THINKING SKILLS **9694/11**

Paper 1 Problem Solving **May/June 2018**

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 **17** printed pages and **3** blank pages.

[Turn over

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

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   Stanley and Walter are two old friends who have recently discovered the art of texting. They can't cope with text language, but, when communicating with each other, they use a code that they invented many years ago.

The code is a substitution code with a twist. When a particular letter appears for the first time in a message it is encoded as the next letter in the alphabet (A becomes B, Z becomes A). On each subsequent appearance it becomes the next letter again (A becomes C, Z becomes B).

For example:

ARE YOU AT HOME TODAY?

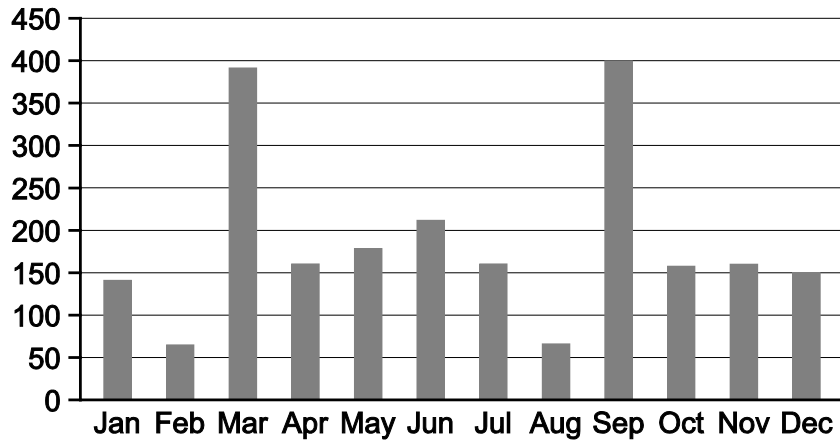encodes as

BSF ZPV CU IQNG VREDA?

Stanley is about to text Walter with the following message.

THE CONCERT TONIGHT STARTS AT HALF PAST SEVEN

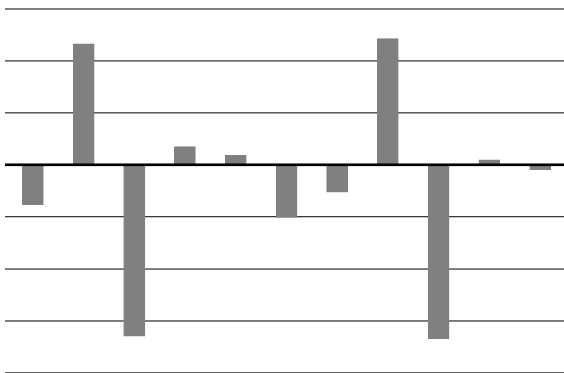How will Stanley encode the word SEVEN?

A   WHWHQ

B   WHWIQ

C   WHXHQ

D   WHXIQ

3 The chart shows the number of new car registrations (in thousands) in Great Britain for each month in 2013.
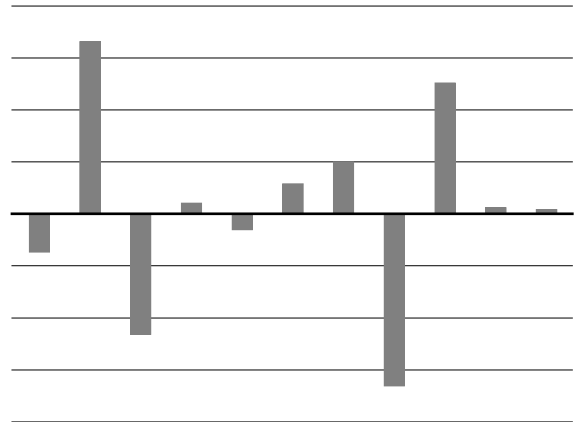

