THINKING SKILLS **9694/13**

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.

Cambridge Assessment
International Education

[Turn over

1 Greg wants to buy a new bicycle. He wants one which has fewer than 24 gears, has a combined frame and groupset weight of less than 6.4 kg and comes with FullSpin 8 brand wheels. The details of four bicycles he has been recommended by a friend are below.

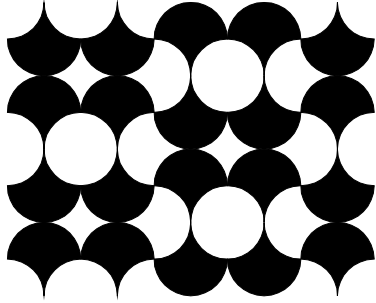| Model	Gears	Groupset weight (g)	Frame weight (g)	Wheels
Allaz	22	1992	4482	FullSpin 8
Bespin	20	1998	4400	FullSpin 7
Crevelo	24	2200	4115	FullSpin 8
Dogme	21	1920	3900	FullSpin 8

Which bicycle should Greg buy?

A Allaz

B Bespin

C Crevelo

D Dogme

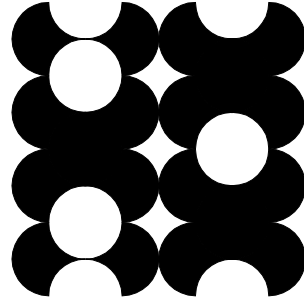**2** The shape below is a Roman tile known as an Ostia.
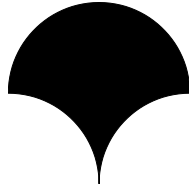
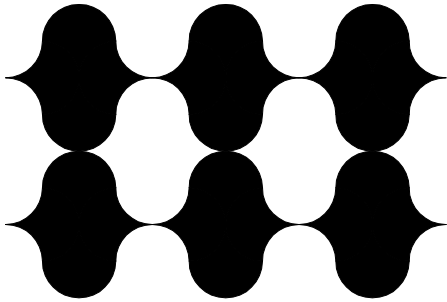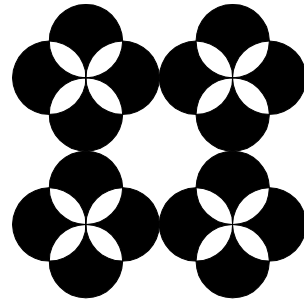Which of the patterns below **cannot** be made using this tile?

A

B

C

D

3 Carpet tiles are more expensive to fit around the edge of a room than when they are not touching the edge. The prices per tile (for the tile as well as its fitting) are:
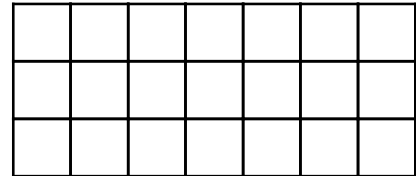
$5 for a tile immediately adjacent to a wall;
$3 for a tile that is not immediately adjacent to a wall.

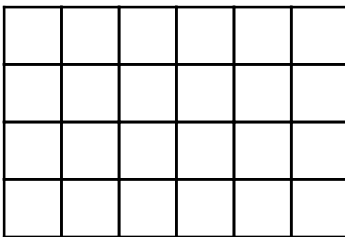In the following plan drawings of four rooms, each tile is shown by a square.
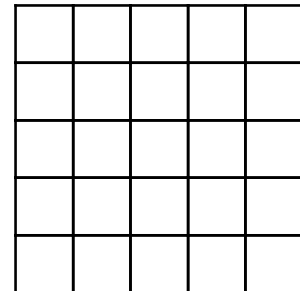
Room W
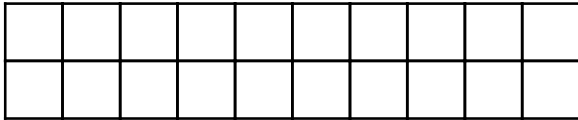
Room X

Room Y

Room Z

Which of these rooms is the cheapest to tile?

A Room W

B Room X

C Room Y

D Room Z

4   A water butt collects rainwater. This water is used by Alan to water the lawns and flowers in his garden. The following graph shows, in mm, the depth of water that fell into the butt and the depth of water that Alan took from it during each of six consecutive days.

