

THINKING SKILLS

9694/11

Paper 1 Problem Solving

May/June 2015

1 hour 45 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.

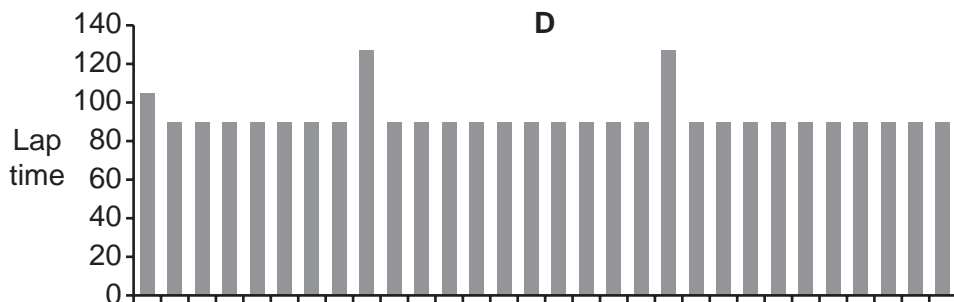
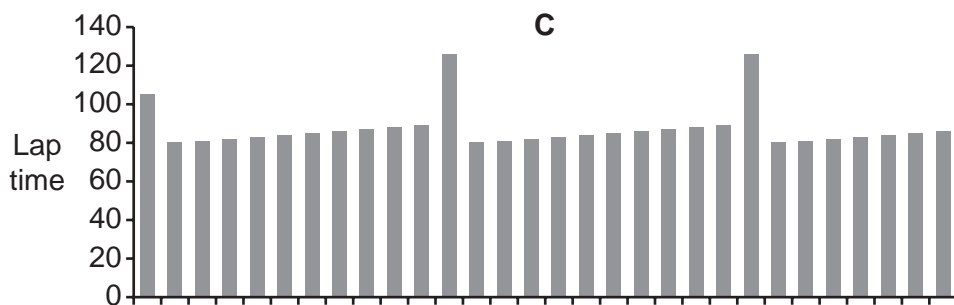
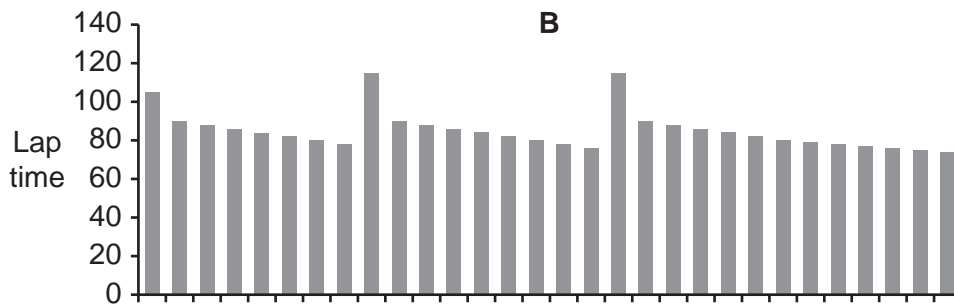
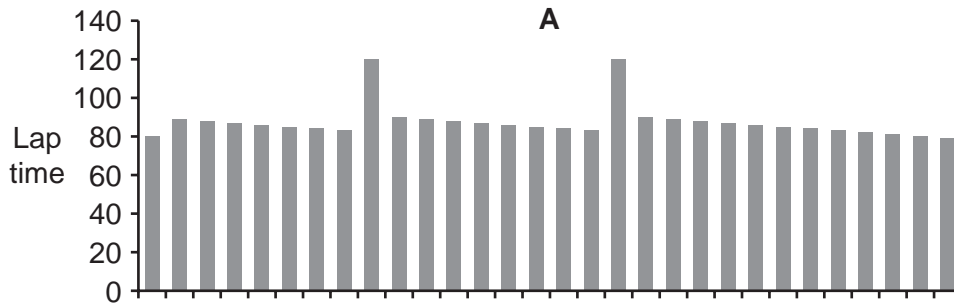
This document consists of **20** printed pages.



- 1 In a motor race, a lap normally lasts up to 90 seconds, except the first one which is slower as the cars have to start from a stationary position. As the cars use up fuel they become lighter and achieve higher speeds. However, they need to stop twice during the race to refuel. Each pit stop 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?



- 2 I buy my sandwiches for each day from the work canteen. The prices are shown in the table below.

<i>Filling</i>	<i>Small roll</i>	<i>Large roll</i>	<i>Baguette</i>
Cheese	\$1.00	\$1.20	\$1.50
Egg	\$1.20	\$1.50	\$1.80
Beef	\$1.80	\$2.00	\$2.20
Chicken	\$1.80	\$2.00	\$2.50
Ham	\$2.00	\$2.50	\$2.80
Pork	\$2.20	\$2.50	\$2.80
For salad add	20¢	30¢	50¢

I plan to have a large cheese roll on Monday and Thursday, a chicken baguette with salad on Tuesday and a large egg roll on Wednesday and Friday.