Which of these charts represents the change in new car registrations from month to month during the year?
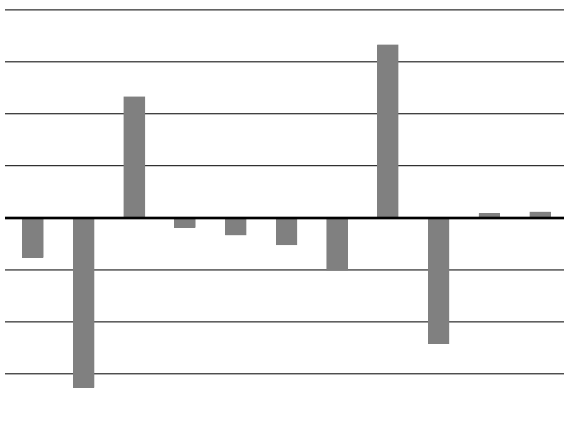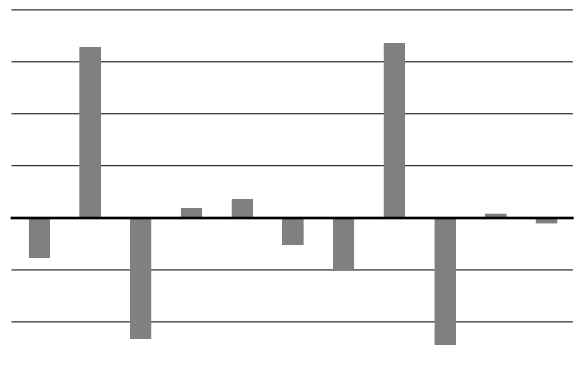
A

B

C

D

4   A baker had two ovens, each with 6 shelves. Each shelf could bake 48 loaves. In order to produce his daily output he used both ovens 5 times a day.
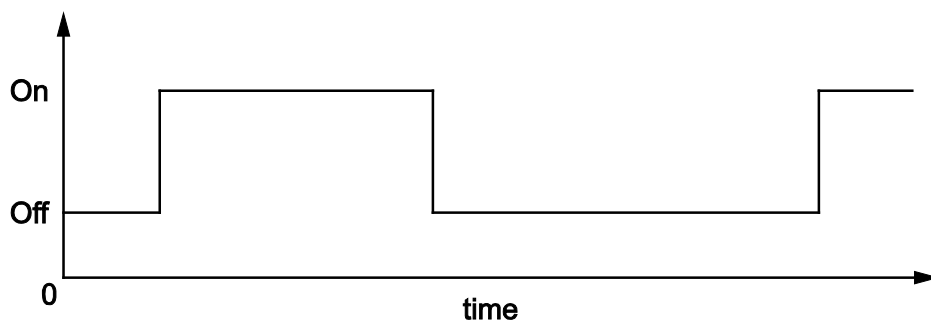
He has replaced his ovens with one super mega oven and has been able to increase his output by 50%. The new oven has 8 shelves and he only needs to use it twice a day.