Key
- depth of water added
- depth of water removed
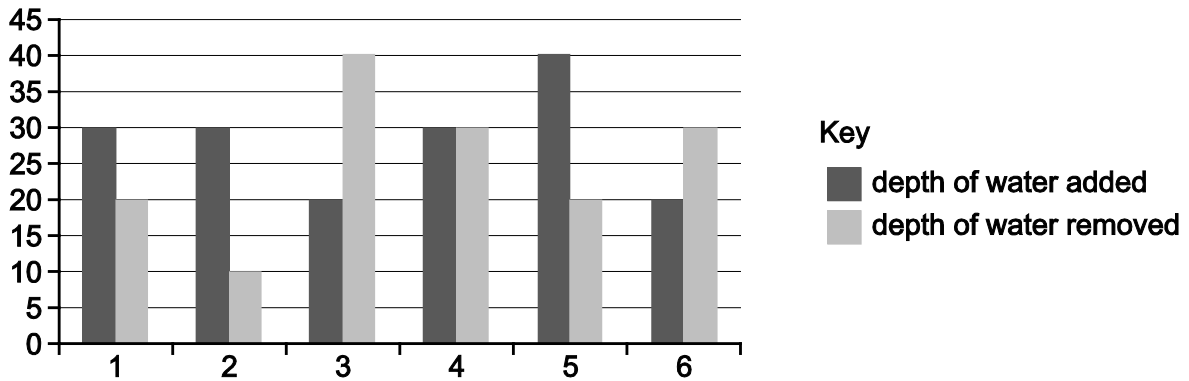
The depth of water in the butt at the beginning of the first day was 60 mm.

Which of the following graphs could represent the depth of rainwater in the butt at the **end** of each day?

A

B

C

D
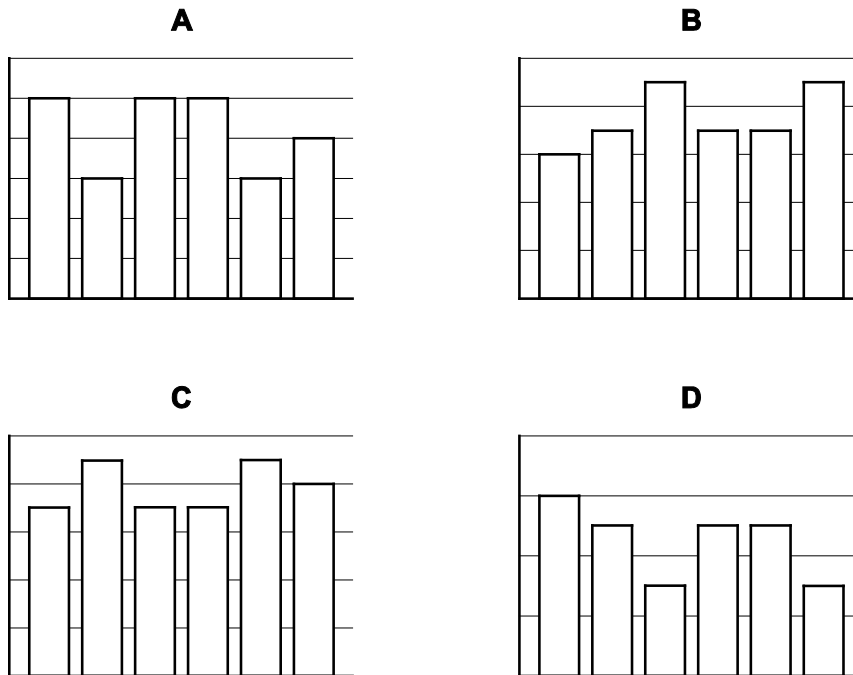
5 Below are three views of the same object.

Which of the following is another view of the object?
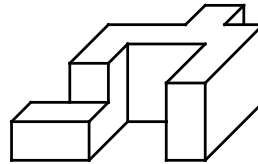
A   **B**   **C**   **D**