The canteen has a special offer: if I order all of my sandwiches for the week then I will get the cheapest one free.

How much will I need to pay for my sandwiches for the week?

- A \$6.00
 - B \$6.70
 - C \$7.20
 - D \$8.40
- 3 A taxi journey is charged at \$0.52 per minute. For example, a 10-minute journey would cost a total of \$5.20. I took a taxi this morning at 10:20 and at the end of my journey I noticed that the fare in dollars (2 digits) and cents (2 digits) was the same as the time in hours (2 digits) and minutes (2 digits).

How much was my taxi fare?

- A \$10.30
- B \$10.40
- C \$10.50
- D \$11.00

- 4 Four daily newspapers are published in Bolandia. They are The Bugle, The Clarion, The Herald and The Messenger.

In a survey, 180 Bolandian residents were asked which of the four newspapers they had bought on a specific date.

Of the 116 people who said they had bought newspapers on that date,

58 had bought The Clarion,
53 had bought The Herald,
42 had bought The Bugle,
19 had bought The Messenger.

Which one of the following can be confirmed from the information given?

- A Half of those asked bought The Clarion on that date
 - B More than half of those asked bought The Herald or The Bugle on that date
 - C Some of those asked bought more than one newspaper on that date
 - D Some of those asked couldn't remember if they had bought newspapers on that date
- 5 Photographs of pupils are taken and offered for sale in various packages.

2 large and 3 small: \$8
3 large and 2 small: \$9
4 large and 2 small: \$11

These prices include the same amount for postage and packing.

What is the cost of postage and packing included in these prices?

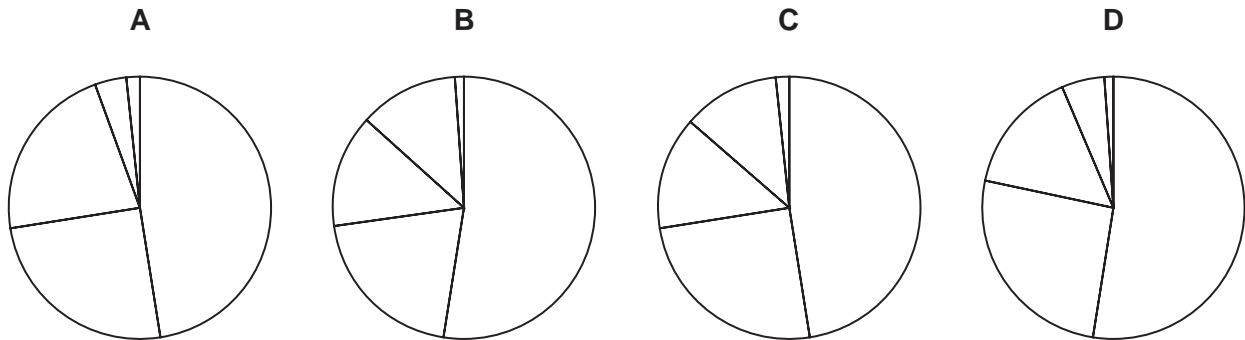
- A \$1
- B \$2
- C \$3
- D \$4

- 6 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:

<i>Facility</i>	<i>Votes</i>
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?



- 7 In the first phase of the annual Kolfeit Ice Hockey Tournament the 32 participating teams are divided into 8 groups of 4. In each group all the teams play each other once.

The group winners progress to the knockout phase, which consists of quarter-finals, semi-finals and the final. This means that all the teams play at least 3 matches, whilst the two teams that contest the final play 6 matches.

As well as the winners' trophy, there is also an award made to the team with the highest average number of goals scored per game during the tournament. This year's 'highest average' award was won by the Blizzards, with an average of 4.75 goals per match.

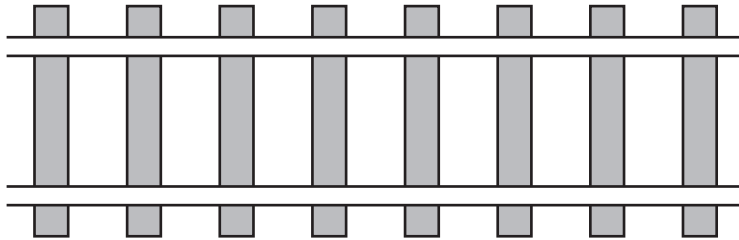
How far did the Blizzards progress in this year's tournament?

- A** Not beyond the first phase
B To the quarter-finals, but no further
C To the semi-finals, but no further
D To the final

- 8 Phoebe is an air stewardess. Her plane has just landed at Berghaan airport at 20:09 (local time) after flying to Tapaculo, where the local time is 2 hours behind Berghaan, and back. The total flying time was 9 hours 43 minutes, and departure from Tapaculo was 1 hour 25 minutes after arrival.