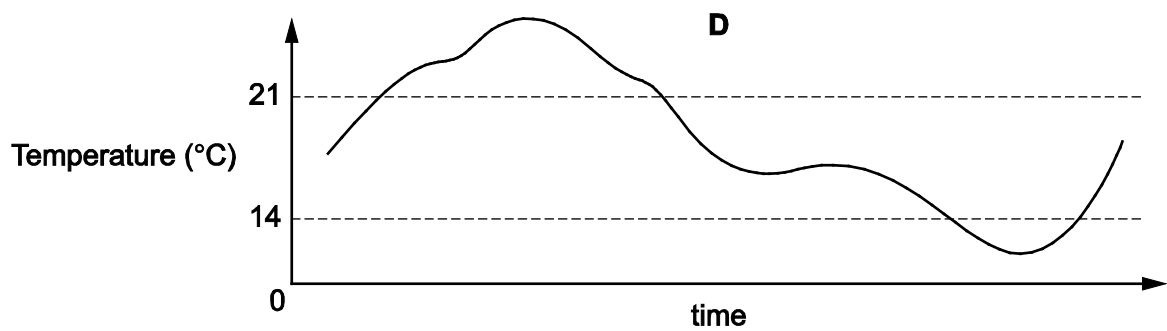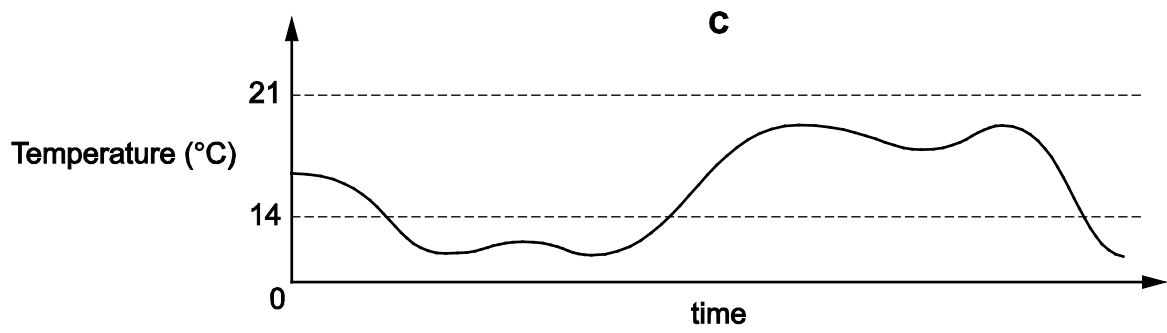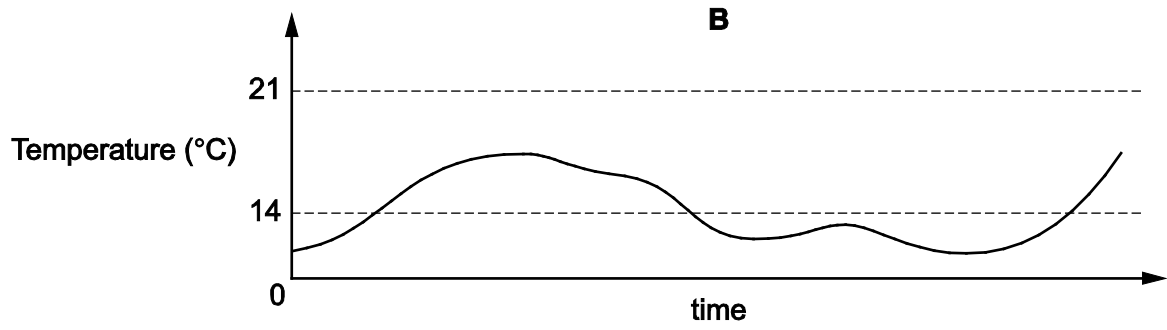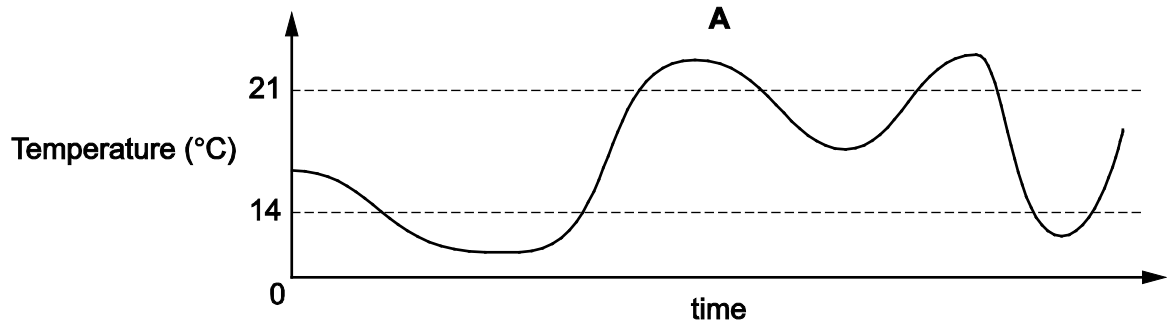How many loaves can he bake on each shelf of his new oven?

A   135

B   180

C   270

D   360

5   A taxi driver notices that his taxi licence number can be viewed upside down and still be read as a 5 digit number. When viewed upside down, the number is 87984 less than the actual licence number.

What is the actual taxi licence number?

A   89061

B   89110

C   96180

D   98106

6   The central heating system in my house switches on if the temperature drops below 14°C and switches off if the temperature rises above 21°C. During one 12-hour period, the status of the central heating system was as shown in the graph below.

Which of these graphs could show the temperature in my house during the same time period?

A

Temperature (°C)

21

14

0   time

B

Temperature (°C)

21

14

0   time

C

Temperature (°C)

21

14

0   time

D

Temperature (°C)

21

14

0   time

7 CIE shares are currently selling at $1.20 each, and OCR shares can be bought for $1.50 each.

Margaret intended to sell $3600 worth of her CIE shares and buy OCR shares, but the instruction was misread as asking to sell 3600 shares.

How many more OCR shares did she get than she was expecting?

A 480

B 600

C 1080

D 1800

8 Ali, Bert, Huck and Tom are the only participants in a somewhat unusual auction. For each item, one of them is given the opportunity to make an opening bid. This bid must be a whole number of dollars. Anyone can then bid more than this, but the bid must be exactly $10 more than the opening bid. If anyone makes this bid he gets the item for the amount of this bid. Otherwise, the person who made the opening bid gets the item for the amount of the opening bid.

The next item for sale is one that all four want. However, Tom knows that Ali will pay no more than $113 for it, Bert no more than $115, and Huck no more than $118. Tom will pay up to $121 and it is Tom's turn to make the opening bid.

What is the lowest bid Tom can make and yet ensure that he gets the item?

A $109

B $111

C $112

D $114

9 Nicola works for an international agency which is based in the United Kingdom. One of the most important parts of her job is discussing communication systems with her colleagues worldwide. All of them work from 08:00 to 17:00 local time with a flexible 1-hour lunch break, taken when possible.