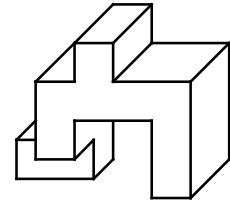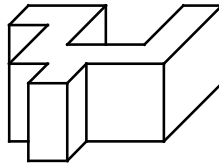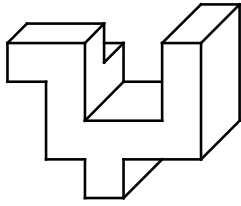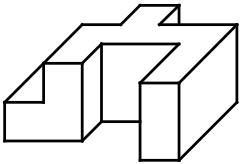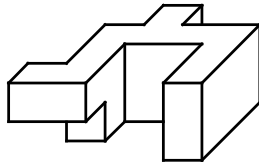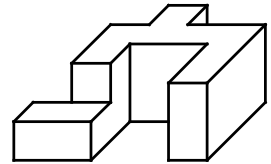**6** Fred has built a miniature railway in his garden. It is a miniature version of the disused railway line from Barton to Homerton, which was 25 km long. When it was in use it operated for 24 hours each day and each train took 1 hour 20 minutes to complete the journey.

The miniature railway in Fred's garden is built to scale, and has a total length of 1 km.

So that he can show his friends how the old line operated in one day, he has compressed a whole day's operations into 3 hours.

If Fred is to accurately replicate the line's operation, at what average speed will his trains travel?

A   1 km/h

B   4 km/h

C   6 km/h

D   10 km/h

7 During a four-day festival candles are lit only at the beginning of a daily gathering. They burn for a single hour each day and are then extinguished. All candles are new at the start, and each one can burn for 4 hours in total. On the first day just one candle is lit, on the second day two, on the third three, and on the final day all four candles are lit. Traditionally, one new candle is started each day.

Hamish wondered whether four shorter candles could be used if it is not necessary to use a new candle each day.

If the candles are all the same length at the start, for how long must they each be able to burn?

A   2.5 hours

B   3 hours

C   3.5 hours

D   4 hours

8 Jules and Jim are planning a weekend holiday to a European city. They have narrowed possible places to visit down to Istanbul, Prague, Rome and Venice. They get a friend who they both respect to mark each destination out of 10 for cost of living, art, food, history and nightlife. His marks are shown in the table below.

	Cost of living	Art	Food	History	Nightlife
Istanbul	9	8	7	9	6
Prague	10	6	5	6	10
Rome	6	9	9	9	8
Venice	7	9	7	8	6

Jules and Jim each choose which three of the qualities they consider most important. Jules chooses cost of living, art and history, while Jim chooses cost of living, food and nightlife. Each of them adds up the scores for their three chosen qualities and then their two totals are added. They decide to go to the place that scores the highest overall.

Where do they choose to go?

A Istanbul

B Prague

C Rome

D Venice

9 The following table shows which towns have a road directly connecting them:

		To				
		Abrico	Belongil	Kambah	Mapua	Swanbourne
From	Abrico	-	Yes	No	Yes	No
	Belongil	Yes	-	No	Yes	Yes
	Kambah	No	No	-	No	Yes
	Mapua	Yes	Yes	No	-	No
	Swanbourne	No	Yes	Yes	No	-

Which of the following, if suitably labelled, would be such an arrangement?

10 The amount of a certain medicine required by a baby depends on its weight, as shown in the table below.

Weight (kg)	Amount of medicine (ml)
2.5 – 3.5	2.9
3.5 – 5.0	3.8
5.0 – 6.5	4.3
6.5 – 8.0	4.5

Four babies were weighed and given the correct amount of medicine in October and again in January.

Which baby required the greatest increase in the amount of medicine from October to January?

|	Weight in October (kg)	Weight in January (kg)
A	5.2	7.1
B	2.8	3.9
C	3.8	6.6
D	6.7	7.3

11 There are various ways to fold your arms: right in front of left or left in front of right, right hand tucked in or not, and left hand tucked in or not.