Which one of the pieces of information given above is **not** needed to work out the (local) time at which Phoebe took off from Berghaan earlier today?

- A Departure from Tapaculo was 1 hour 25 minutes after arrival
 B Landing time at Berghaan was 20:09
 C Tapaculo's local time is 2 hours behind Berghaan
 D Total flying time was 9 hours 43 minutes
- 9 One of the most important parts of a railway track is the sleepers (also known as ties) to which the metal rails are attached. These sleepers make sure that the rails do not move and the distance between the rails remains the same.



Originally, the sleepers were made from wood like oak, but in modern times they are made from concrete. As the wood rots, the oak sleepers are replaced with concrete ones. Each 10 km section is replaced over a period of 3 months. There are 2400 sleepers per km of track.

In the first month, one third of the sleepers were replaced. In the second month two fifths of the remaining sleepers were replaced.

How many sleepers had to be replaced in the final month to complete the task?

- A 6400
 B 8000
 C 9600
 D 14400

- 10 In Bolandia, car registration plates have two letters followed by two digits.

The allowed letters are A, B, C, D and E.

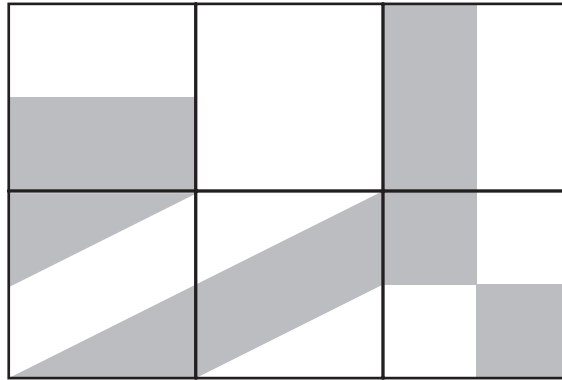
The allowed digits are 1, 2 and 3.

The two letters must be different from each other.

The two digits must not add up to 4 as this is considered unlucky.

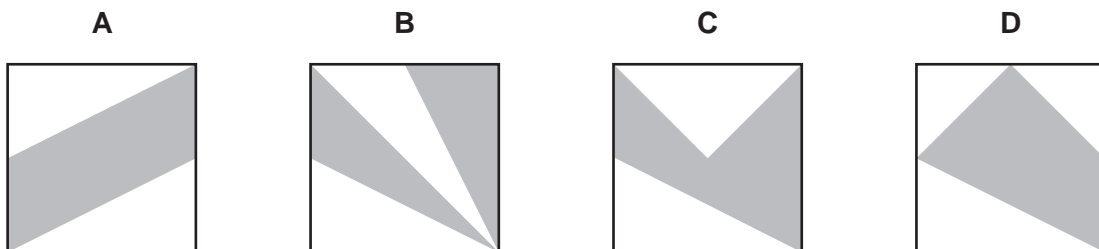
How many different registration plates could there be?

- A 80
 B 120
 C 150
 D 180
- 11 A window in my new house is made of six panes of glass. Half of each pane of glass is coloured and half is clear. Unfortunately, one of the panes is missing so the window currently looks as shown below.