An upgrade to a system needs to be discussed and so a 1-hour video conference has to be organised. The time differences of the colleagues are shown in the table below.

City	Time difference
Accra	−1 hr
Addis Ababa	+2 hrs
Karachi	+4 hrs
Montevideo	−4 hrs
Tehran	+3.5 hrs

At what local time will the conference start in Tehran?

A 14:30

B 15:00

C 15:30

D 16:00

10 Kevin owns a games shop and is about to order copies of a new game which will be released next week. Because of the game's expected popularity, each retailer is only allowed to place one order. Kevin is confident that he could sell at least 300 copies of the game, but he only has enough space in his shop to store 50 copies.
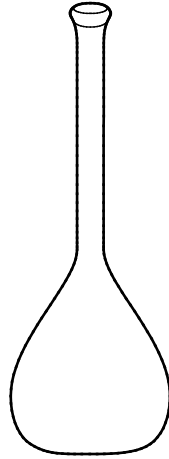
There are two possibilities for additional storage space that he can hire. The first will hold up to 100 copies of the game and would cost $300. The second will hold up to 150 copies of the game and would cost $650.

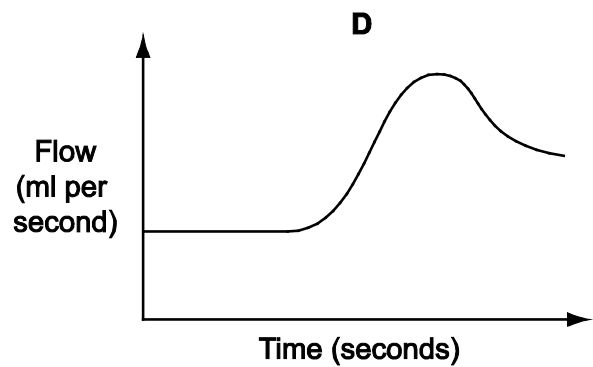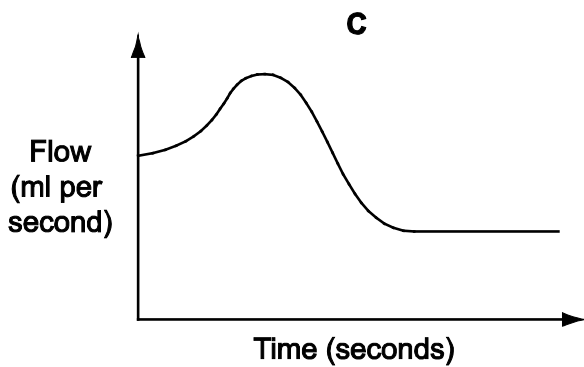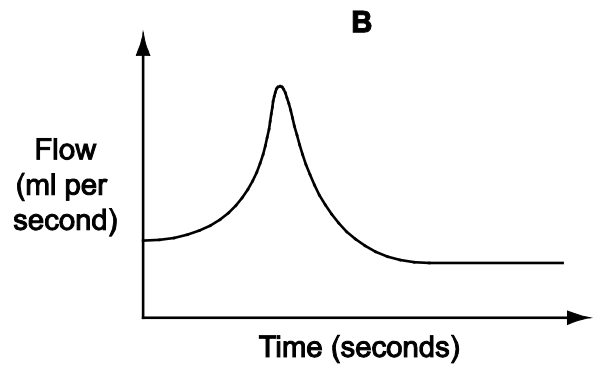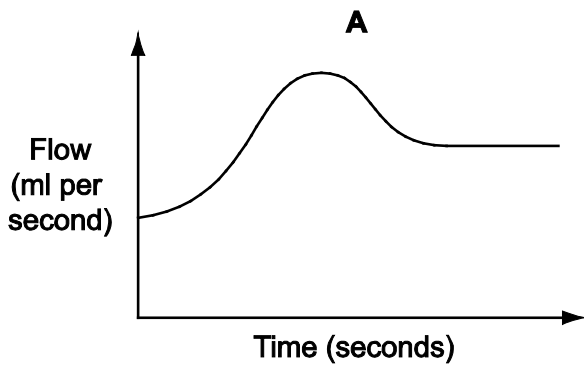Kevin will make $4 profit on each game sold if he does not hire any additional storage space.

What is the most profit that Kevin can make from the games that he orders?

