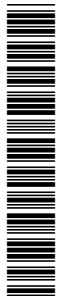**THINKING SKILLS**

9694/12

Paper 1 Problem Solving

May/June 2019

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 **22** printed pages and **2** blank pages.

IB19 06_9694_12/3RP
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[Turn over

1 The set menu for a restaurant has different prices per person depending on the total number of people in any group eating there. The prices are shown in the table below.

| Group size	Number of courses		
	1	2	3
1 – 6	$14	$18	$22
7 – 12	$13	$17	$21
13 – 20	$13	$16	$19
21+	$12	$15	$18

William has just eaten at the restaurant with 14 of his friends. Everyone had a meal from the set menu: 5 of the group had just 2 courses, while the other 10 had 3 courses.

What was the total price for the meals?

A $255

B $270

C $295

D $300

2 The two designs shown below were each drawn on a piece of transparent plastic. By picking up these pieces of plastic and turning them around (and over), the two pieces can be placed on top of each other in various ways.
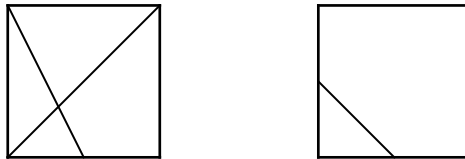
Which one of the following **cannot** be produced?

A   B   C   D
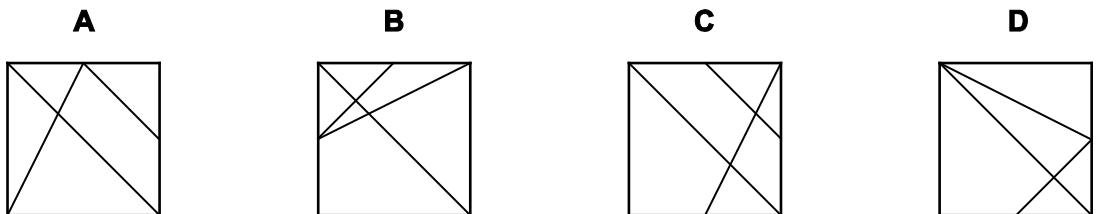
3 Jamie is planning a holiday. He is considering six destinations and finds a web page that rates each of these six for different aspects of a holiday. These ratings are given in the table below.

	Art galleries	Nightlife	Restaurants and bars	Scenery	Weather	Total
Bluepool	10	10	7	7	10	44
Clatown	8	8	8	10	8	42
Finton	9	7	6	8	10	40
Mableton	6	9	10	7	9	41
St Giles	7	6	9	8	10	40
Twentyby	5	10	10	10	8	43

Jamie regards weather as the most important aspect and chooses a resort that scores best in this aspect. If resorts score equally on weather, he rates these according to how they score on scenery. If there are still equally desirable resorts, he decides on the basis of how they score for nightlife. If there is still not one definite winning resort, then he uses restaurants and bars, and then, if necessary, art galleries.
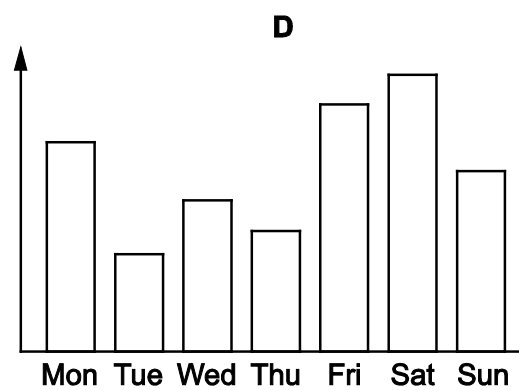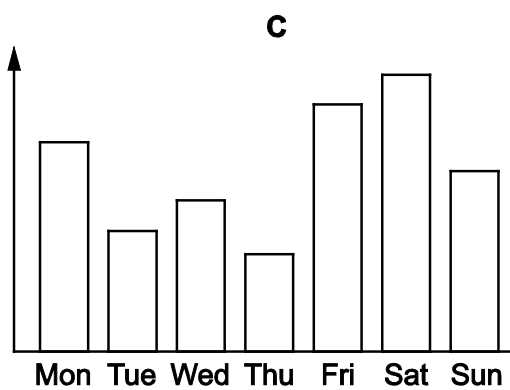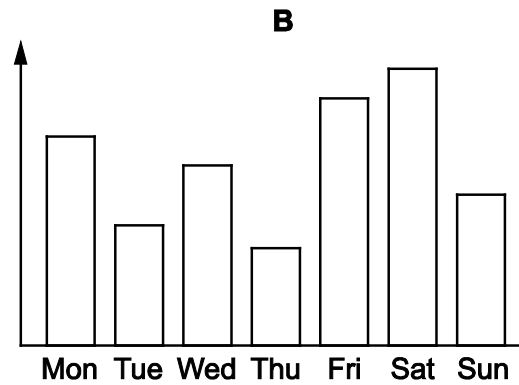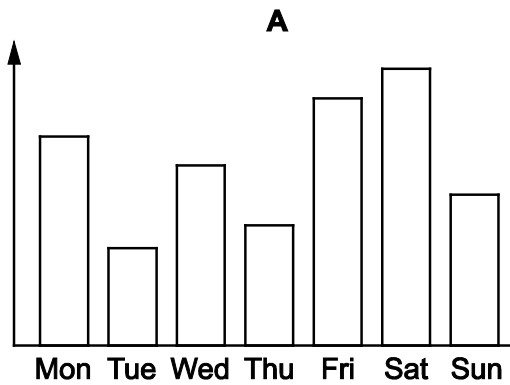
Which resort does Jamie choose?