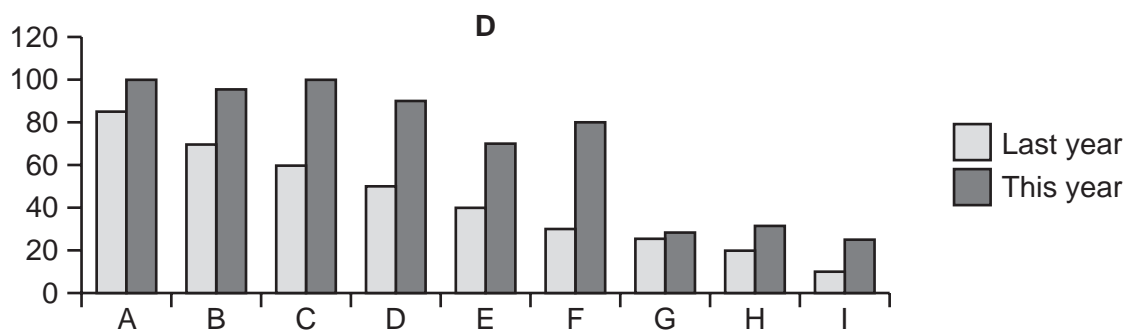
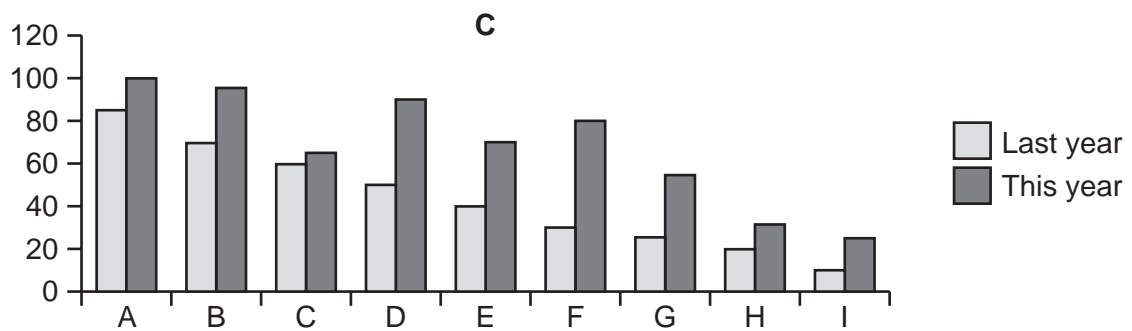
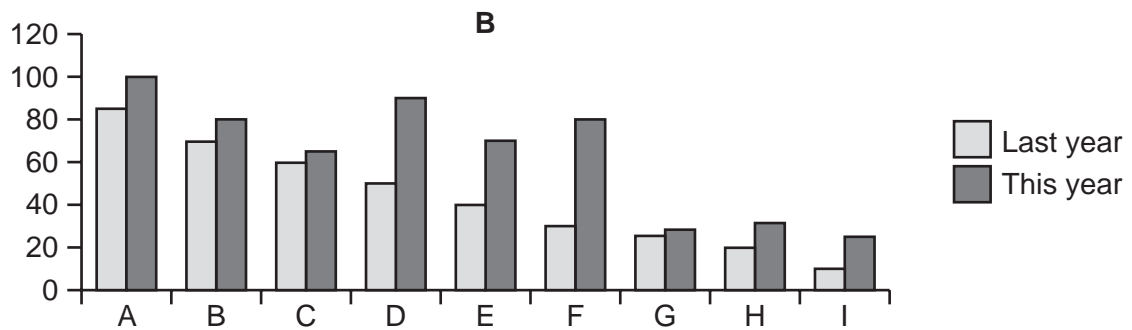
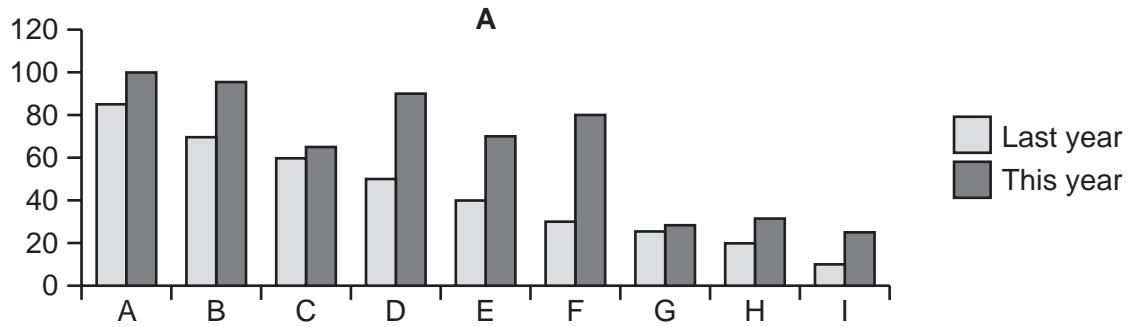
I want to fill in the missing pane of glass so that at every edge the colours match.

Which one of the panes of glass could I use to fill the gap (the pane can be rotated or turned over)?



- 12 A firm makes 9 different products (A–I) and managed to sell more of every product this year than last year. The sales of 2 products each rose by more than 100%, 3 rose by between 50% and 100%, 1 by between 25% and 50%, and the rest by less than 25%.

Which of the following charts could represent the data above?



- 13 The local shop has an offer on DVDs. All DVDs are priced at \$15, \$20 or \$22. When you have chosen your DVDs, if the total price is a two-digit number and not a multiple of 10, then you can reverse the digits of the price before you pay (i.e. a price of \$65 would become \$56, but you would not be able to change a price of \$80).

Henry has just bought some DVDs. What is the largest saving that he can possibly have made from this offer?

- A \$63
- B \$72
- C \$81
- D \$91

- 14 The local public transport system's charges are given in the table below. Each journey made requires one ticket.

Single ticket for one journey	\$1.00
Book of four tickets	\$3.20
Book of six tickets	\$4.50
Book of eight tickets	\$5.60

Books of tickets can be used on the day they are bought and the following day. They cannot be used after that.

Ethan's job is such that the number of journeys he needs to make depends on the day of the week. The pattern is shown below.

<i>Day</i>	Mon	Tue	Wed	Thu	Fri	Sat	Sun
<i>Journeys</i>	5	7	5	4	3	1	0

What is the smallest weekly expenditure on tickets that will allow Ethan to take all these journeys?