How many people with their arms folded do there need to be in a photograph to ensure that at least two people are folding their arms in the same way?
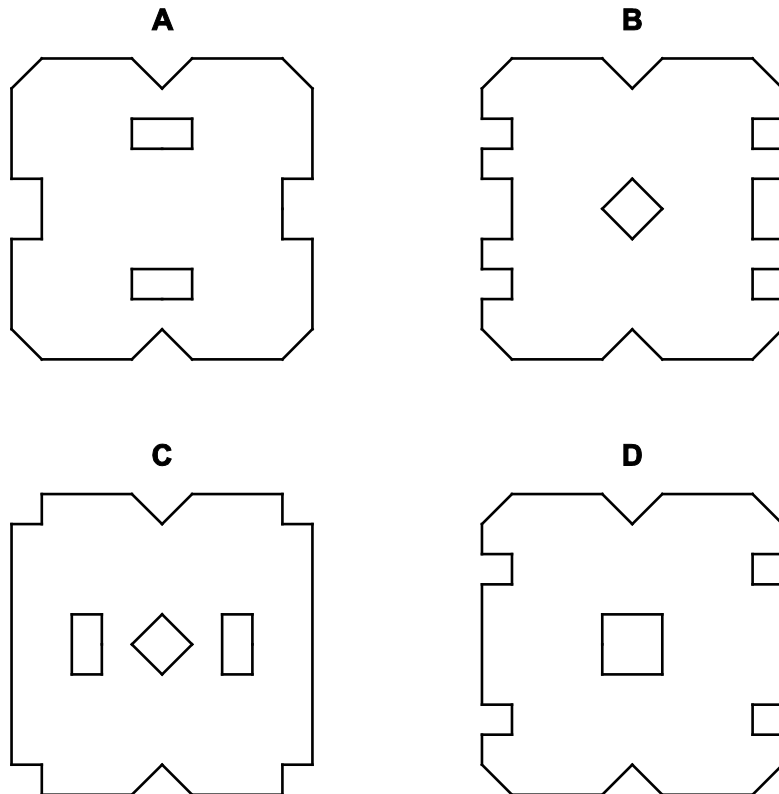
A 4

B 7

C 8

D 9

12 Gerry has folded a square piece of paper twice, creating a smaller square, and cut through the resulting four layers to produce the following appearance:
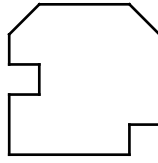
Which one of the following could **not** be the paper once Gerry has unfolded it?

A

B

C

D

13 Joanna is planning a party next month. She invited all her work colleagues to the party, expecting just 35 of them to be able to attend. She calculated that she needed to spend $8 on food and drink for each of the guests and bought enough to cater for up to 35 guests. When she had received all of the replies she found that 50 of the people she had invited were going to attend. She decided to provide less food and drink, spending only $7 per guest on food.

How much more did Joanna need to spend to have the amount of food she wanted for the party?

A $55

B $70

C $85

D $105

14 John set a test for his students last week which was made up of three sections. All three sections had 10 questions. Questions in Section A were worth 2 marks each, those in Section B were worth 3 marks each and those in Section C were worth 5 marks each. John has set the pass mark at 70 out of 100.

What is the difference between the largest number of questions that could be correctly answered while failing the test and the smallest number of questions that could be correctly answered while passing the test?

A 1

B 3

C 6

D 10

15 Gordon is at a silent disco, where everyone has headphones. Because not everyone is listening to the same music, the lights cannot flash in time with the music. Instead, each coloured light is flashing in a repeating pattern, and all the patterns have different lengths. For the whole of each second, each light is either on or off.

Gordon noted down the first 16 seconds as follows:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Red	●	●		●	●	●	●	●		●	●	●	●	●		●
Orange	●	●		●		●		●		●	●	●		●		●
Yellow		●	●		●	●		●	●		●	●		●	●	
Green	●	●	●			●	●	●			●	●	●			●

What is the shortest possible time after which the whole sequence repeats?

A 15 seconds

B 16 seconds

C 30 seconds

D 60 seconds

16 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.

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

Which car satisfies her requirements?

A   Mars

B   Neptune

C   Pluto

D   Venus

 [Turn over

17 Twelve contestants are taking part in a series of challenges. Today's challenge was an obstacle course, which they completed against the clock. The contestant who completed the course in the shortest time was awarded 5 points, the contestant with the second-best time was awarded 2 points, and contestants whose times were within 90 seconds of the second-best time were awarded 1 point each.

The order in which the contestants competed and their times (min:sec) are shown below.

Arthur	12:33
Tammy	12:57
George	11:39
Callum	13:34
Lesley	10:51
Vikram	12:23
Linda	13:25
Scott	13:18
Sana	12:26
Carol	12:08
Aqib	13:04
Pippa	12:45

How many of the contestants scored points in today's challenge?

A 3

B 5

C 7

D 9

18 In many countries it is common to talk about which week it is in the year, but there has to be a standard way to define the numbering because the 1st of January is not on the same day of the week from year to year. A week is specified as starting on Monday and finishing on Sunday. Week 1 is the first week with most of its days in the year.

Which of the following is **not** another way to describe Week 1?