A Bluepool

B Finton

C St Giles

D Twentyby

4   The table below shows the number of people who visited the Lukansey Museum each day last week.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
558	321	403	260	659	738	481

Which one of the following charts correctly illustrates last week's visitor numbers?

A

B

C

D

5 The table below shows the leading goal scorers in the Galaxy league with three games to go.

Player	Team	Goals
Nory	United	26
Reasher	Castleton	24
Leopard	Albion	20
Fedoe	Hamilton	19
Newo	Looper	18

The scores to the final 3 games were:

Week 16

0	United	vs	Jewellers	2
2	Castleton	vs	Miners	1
1	Looper	vs	Sox	2
6	Hamilton	vs	Clarkstown	0
1	Albion	vs	Hillers	0

Week 17

1	Jewellers	vs	Looper	4
1	Miners	vs	United	1
2	Sox	vs	Castleton	1
2	Clarkstown	vs	Albion	4
4	Hillers	vs	Hamilton	3

Week 18

|				
3	Jewellers	vs	Miners	1
0	Albion	vs	Hamilton	3
2	United	vs	Sox	1
0	Clarkstown	vs	Castleton	0
5	Looper	vs	Hillers	3

Which of the following players can **not** be the season's highest goal scorer?

A Fedoe

B Leopard

C Nory

D Reasher

6 Jim has some shapes made of card which are grey on one side and white on the other. One of these is shown below.


Which one of the following shapes can Jim fit together with the above piece to make a solid grey rectangle?
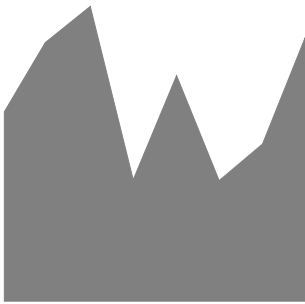
| A | B | C | D |

7 Amy is a student and at weekends she works as a waitress. Starting in August, she saves as much money as she can each month in preparation for going to university. The following table shows her total savings at the end of each of the last five months of last year.

Month	August	September	October	November	December
Total savings	$38	$158	$250	$290	$381

Which one of the following pie charts could represent the amount that Amy saved each month?
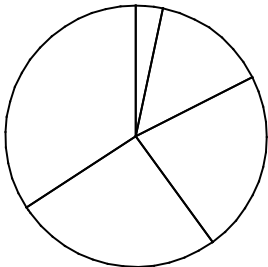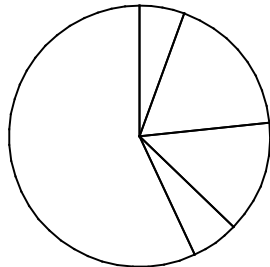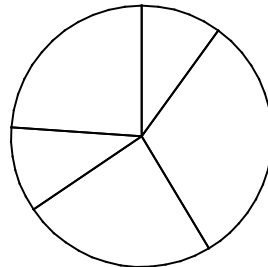
| A | B | C | D |
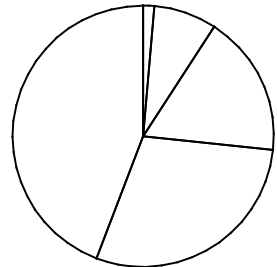
8 Bertha buys electricity from a company that offers a choice of two tariffs. Both have a daily charge of $0.20 regardless of how much electricity is used. The 'standard' tariff charges $0.10 for each unit used, while the 'day/night tariff' charges $0.12 for each unit consumed between 06:00 and 22:00 but only $0.05 for each unit consumed between 22:00 and 06:00, when total demand on the electricity network is low. Bertha is currently on the standard tariff.

What is the highest proportion of her total electricity consumption that Bertha's daytime use can be, so that she would not be paying more if she switched to the 'day/night' tariff?