- A \$17.80
- B \$18.60
- C \$18.80
- D \$19.00

15 The table shows the costs incurred on the ski slopes of some popular Alpine ski resorts.

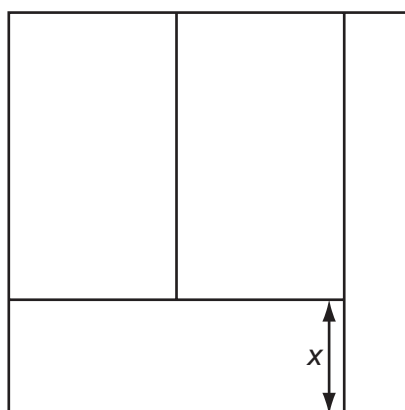
<i>Resort</i>	<i>Country</i>	<i>Adult 6-day ski pass (€)</i>	<i>Child 6-day ski pass (€)</i>	<i>Price of a coffee (€)</i>	<i>Price of a beer (€)</i>
Andermatt	Switzerland	160.50	79.50	2.50	3.20
Brand	Austria	133.00	89.00	2.20	2.80
Courchavel	France	182.00	127.50	3.00	5.00
Galtur	Austria	131.00	87.00	2.50	2.80
Gressoney	Italy	190.80	95.00	1.00	2.50
Les 2 Alpes	France	172.50	135.80	1.35	2.50
Pila-Aosta	Italy	179.00	95.00	0.90	2.00
Val d'Isere	France	208.50	167.00	1.80	3.50
Verbier	Switzerland	194.00	194.00	2.22	1.50

A family that would require two adult 6-day ski passes, two child 6-day ski passes, and would drink about 20 coffees and 20 beers is going to go on a skiing trip.

In which country is the resort, from those listed above, at which this family would spend least on the items in the table?

- A** Austria
- B** France
- C** Italy
- D** Switzerland

- 16 Peter is laying out his vegetable plot, which is 3 m x 3 m. He wants to divide it into four sections, as shown, all of equal area.



NOT TO SCALE

How long should the line marked 'x' be?

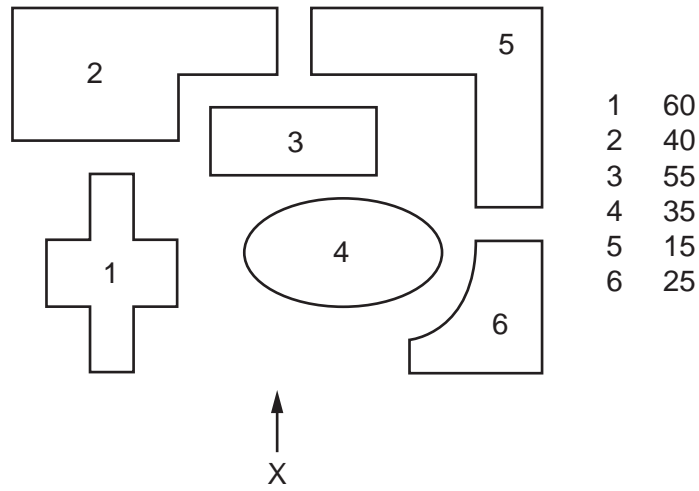
- A 0.50 m
 B 0.75 m
 C 1.00 m
 D 1.25 m
- 17 The Gatwick Express is a high speed railway service between Gatwick Airport and central London. Journey time is 30 minutes. When a train arrives at its destination, there is a minimum 20 minute wait before it makes the return journey. This is to allow the driver and guard to have a rest and to walk from one end of the train to the other. The schedule is set out below.

London to Gatwick	Gatwick to London
First Train 03:30 04:30	First train 03:45 05:20
Every 15 minutes from 05:00	Every 15 minutes from 05:50
Until 00:00 Last train 00:32	Until 00:50 Last Train 01:35