A The first week containing a Thursday in the year

B The first week starting on or after 29th December of the previous year

C The week containing the first Sunday on or after 4th January

D The (only) week containing 1st January

19 Sporties are pieces of chocolate in the shape of golf balls, tennis balls and footballs. All golf ball sporties are 5 g, all tennis ball sporties are 6 g and all football sporties are 8 g. Bags of sporties contain exactly 125 g of chocolate and always include at least 2 of each type.

What is the minimum number of sporties that a 125 g bag can contain?

A 16

B 17

C 18

D 19

20 In a consumer test, 120 people were asked to taste samples of two new cheeses, labelled X and Y, and say whether they would consider buying either or both of them.

79 said they would consider buying cheese X.
51 said they would consider buying cheese Y.
Only 18 said that they would not consider buying either of them.

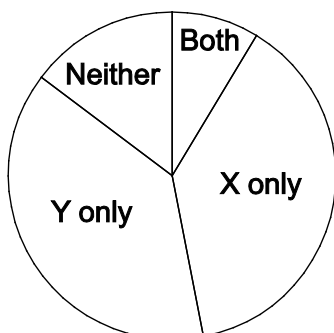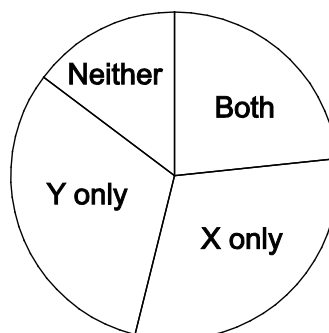Which one of the following pie charts shows the results of the consumer test?
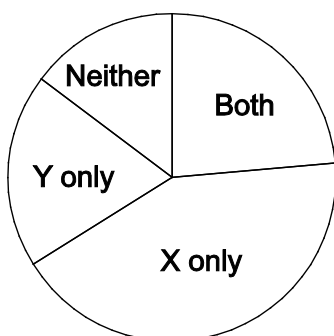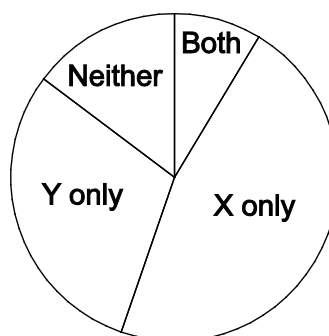
21 David has a set of square tiles, each with a pattern on one side only. The pattern on each tile is made up of four triangular sections. Each section is either red (R), blue (B), green (G), or yellow (Y), and all four sections on any tile are different colours. There are several tiles with each type of pattern in the set.

David is creating a design using the tiles, and has decided that, in this design, tiles can only be placed next to each other if the sections touching are the same colour. The diagram shows the colours that he wants some of the sections to be.
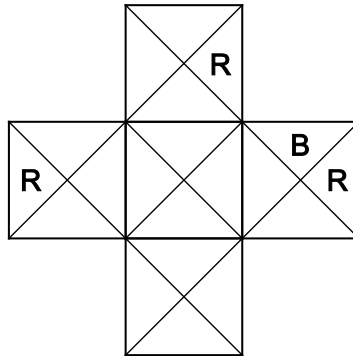
How many different types of tile could be used for the central tile?

A   2

B   4

C   6

D   8

22 "Leave It To Us" is a company that organizes children's parties. They charge a basic price of $24, plus additional charges per hour of the party and per child attending.

I hired the company last year for my daughter's birthday. The party was a great success, so I have hired them again this year.

Last year the party lasted for 3 hours and 15 children were present. The total cost was $120. This year the party will last for 4 hours, but there will only be 12 children. "Leave It To Us" has not changed any of the charges since last year, and the total cost will again be $120.

What is the scale of charges employed by "Leave It To Us"?

A $24 + $12 per hour + $4 per child

B $24 + $15 per hour + $5 per child

C $24 + $17 per hour + $3 per child

D $24 + $18 per hour + $2 per child

23 Richard is going to travel by train to meet his friend, Frank, this weekend. He will have to change trains at Midtown. The trains from Richard's village to Midtown leave at quarter past and quarter to each hour and take between 45 and 55 minutes to reach Midtown. The trains from Midtown leave at 25 past each hour and take between 30 and 40 minutes to reach Frank's village. Richard needs to arrive at Frank's village by 1 pm.