A 5/17

B 2/5

C 5/7

D 17/20

9 Vehicles cannot stop instantly. The stopping distance of a car is made up of two parts. The first part, known as the thinking distance, is the distance travelled during the time it takes the driver to put her foot on the brake (her reaction time). The second part, known as the braking distance, is the distance travelled in the time after braking has started until the car comes to a halt. The chart below shows the stopping distances at various speeds for a driver with a typical reaction time of about 0.7 seconds with a car with reasonable brakes in good road conditions.
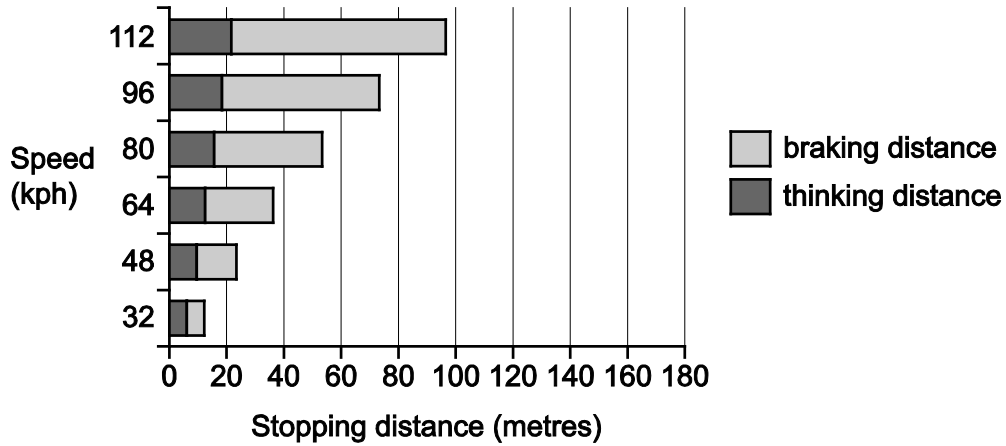
Consider a driver whose reaction time is double that of the typical driver illustrated, in a car with a new braking system that reduces braking distance by 50%, compared with the car illustrated.

For the same road conditions as assumed above, which of the following charts illustrates the stopping distances for this new driver and car?

[Turn over
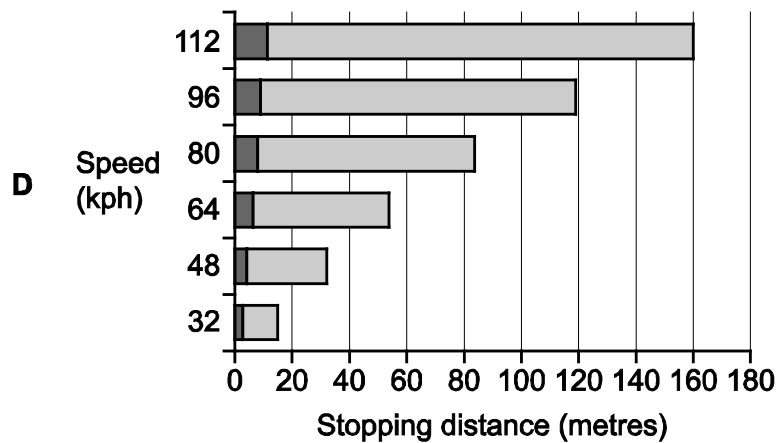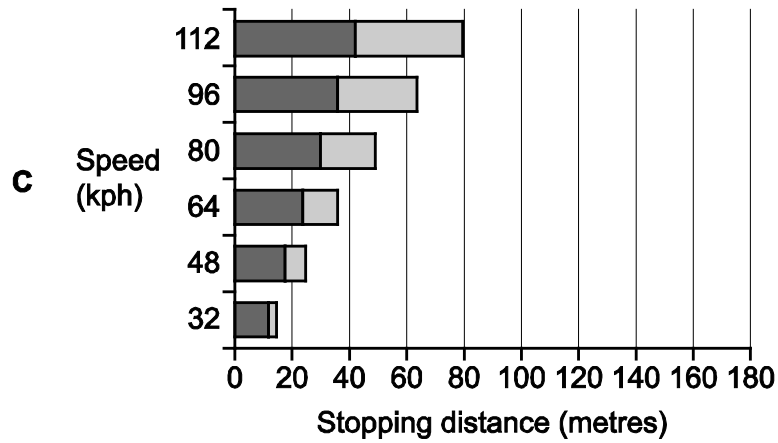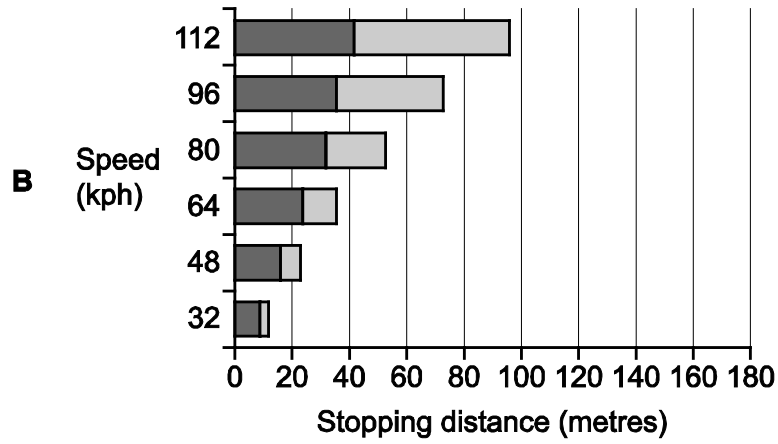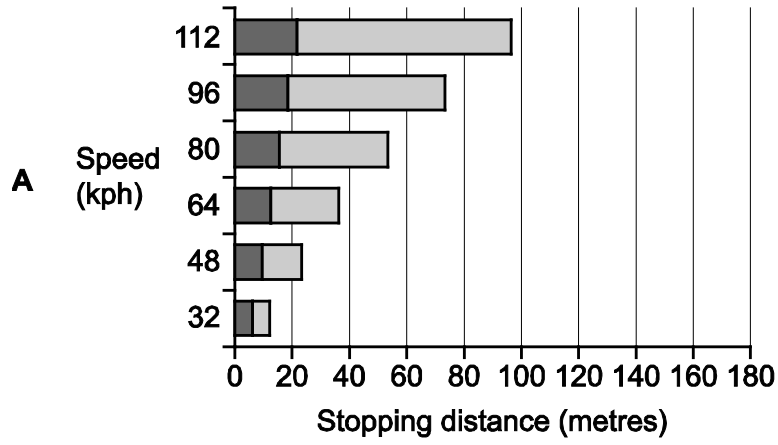
10 At the local shop bottles of lemonade cost $2 each. Every week Tom goes to the shop to buy 5 bottles of lemonade. This week there was a special offer at the shop. Tom bought 5 bottles of lemonade as usual, but spent $1 less than usual.