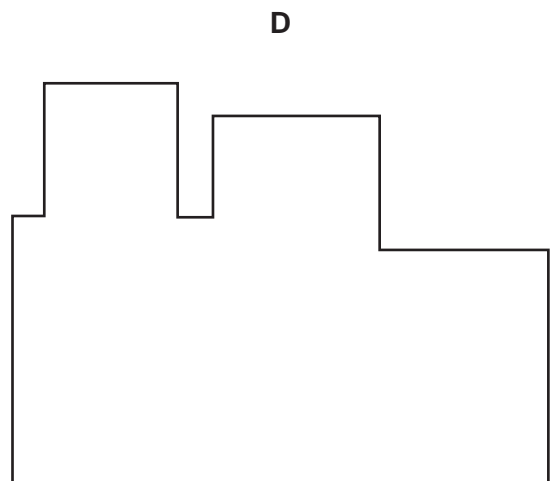
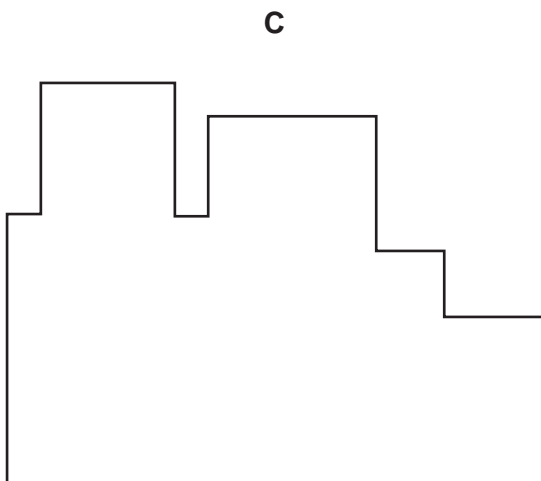
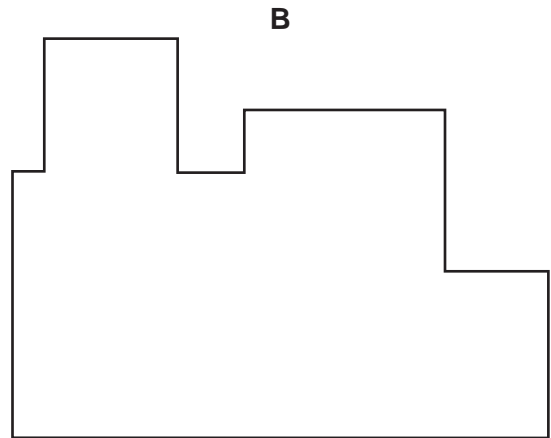
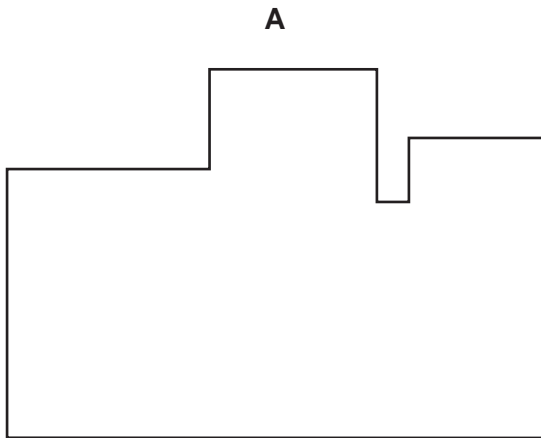
How many trains are needed to run this service?

- A 5
 B 6
 C 7
 D 8

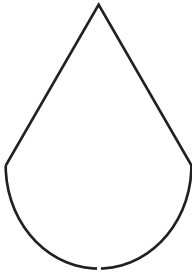
18 A plan view of the buildings at a college campus is shown below, along with the heights of each of the buildings 1–6.



Which of the following represents the sky line view from 'X'?

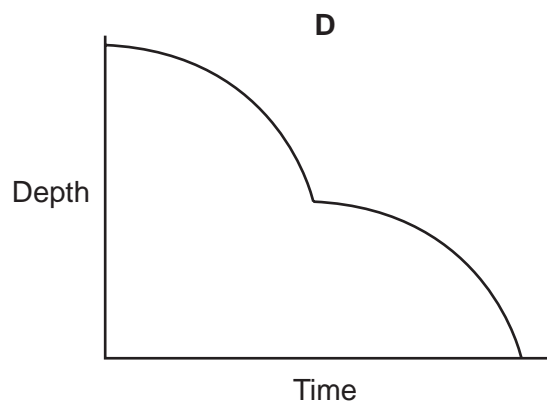
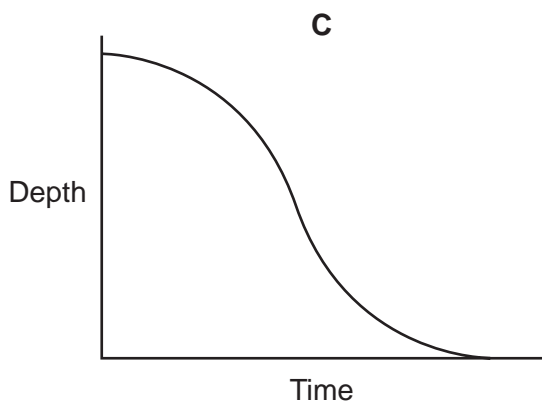
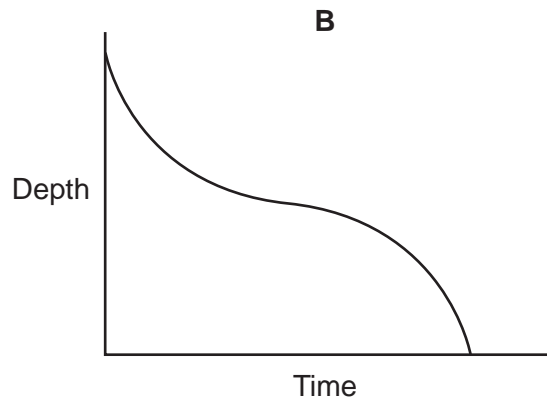
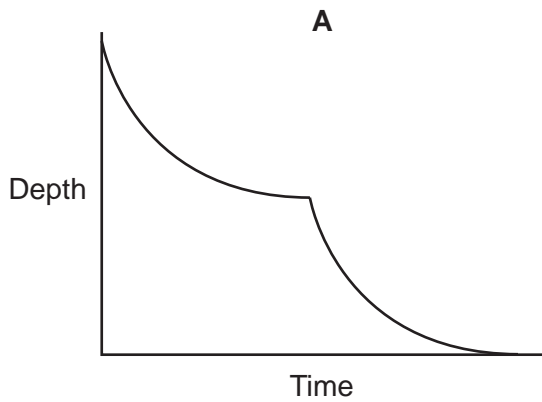