What is the latest that Richard could leave to be sure to arrive on time at Frank's village?

    A   10.15 am

    B   10.45 am

    C   11.15 am

    D   11.45 am

24 In some countries fuel consumption in cars is measured in MPG: miles (rather than kilometres) per gallon (rather than per litre). In other countries the measure is litres per 100 km.
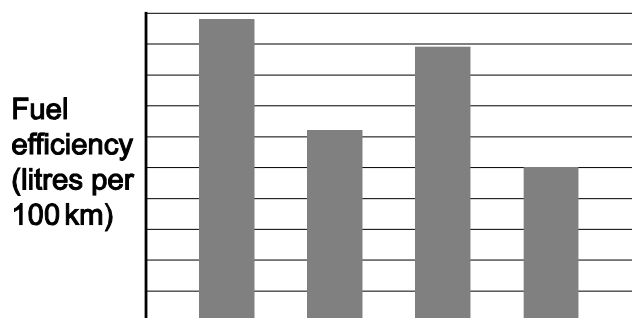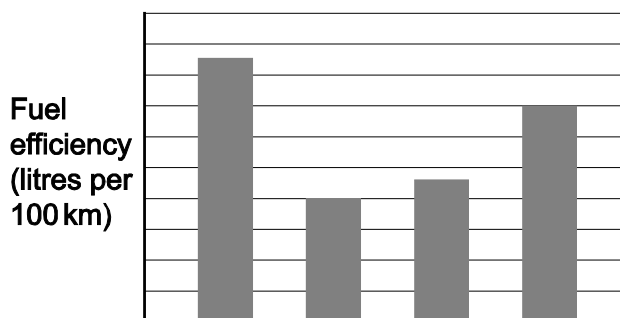
Four cars were rated in MPG:

Fuel efficiency (MPG)
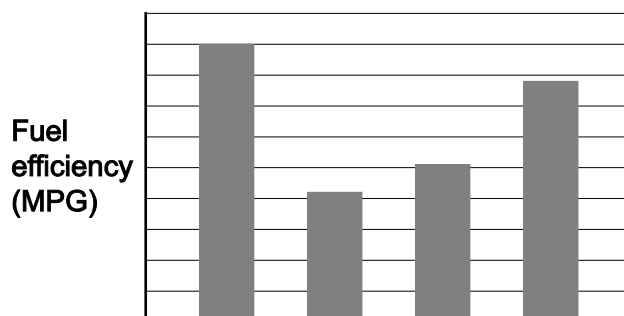
The same four cars were tested in another country, but not necessarily in the same order. The results were reported in litres per 100 km.

Which one of the following, if suitably labelled, could show the results from the second country?
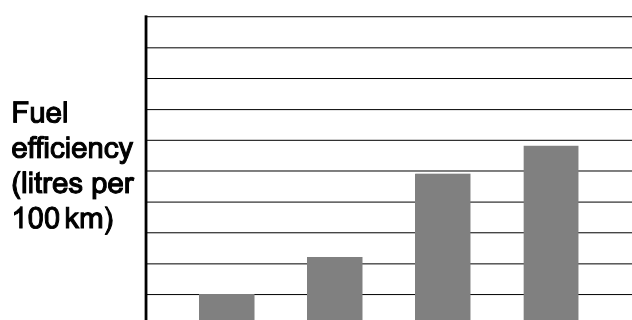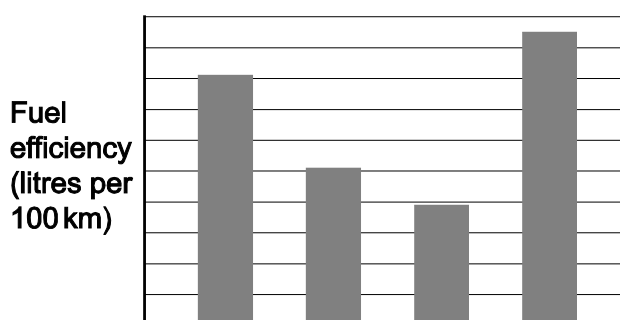
A

Fuel efficiency (litres per 100 km)

B

Fuel efficiency (litres per 100 km)

C

Fuel efficiency (litres per 100 km)

D

Fuel efficiency (litres per 100 km)

25 A packet contains 24 sweets, which are red, green, yellow or white.

There are the same number of reds as greens.
The total of the number of whites and greens is 7 times the number of yellows.
The total number of the greens and yellows is 4 more than the number of whites.