Which one of the following could be the offer that was available for lemonade?

A Buy 1 bottle and get 1 at half price

B Buy 2 bottles and get 1 free

C Buy 3 bottles and get 1 at half price

D Buy 3 bottles and get 1 free

11 I recently tiled the 3.6 m x 3.6 m floor of a room in my house. I bought 20 each of four different tiles, detailed below.

- Grey rectangular tiles   80 cm x 40 cm
- Grey square tiles   40 cm x 40 cm
- White rectangular tiles   80 cm x 40 cm
- White square tiles   40 cm x 40 cm

Wishing to create a pattern with rotational symmetry, I produced the following:
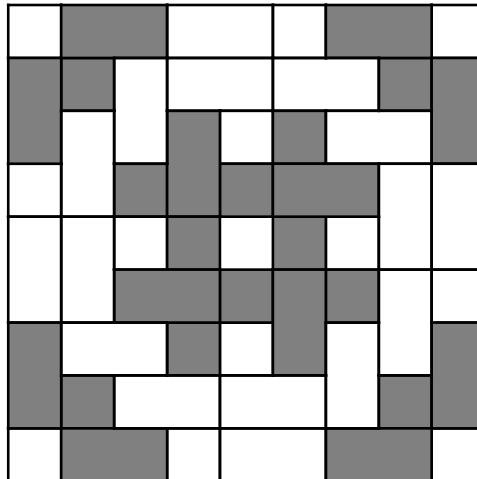
Of which type of tile did I have fewest left over when I had completed the tiling of the floor?

A Grey rectangular

B Grey square

C White rectangular

D White square

12 Wesley is interested in the pronunciation of old English and is looking at some old rhyming poems. He assumes that if one word rhymes with another, and the second word rhymes with a third, then the first and third words also rhyme.

He observes the following rhyming pairs:

abroad / flood	on / son	love / prove	displays / grace
hell / fail	place / praise	grace / praise	hell / seal
renewed / good	taste / last	unknown / sun	on / down
face / praise	will / seal	flood / blood	grace / graze

From the evidence above, which of the following pairs of words could Wesley **not** conclude to have rhymed in old English?

A place / grace

B fail / will

C blood / good

D down / son

13 In the Chrustasian Football League points are awarded as follows:

Lose: 0 points
Draw: 1 point
Win: 1 point, plus 1 point for each goal that the team wins by
(e.g. a total of 4 points for 3 – 0, 4 – 1, 5 – 2 etc.)

Barnakkol are unbeaten so far this season and are top of the league with 35 points. They have won 10 of the 12 matches they have played and drawn 2, scoring a total of 39 goals.

How many goals have been scored against Barnakkol so far this season?

A 10

B 12

C 14

D 16

14 On a clear cloudless morning, I can see vapour trails drifting across the sky. They are created by successive aircraft flying along the same flight path. The aircraft go at the same speed and in the same direction, but are separated by 5 minutes. The wind speed and direction changes from day to day, but not noticeably within an hour. The aircraft are too far away to see.

Which one of the following could **not** be the pattern of recent vapour trails seen out of my window on a cloudless morning?