19



The drawing shows the cross-section of a container which is used to water plants. The container is filled with water and is suspended above a houseplant. There is a small hole at the lowest point of the container, through which the water escapes at a constant rate. An observer draws a graph to show how the depth of water in the container changes with time, from when it is completely full of water.

Which of the following graphs best represents the given information?



- 20 Mary is considering buying a new car. Ideally she wants 5 doors, 4 or more seats, a diesel engine and alloy wheels; but she is prepared to accept a car featuring 3 out of 4 of these requirements. Also, if it has an automatic gear box, it must have at least an 1800cc engine; and if it does not have air conditioning it must have a sun roof.

<i>Name of car</i>	Jupiter	Mars	Mercury	Neptune	Pluto	Saturn	Venus
<i>No. of doors</i>	4	5	2	5	5	4	5
<i>No. of seats</i>	4	5	2	4	5	4	4
<i>Engine (cc)</i>	1600	2000	1500	1700	1800	2000	1500
<i>Air conditioning</i>	Yes	No	Yes	Yes	No	Yes	No
<i>Sun roof</i>	No	No	Yes	No	Yes	No	Yes
<i>Gear box</i>	Manual	Manual	Auto	Manual	Auto	Manual	Auto
<i>Alloy wheels</i>	No	Yes	Yes	No	Yes	Yes	No
<i>Metallic paint</i>	Yes	Yes	No	No	No	Yes	No
<i>Central locking</i>	Yes	No	Yes	No	Yes	No	Yes
<i>Fuel</i>	Petrol	Diesel	Diesel	Petrol	Petrol	Petrol	Diesel

Which car satisfies her requirements?

- A Mars
- B Neptune
- C Pluto
- D Venus

21 The table shows how rainfall can be used to classify different regions by type of climate.

<i>Type of climate</i>	<i>Annual Rainfall (mm)</i>
Desert	0–100
Semi-desert	100–250
Arid	250–500
Semi-arid	500–800
Semi-humid	800–1500
Humid	1500–2000
Wet Tropics	Over 2000

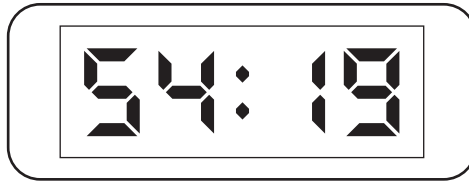
The charts below show the rainfall during a 12-month period from four regions of the world.

Which region would be classified as arid?

	J	F	M	A	M	J	J	A	S	O	N	D
A	50	125	60	75	20	50	75	25	20	70	25	55
B	75	50	40	35	45	55	75	75	20	30	35	25
C	5	35	25	25	10	20	25	30	10	20	0	0
D	60	40	50	25	25	25	55	50	30	10	20	15

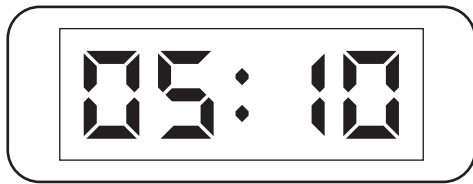
- 22 Earlier today I bought a digital clock that was being offered for sale at a greatly reduced price. I have now discovered why it was so cheap. It works perfectly, except that only one of the digits is in its correct position.

Its appearance at this particular moment is:

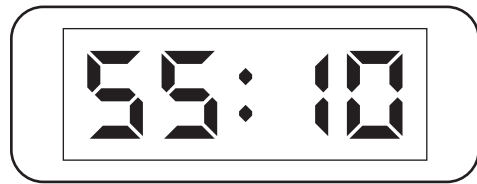


How will this clock appear in one minute's time?