How many white sweets are there?

A 6

B 8

C 10

D 14

26 Melanie bought 3 oranges, 4 pears, 5 apples and 6 bananas for a total cost of $3.10. She remembers that the price of one of the fruits was 12¢ each, one was 15¢ each, one was 20¢ each and one was 25¢ each, but she has forgotten which was which.

What was the price of each banana?

A 12¢

B 15¢

C 20¢

D 25¢

27 The object of the sport of archball is to kick the ball towards a circular target that has a hole in its centre.

Two types of goal can be scored:

- A touch goal, worth 2 points, is scored when the ball makes contact with the target.
- A through goal, worth 5 points, is scored if the ball passes through the central hole.

Archball's Bowdance Cup has been won this year by Cambersly, beating Spandome 23 – 14 in last Saturday's final.

Which one of the following additional pieces of information is sufficient, by itself, for the total number of goals scored during last Saturday's match to be deduced?

A Cambersly scored more goals than Spandome

B Cambersly scored more touch goals than Spandome

C More touch goals than through goals were scored during the match

D Spandome scored more through goals than Cambersly

28 A chef is preparing a meal for 120 people to celebrate the local football team winning the league. For dessert he is making apple pies, blueberry pies, cherry pies and damson pies. Everybody will have one pie, but the chef doesn't want to make so many pies as to guarantee that everybody gets their first choice pie. He decides that he will make enough pies to ensure that there are no more than twenty people who can't get their first or second choice.

What is the total number of pies he should make?

A 140

B 160

C 200

D 220

29 The graph below shows the predicted currency exchange rates against the US dollar for the first 5 months of next year. For example, 100 USD will buy 77 GBP in April next year.
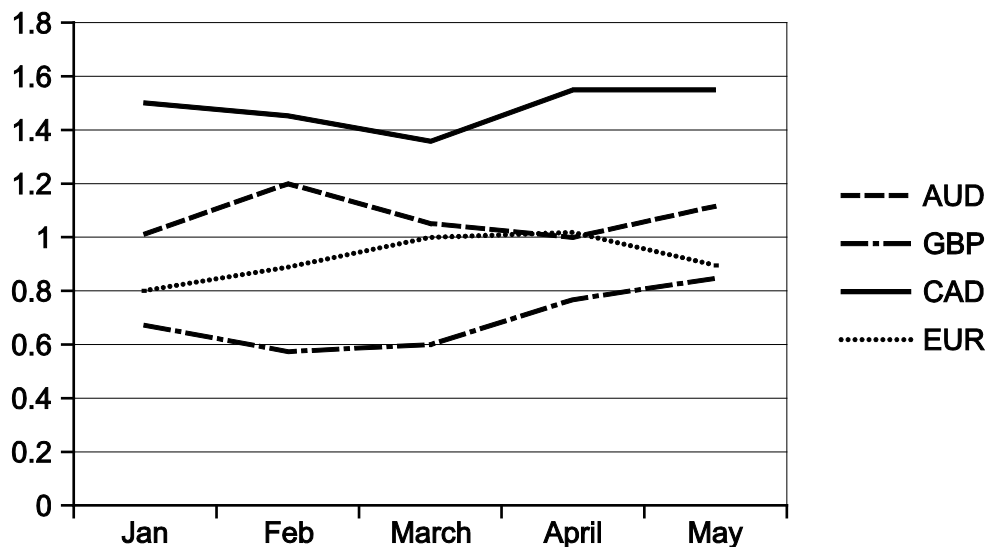
Jeremy has some USD, and wishes to end up with more.

Which of the following strategies would make the most profit?

A Buy GBP in January and sell it back in May

B Buy AUD in January, sell in February buy EUR, sell in March buy CAD, sell in April buy AUD, sell in May

C Buy CAD in January, sell in February buy AUD, sell in March buy EUR, sell in May

D Buy GBP in January, sell in February buy AUD, sell in April buy EUR, sell in May

30 Tickets for a recent concert were $10 each for adults and $5 each for children. A family ticket for 2 adults and 2 children was available for $25.

Tickets for all 640 seats in the theatre were sold, and the total income from ticket sales was $4780.

What is the maximum number of family tickets that could have been sold?

A 52

B 82

C 108

D 160

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