A $150
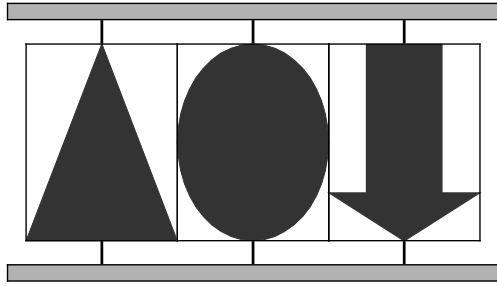
B $200

C $250

D $300

11 Having established the relationship between the height and the volume of liquid in this flask, a laboratory worker uses this information to calculate how he should regulate the flow of liquid into the flask so that the height of liquid rises at a constant rate.
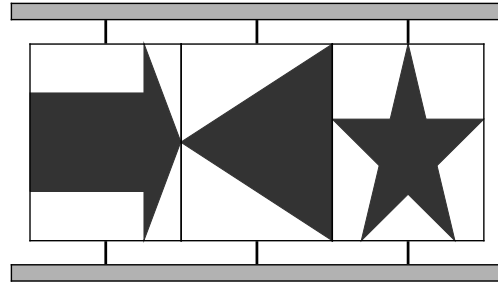

Which one of the following graphs best represents the planned flow of liquid?

12 A display board is made of three separate screens. Each of the screens is attached to the frame at the top and bottom so that it may be rotated. Each screen shows a picture on each side. The views of the board from the front and back at the moment are shown below.
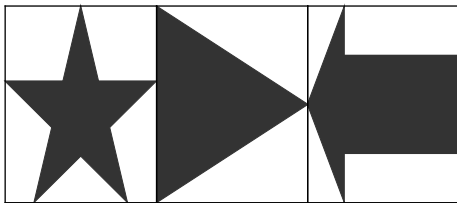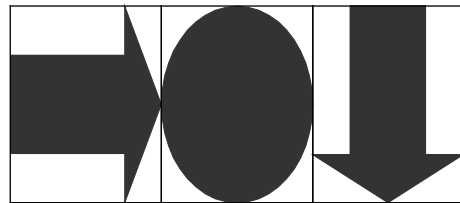
Front   Back

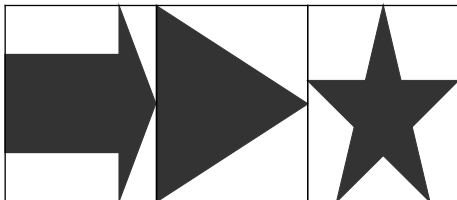Which of the following could show the view from the front or the back once at least one of the screens has been rotated?
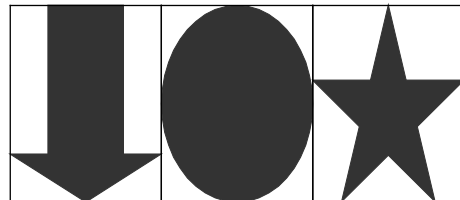
A

B

C

D

13 Charlie's Chicken and Lentil restaurant operates in several countries, with each outlet having exactly the same items on the menu. Company policy is to charge the same basic price, measured in Bolandian dollars, for any item in any country, but this basic price is supplemented by any local taxes.

In Bolandia the only tax is a general 25% tax on all restaurant food and drink, and in Charlie's a customer pays $5.00 for a chicken burger with fries, and $2.00 for a soft drink. In Colandia the currency is the colan, and there are exactly two colans to every Bolandian dollar. There is no general tax on restaurant food but there is a special 50% tax on all soft drinks.

What would a customer in Colandia have to pay for a meal of a chicken burger with fries and a soft drink at Charlie's?

A 12.00 colans

B 12.80 colans

C 13.50 colans

D 14.00 colans

14 At 12:45 Jimmy left his home in Pinetrees and cycled to visit his grandmother in Oakville. On his way he stopped for 10 minutes in Rowan for a coffee and then he popped in to see his friend in Yewton. He arrived in Oakville at 16:25. Jimmy cycled at a steady speed of 24 km/h and his average speed for the whole journey, including the stops, was 18 km/h.

For how long did Jimmy stop in Yewton?

A 40 minutes

B 45 minutes

C 55 minutes

D 60 minutes

15 During a guided tour of Sindrow Castle, a group of tourists climbed to the top of Fineview Tower. At the top, the guide asked the six children in the group to guess how many steps they had climbed. Their guesses were 155, 157, 167, 168, 179 and 183.

The guide revealed that the closest guess was only 3 more or less than the correct number and that two of the other guesses were no more than 10 away.
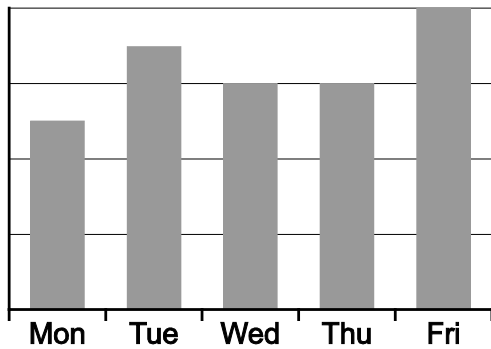
How many steps had they climbed?