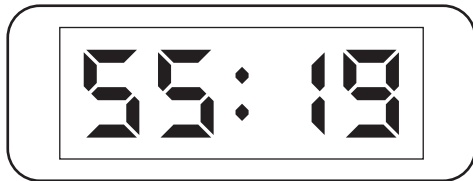
A



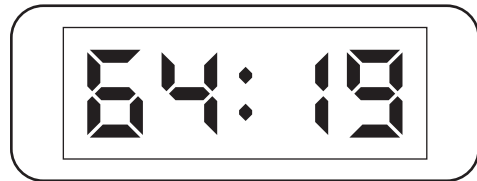
B



C



D



- 23 My friend is getting married next week and I still need to buy a present from the wedding list. The remaining items on the list are shown in the table below with the maximum numbers that can be bought.

<i>Item</i>	<i>Price each (\$)</i>	<i>Maximum needed</i>
Small Plate	2	12
Large Plate	3	6
Cup	2	6
Casserole dish	29	1
Toaster	25	1
Serving plate	24	1

I want to spend as close to \$50 as possible, without going over \$50 and I do not want to buy more than two different types of item, although I might buy more than 1 of each type of item that I choose.

What is the largest number of items that I could buy to achieve these aims?

- A 8
 B 11
 C 13
 D 14
- 24 On my computer I recorded the amount of money I spent each day last week, but I accidentally mixed up the data. So my table, shown below, may not now show the correct amounts next to some or all of the days.

<i>Day</i>	<i>Amount (\$)</i>
Sunday	52
Monday	41
Tuesday	25
Wednesday	18

I remember that the combined amount for Monday and Tuesday was more than the combined amount for Sunday and Wednesday. I also remember that the combined amount for Sunday and Tuesday was more than the combined amount for Monday and Wednesday.

Which one of these statements **cannot** be true?

- A Sunday's amount is more than Monday's amount
 B Monday's amount is more than Tuesday's amount
 C Tuesday's amount is more than Wednesday's amount
 D Wednesday's amount is more than Sunday's amount

- 25** Charlie delivers takeaway meals. He offers 5 different meals. He is to deliver meals to a party of 8 people but, unfortunately he has lost the original order as well as the telephone number of the party organiser. He decides to take a mix of the meals, but wants to guarantee that everybody gets either their first choice meal or what would have been their second choice.

What is the lowest number of meals Charlie can take and be sure everybody gets at least their second choice?

- A** 16
B 20
C 25
D 32
- 26** A cube hangs from a piece of string directly under a light source. The string is attached to one of the corners of the cube.

Which of these shapes is the shadow made on the floor?



- 27** I have wanted to buy two particular books for some time, but, as they are quite expensive, I have been waiting for the inevitable special offers to appear.

Now, this week, both Blackers and Wetrock's have special offers, as follows:

Blackers: Buy any 2 books – pay half price for the cheaper one.

Wetrock's: 15% discount on total purchases of at least \$50.
 20% discount on total purchases of at least \$100.

Surprisingly, the two books will cost exactly the same altogether this week, whether I buy them at Blackers or Wetrock's.

The full price of the cheaper of the two books is \$42. What is the full price of the other one?

- A** \$63
B \$84
C \$98
D \$105

- 28** A train travelling at a constant 80 kilometres per hour is passed by a train travelling in the opposite direction at a constant 60 kilometres per hour. A passenger on the first train notes that the second train takes 5 seconds to pass by.

Which one of these quantities can be calculated from this information alone?

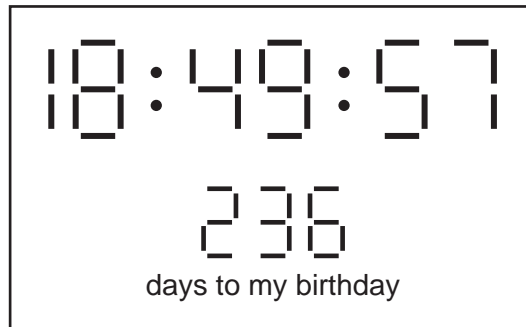
- A** The length of the first train
 - B** The length of the second train
 - C** The combined lengths of the two trains
 - D** The time taken for the first train to pass an observer in the second train
- 29** A road has two sets of traffic lights, which alternate between red and green. The first set is red for 15 seconds and green for 40 seconds. The second set is red for 35 seconds and green for 15 seconds. It takes a car 60 seconds to travel between the first and second set.

A pedestrian sees both sets of lights change to red at the same time. How long does he have to wait until he sees a car that is just stopped by the first set turning red which will go on to be just stopped by the second set turning red?

- A** 235 seconds
- B** 275 seconds
- C** 290 seconds
- D** 385 seconds

30 My digital clock has a special feature that can be set to count down to my next birthday.

On a number of occasions today the clock has displayed all the digits from 1 to 9 inclusive simultaneously, for instance:



In how many days from now will the clock next display all the digits from 1 to 9 inclusive simultaneously?

- A Somewhere between 1 and 10 days
- B Somewhere between 11 and 20 days
- C Somewhere between 21 and 30 days
- D Somewhere between 31 and 40 days

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