A

B

C

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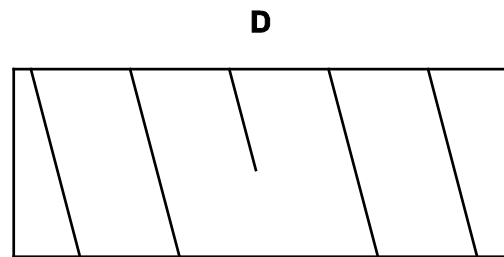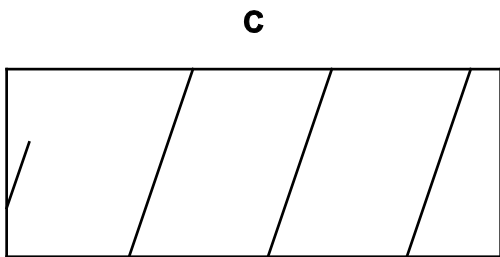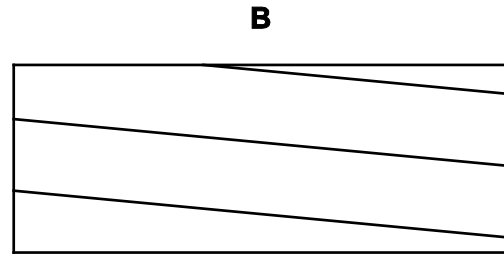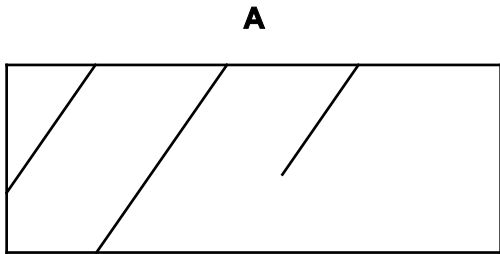
15 The table shows the costs incurred on the ski slopes of some popular Alpine ski resorts.

Resort	Country	Adult 6-day ski pass (€)	Child 6-day ski pass (€)	Price of a coffee (€)	Price of a beer (€)
Andermatt	Switzerland	160.50	79.50	2.50	3.20
Brand	Austria	133.00	89.00	2.20	2.80
Courchevel	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 I want to create a rectangular pond in my garden. I have not yet decided on the exact dimensions, but its length will be twice its width and will be between 2 metres and 6 metres inclusive. There will also be a strip of concrete of width 0.5 metres around the edges of the pond, as illustrated below.

NOT TO SCALE
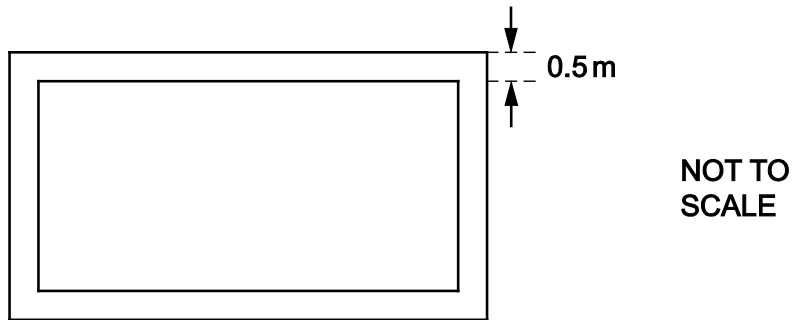
Which of the following graphs best represents how the surface area of the pond and the area of the concrete vary with the length of the pond?
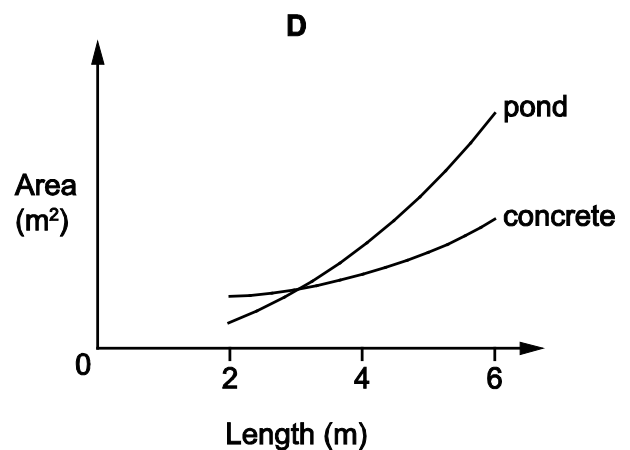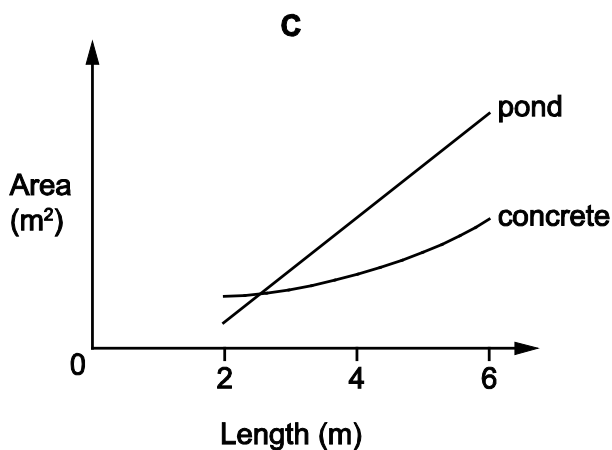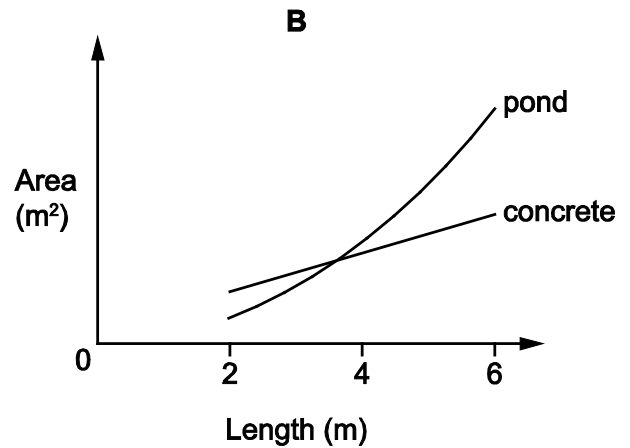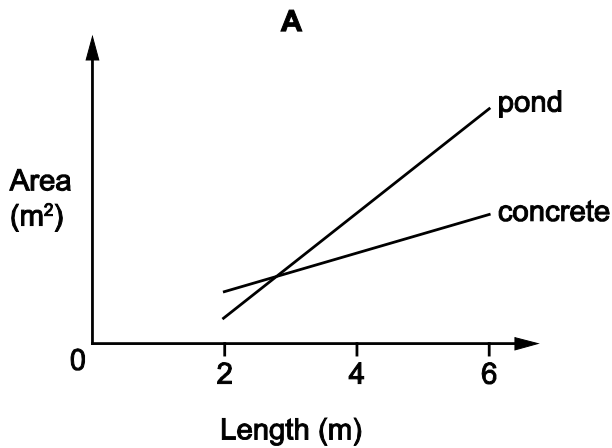
17 Richard is taking part in a young entrepreneur competition. He has $120 to invest in toys that he can sell on at a profit. Sherlock dolls would cost him $15 each and he could sell them at $19 each, while Watson's junior doctor kits cost $25 each and he could sell each kit for $32. Richard can buy all of one toy or a mixture of the two but cannot spend more than his $120.