A 160

B 164

C 171

D 176

16 William decided to track the number of calories that he consumed on each day last week. The table shows the quantity of calories he consumed at each meal on each day.

Day	Breakfast	Lunch	Dinner
Monday	500	1200	800
Tuesday	700	1500	800
Wednesday	600	1000	1000
Thursday	600	1400	1000
Friday	800	400	800

Which of the following bar charts shows the total number of calories for each day?
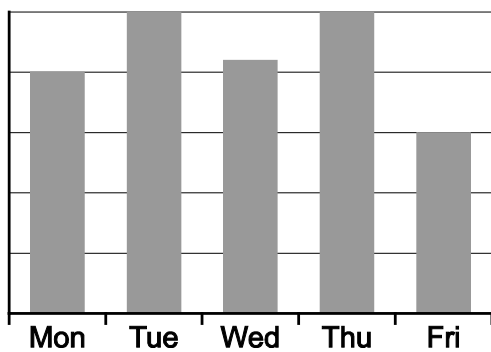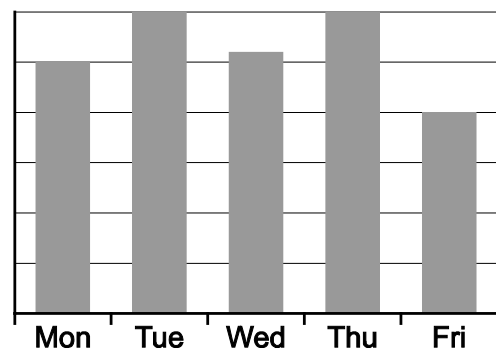
A

B

C

D

17 The jars of peanut butter that I buy cost \$7.20 each and normally contain 500 grams. At present, however, each jar contains an extra 20% free, and, additionally, the supermarket has a "buy 3 jars get another one free" offer in place this week.

By how much is the cost per 100 grams of peanut butter less than it normally is if I take full advantage of the supermarket's offer today?

A 36¢

B 54¢

C 64¢

D 90¢

18 A zoo wishes to transport a family of four wolves overnight to a facility 200 km away. The journey will take 6 hours plus an additional 45 minutes at each end to load and unload the animals. The wolves must be sedated for this entire period.

The zoo keepers know the wolves weigh a total of 420 kg and that none of them weighs less than 100 kg, but they are unsure of their individual weights. The zoo uses Dog Tired tranquilisers because, unlike some other brands, they can be used again while the wolf is still sedated. The tranquilisers come with the following guidelines.

- Product will sedate a wolf weighing 120 kg for 4 hours
- Product will sedate a wolf weighing 110 kg for 4 hours 30 minutes
- Product will sedate a wolf weighing 100 kg for 5 hours
- Product will sedate a wolf weighing 80 kg for 6 hours
- No more than 2 doses should be administered in any 24-hour period

The wolves will be sedated at midnight and must remain so during the entire journey.

During what time period should the tranquiliser be re-administered to ensure a safe journey?

A Between 03:00 and 03:30

B Between 03:30 and 04:00

C Between 04:00 and 04:30

D Between 04:30 and 05:00

19 In Bolandia, every day is either rainy or dry. It is never rainy three days in a row and it is never dry three days in a row. It always rains on a Sunday and on a Monday and it is always dry on a Thursday.

How many dry days are there every week in Bolandia?

A 1

B 2

C 3

D 4

20 The pass rate for driving tests varies according to the time of day.

Which one of the following, on its own, could **not** be the reason for this variation?

A Driving in heavy traffic is more difficult, and there's more traffic at some times of day than others

B Examiners are more generous after lunch

C More tests are taken in the morning than in the afternoon

D Those who book as soon as they can are not as good as those with more experience, and they are allocated earlier times in the day

21 It normally takes me 24 minutes to walk to work. Today I walked three-quarters of the way as usual, but because of some roadworks the final part of my journey was slower, and my walk to work took me 4 minutes longer than it normally does. The total distance I walked was the same.

At what fraction of my normal speed did I walk, on average, during the slower part of my journey?

A 5/12

B 3/5

C 2/3

D 5/6

22 Dave works as a salesman for the first 11 months each year and has December off as holiday. He is paid $1000 each month by his employer, with a commission that depends upon his monthly sales figures. On average he gets $1800 commission each month that he works. In December his employer just pays him his basic salary of $1000.

