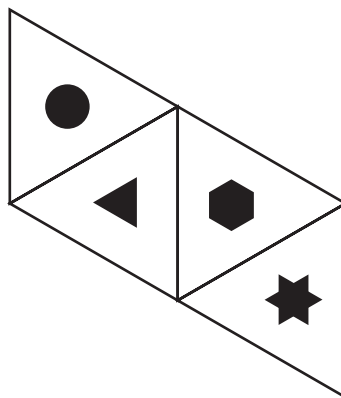
Which one of the following does **not** show a possible view of the assembled dice as seen from
above one vertex?

A	B	C	D

27 The average weight of a particular group of people is 72.1 kg. The group is joined by Wilf and Zak.

Which one of the following sets of information may **not** be sufficient to calculate the average weight of the new group including Wilf and Zak?

A The number of people in the original group and the combined weight of Wilf and Zak.

B The percentage increase in both total weight and total number of people when Wilf and Zak join.

C The total weight of the original group and the combined weight of Wilf and Zak.

D Wilf's and Zak's individual weights and the number of people in the original group heavier than each.

28 In a motor race, a lap normally lasts up to 90 seconds, except the first one which is s̶ ̶ ̶ ̶ the cars have to start from a stationary position. As the cars use up fuel they become l̶ ̶ ̶ achieve higher speeds. However, they need to stop twice during the race to refuel. Each ̶ will add about 37 seconds to their lap time.

One team elects to try out its tyres on a track in a rehearsal for a full race where there are no other vehicles to interrupt the steady progress of the vehicle. The driver performs well and makes no driving errors to affect the times and the conditions remain constant.

Which one of the graphs shows the lap times of the rehearsal?
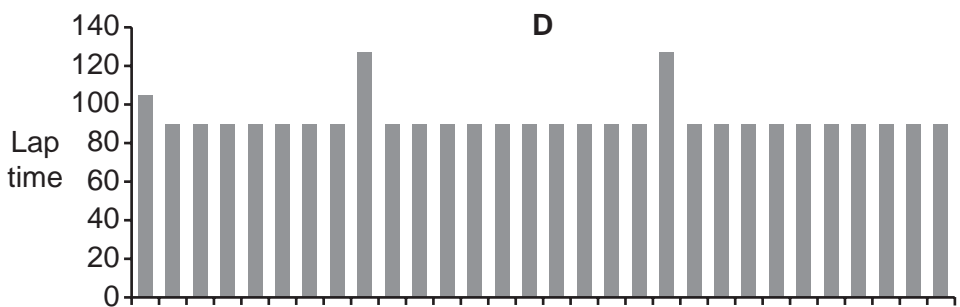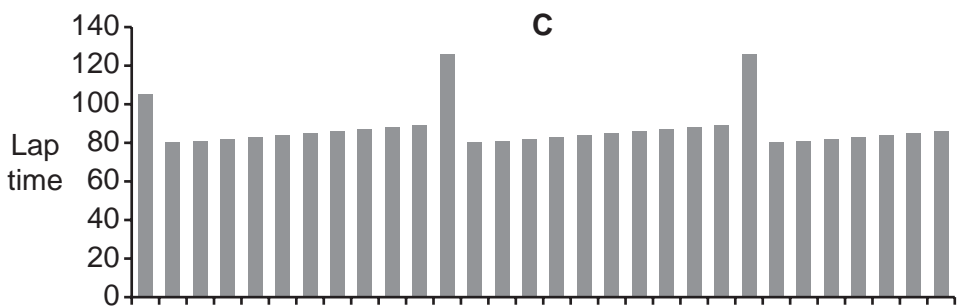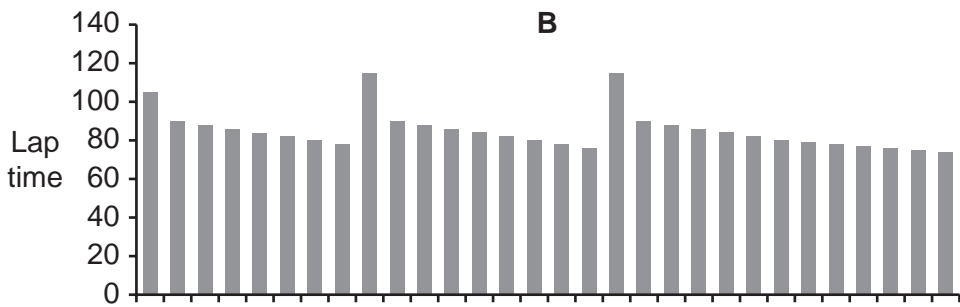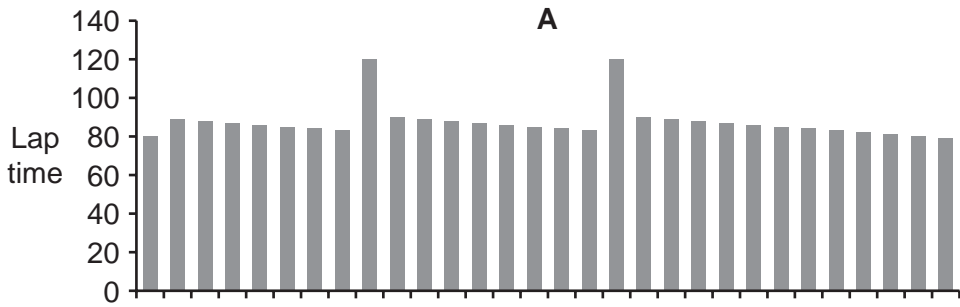
29 John feeds the wild birds in his garden with bird seed placed in three feeders. [Two of the] containers have the same capacity, each holding 300 grams of seed, whilst the third fe[eder holds] 900 grams of seed. His seed storage bin contains 18 kilograms of seed. Because more b[irds] visit the large container, it takes the same amount of time to become empty as the smaller [ones] and all three containers have to be refilled every second day.

How many days will he be able to feed the birds for?

A 20 days

B 23 days

C 24 days

D 30 days

30 The Dee Street car park in Tayforth has spaces for 40 cars. The charge for parking is a flat rate of 80 cents per hour, or part of an hour, but only applies from 8 am to 6 pm each day.

Upon arrival, a driver must take a ticket from the machine at the entrance. When leaving, the driver has to insert the ticket into the machine at the exit, and pay the required amount of money, before the barrier will rise to allow departure. This machine will not give change.

Clyde empties the machine at the exit at 9 pm every day. As was the case yesterday, there were no cars in the car park when he arrived this evening. He has just taken $357.20 out of the machine, despite the fact that 40 x 10 hours x 80 cents per hour = $320.

Which one of the following could **not** be a contributory factor to the day's income being greater than the apparent maximum?

A No car leaves before 9 am.

B Some cars arrive after 5 pm.

C Some cars leave less than an hour after arrival.

D Some drivers are not able to put the correct amount of money into the machine.