Richard intends to make as much profit as possible. How many toys will he buy altogether?

A 5

B 6

C 7

D 8

18 Aaron is planning to buy a new bookcase to hold his collection of books by his favourite 19th century author. He has all 49 of the books and each one is 3 cm wide. There are four bookcases available in the style that Aaron wants to buy. The details of each option are shown in the table below.

Price	Number of shelves	Width of each shelf (cm)
$200	2	80
$250	3	50
$275	4	40
$300	5	30

The height and depth of each shelf is the right size to hold the books. Aaron wants to have as little space as possible left over at the ends of the shelves when all of the books are in the bookcase. He will not keep any other books in the bookcase.

What is the price of the bookcase that Aaron should buy?

A $200

B $250

C $275

D $300

19 I am, at present, on holiday in Bolandia, where the unit of currency is the bol (Ђ).

Last week I changed $500 at a currency exchange bureau, and, after 2% commission had been deducted, I received Ђ8428. I will be changing another $500 today at the same bureau (where 2% commission will again be deducted), and I am pleased to discover that the exchange rate against the dollar has increased by Ђ0.4 since last week.

If you were asked to work out how many more bols I will receive today than I did last week, which of the pieces of information given above would **not** be necessary?

A I received Ђ8428 last week

B The amount I changed last week (and will change today) is $500

C The bureau deducts 2% commission

D The exchange rate against the dollar has increased by Ђ0.4 since last week

20 Claudio's coffee bar is open in the morning, closes for a siesta in the afternoon, and then opens again in the evening. Claudio sells three styles of coffee drink.

An Espresso is just a shot (60 ml) of espresso and no milk.
A Cappuccino is a shot of espresso, 60 ml of steamed milk and 30 ml of milk turned into foam.
A Latte is a shot of espresso, 120 ml of steamed milk and 15 ml of milk turned into foam.

Latte is more popular in the morning and the other two are more popular in the evening. The table below shows the average number of these drinks sold by Claudio in the morning and evening.

	Espresso	Cappuccino	Latte
Mornings	100	100	300
Evenings	250	400	100

Which one of the following statements gives the most accurate account of the relative amount of milk Claudio uses on average in the morning compared to the evening?

A Claudio uses 50% more milk in the evening than in the morning

B Claudio uses 25% more milk in the evening than in the morning

C Claudio uses the same amount of milk in the evening and the morning

D Claudio uses 30% less milk in the evening than in the morning

21 The cows on Jack's farm produce a total of 1000 litres of milk per day. It costs $0.90 to produce each litre of milk. He is paid $1.00 per litre when it is sold. Before he was prosecuted, he diluted it by adding 20 litres of (free) rainwater each day because he thought nobody would notice a small amount of added water.

By how much did adding the water increase his profit?

A 2%

B 10%

C 12%

D 20%

22 Everybody in a class of 30 took a spelling test and everybody scored a different mark out of 100. The 10 highest-scoring students had an average mark of 85. The 15 lowest-scoring students scored an average of 55.