A new law requires employers to pay holiday pay equal to the average an employee earns when working, including commission. Dave's employer tells him that he cannot afford to do this so must reduce Dave's basic salary to $900 per month. Dave agrees to this new salary.

With this new deal, how much more does Dave expect to earn in a year compared with his contract before the new law?
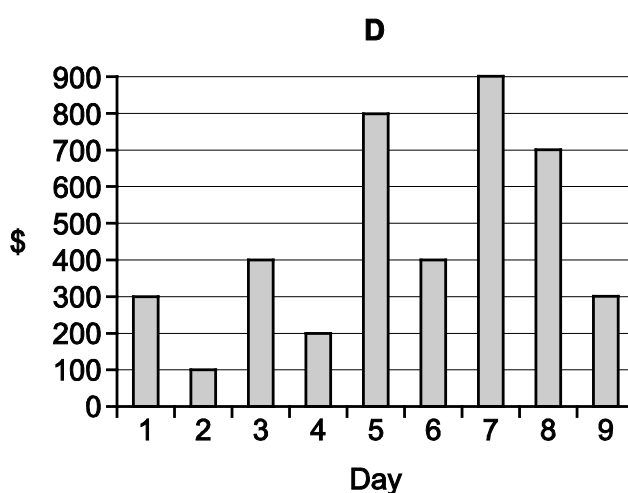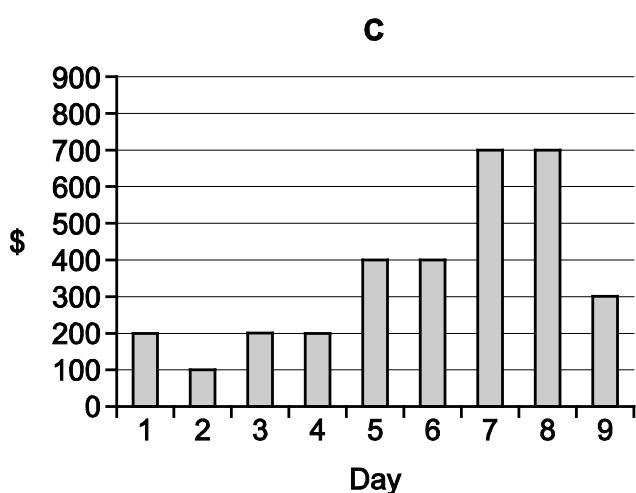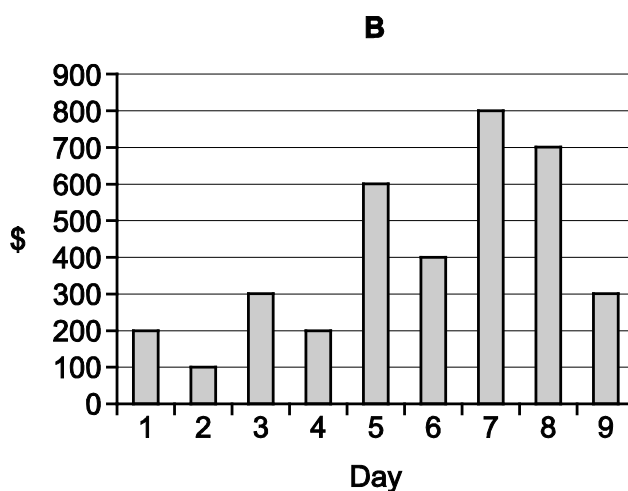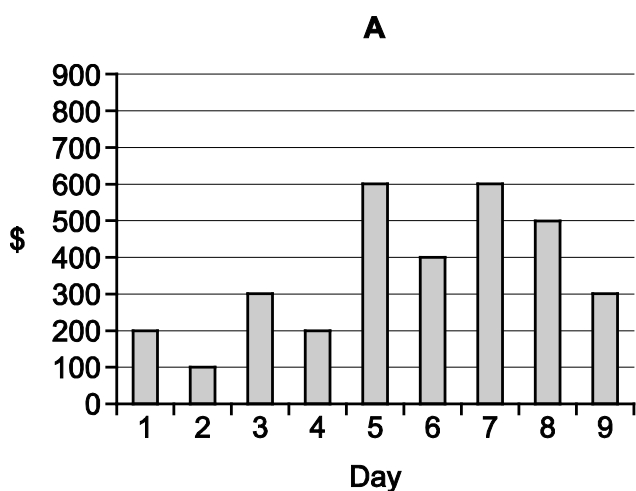
A $600

B $700

C $800

D $900

23 The cost of hiring a web designer is $200 for the first day's work followed by $100 per day for each subsequent day. When five or more designers are needed for a particular day, a supervisor is required, adding $200 to the cost for that day.