Which one of the following would **not** be sufficient to enable the overall class average mark to be calculated?
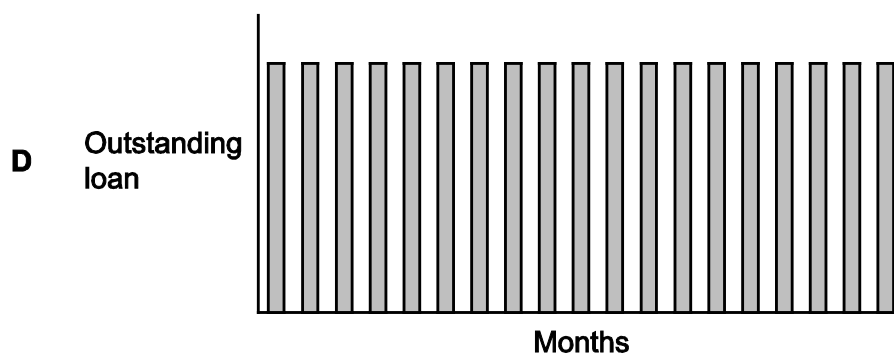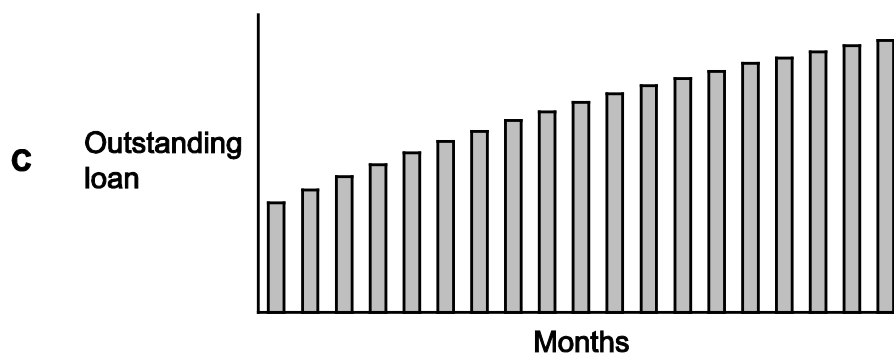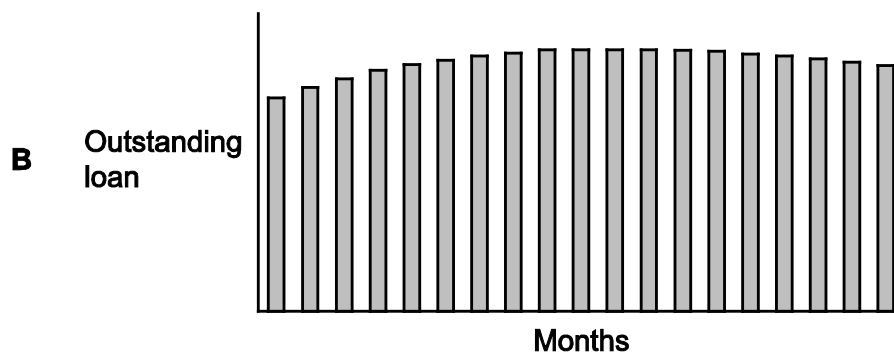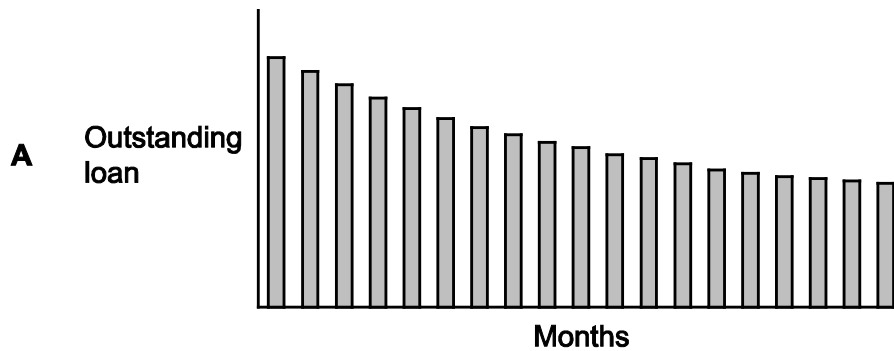
A The average mark of the 20 lowest-scoring students

B The average mark of students with the 11th to 15th highest marks

C The average mark of the 15 highest-scoring students

D The average mark of the 20 highest-scoring students

23 Ruaridh sells T-shirts in Earls Court. He knows that any person from Australia or New Zealand is as likely as any other to be a customer, but he cannot distinguish between them from their accents. There are 20 million Australians and 4 million New Zealanders. One of his T-shirts gets a laugh from every New Zealander, but only one Australian in ten.

A customer who he can tell is from one of the two countries laughs at the T-shirt. What is the chance they are from New Zealand?

A 2/3

B 1/2

C 10/11

D 1/6

24 Orla has a loan from her bank, with slightly unusual conditions. Every month, she pays back a fixed percentage of the outstanding amount. Every month the bank loans her an extra fixed amount. No interest is payable until the end of the loan period.

Which of the following graphs could **not** show her balance from month to month?

A   Outstanding loan

Months

B   Outstanding loan

Months

C   Outstanding loan

Months

D   Outstanding loan

Months

25 Four friends, all 23 or 24 years old, wish to join a tennis club together. There are three equally good clubs very close to where three of the friends, Ann, Butch and Cassie, live. Don lives 40 kilometres away.

Butch is still in full time education taking a higher degree, while the other three have left their student days behind them and are pursuing their various careers.
Cassie is in the entertainment business and can play tennis in the daytime on weekdays only. Apart from Cassie, the friends all insist on being able to play on evenings and weekends as well as on weekdays.

Annual membership rates differ for the various categories of membership at each of the clubs. The prices of these are in the table below.

	Victoria Tennis	Granville Tennis	Brooke Tennis
Adult	$170	$115	$90
Young person (18 to 24)	$85	$115	$85
Full-time student	$66	$70	$50
Child (under 18)	$41	$70	$30
Country member (residing more than 30 km away)	$66	$55	
Off-peak (playing 09:00 to 18:00 Mondays to Fridays)	$90	$70	
Sunday Club (Sunday afternoons only)	$56		

What is the least total amount that the four friends must pay to join the same club and play tennis when they want to?

A $302

B $305

C $307

D $310

26 Colin has a small business servicing computers. He currently has 23 computers awaiting servicing. He has two technicians, one of whom takes 1 hour 30 minutes to complete each service, the other takes 2 hours 15 minutes. They never work on the same computer. The company works Monday to Friday, from 9 am to 5 pm, with a lunch break from 1 pm to 2 pm. It is now 9 am on Monday morning.

When, to the nearest half hour, will the current waiting list be completed?

A 5.00 pm on Wednesday

B 10.30 am on Thursday

C 11.00 am on Thursday

D 3.00 pm on Thursday

27 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

28 John wants his group to play on the djembe drums, but knows that if all four drums are hit at the same time the neighbours will complain about the noise. He gets the group to start together, but each person is given a different pattern to repeat, which he has designed to ensure a maximum of three at any time.

Alice: beat, pause
Boris: beat, beat, pause
Charlie: pause, beat, beat, beat
Doris: pause, beat, beat, beat, pause, beat

After a while, someone skipped a single pause and continued drumming. Luckily, there was no cause for complaint. Who missed the pause?
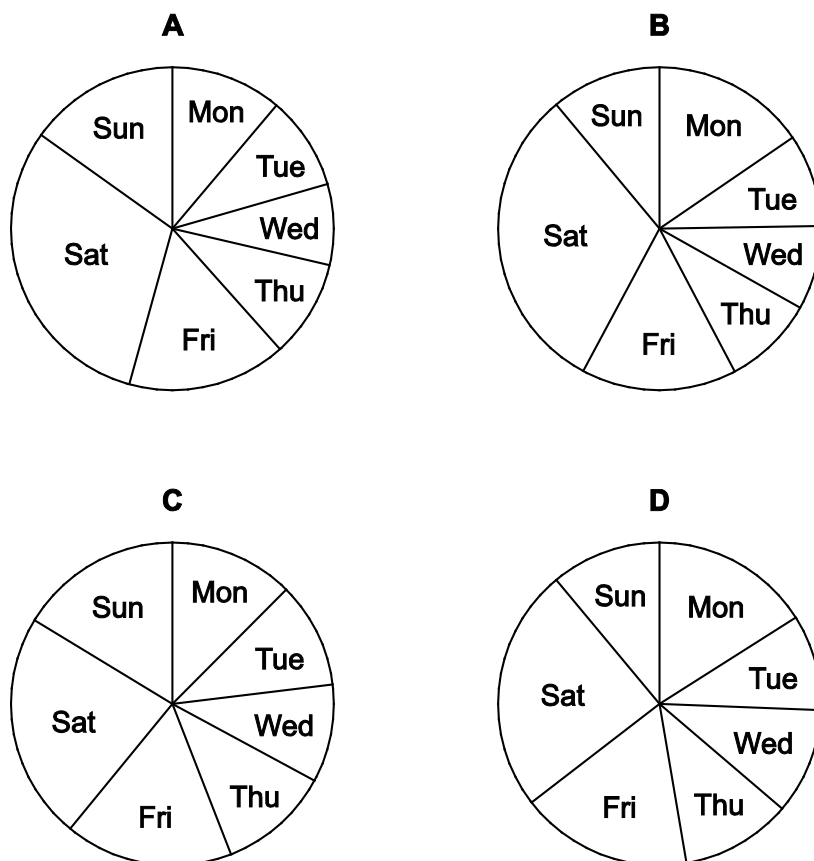
A   Alice

B   Boris

C   Charlie

D   Doris

29 Heidi Clare's new book *Listen To Me* is proving to be popular. 600 copies were sold last week at the Ranton branch of Reedmor.

The daily sales were as follows:

Mon	Tue	Wed	Thu	Fri	Sat	Sun
75	64	56	67	104	136	98

Which one of the following pie charts shows these sales figures?

A

B

C

D

30 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% rather than changing the cost per kilometre again. 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

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24

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