Gary requests a quote for a 9-day job which will require the following designers each day:

		Day								
		1	2	3	4	5	6	7	8	9
Designer	Adam	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Colin			✓	✓	✓	✓	✓	✓	✓
	Dawn					✓	✓	✓	✓	✓
	Margaret					✓	✓	✓	✓	
	Robert							✓	✓	

Which of the following bar charts represents the cost associated with each day of the project?

A

B

C

D

24 Amy's mother sent her to the post office to buy stamps for a letter. By the time she got there, she had forgotten how much the letter would be to post, but she was sure it was between 8¢ and 12¢ inclusive. The post office sells stamps in every single cent denomination from 3¢ to 10¢, and then the next is 15¢.

What is the least amount that Amy could spend on stamps and still be able to cover any postage value from 8¢ to 12¢?

A   12¢

B   15¢

C   18¢

D   21¢

25 Kate needs to visit her friend this weekend. Her friend has agreed to collect her from the bus station in the nearest town once she has arrived. Kate will leave her town as soon as possible after 10:00, but unfortunately she has lost the bus timetable.

Kate can only remember the following facts about the bus timetable:

- Buses leave at regular intervals.
- The time between one bus leaving and the next one is more than 30 minutes.
- The first bus leaves at some time before 09:00.
- The journey takes a total of 2 hours 25 minutes.

Knowing which departure times would allow Kate to work out the earliest time that she could arrive at her destination?

A   10:50 and 12:00

B   10:50 and 12:35

C   12:00 and 13:10

D   12:00 and 13:45

26 Sharifah runs at 6 km per hour and Leillah runs at 5 km per hour. They both run anticlockwise around a circular track of length 500 metres. Leillah starts 200 metres ahead of Sharifah.

At what position around the track (measured anticlockwise) will they be when Sharifah first overtakes Leillah?

A   100 metres from Sharifah's start point

B   200 metres from Sharifah's start point

C   300 metres from Sharifah's start point

D   400 metres from Sharifah's start point

27 Six teams of five riders enter a team bicycle race. A team must get at least three riders in the top 15 finishers to be eligible to win. To find the winning team, the finishing positions of a team's top three riders (as long as they are in the first 15 to finish) are added together. The team with the lowest total from these top three riders wins the event. If two teams have the same total, the one whose best rider finishes before the other team's best rider is deemed the winner.

The teams of the first 13 riders to finish are given in the table below.

Position	Rider	Team
1	Charlotte	Cat Cycles
2	Beth	Blue Bluebirds
3	Dylis	Dell Druids
4	Abi	Ax Aces
5	Erica	Ex Eagles
6	Freda	Free Fliers
7	Bren	Blue Bluebirds
8	Doris	Dell Druids
9	Cath	Cat Cycles
10	Ann	Ax Aces
11	Ella	Ex Eagles
12	Alice	Ax Aces
13	Amy	Ax Aces

Ex Eagles and Free Fliers did not have a rider in 14th or 15th position so certainly were not the overall winning team.

On the basis of the information above, which other team **cannot** be the winning team?

A Ax Aces

B Blue Bluebirds

C Cat Cycles

D Dell Druids

28 To get to work Kate must drive for 10 minutes to reach Newtown Station, take the next train to Central Station in the city and then walk for 20 minutes to reach her office. Whenever Kate arrives at Central Station later than usual, she takes a taxi from there to her office. The taxi takes 5 minutes to make the journey. Trains to Central Station depart every 30 minutes and Kate always plans to arrive at Newtown Station 20 minutes before her train is due to depart.

This morning Kate arrived at work 15 minutes later than usual.

Which of the following would explain why Kate arrived at work 15 minutes later than usual?

A   Kate arrived at Newtown Station 15 minutes later than usual

B   Kate arrived at Newtown Station 45 minutes later than usual

C   The train that Kate normally takes was 15 minutes late

D   The train that Kate normally takes was 20 minutes late

29 The game of Nudge is played with a set of 15 pieces called 'bumps'. Some bumps weigh 15 g, some weigh 30 g and some weigh 40 g. A full set of bumps has a total weight of 420 g and contains a different number of each type.

How many 30 g bumps are there in a full set of 15 bumps?

A   2

B   3

C   5

D   8

30 Kevin is going to make some designs using two identical square tiles that are black on one side and grey on the other. He will cut the tiles and rearrange the pieces, without discarding any.

Which of the following designs is **not** one that Kevin could make?

A

B

C

D

18

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