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**THINKING SKILLS**

**9694/11**

Paper 1 Problem Solving

**May/June 2017**

**1 hour 45 minutes**

Additional Materials:      Multiple Choice Answer Sheet  
   Soft clean eraser  
   Soft pencil (type B or HB is recommended)

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**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**

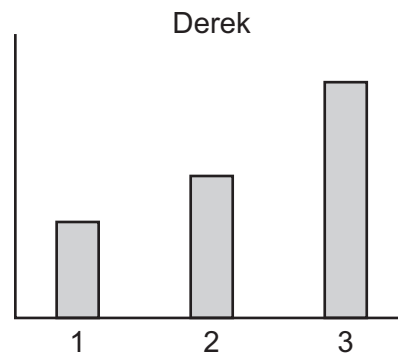
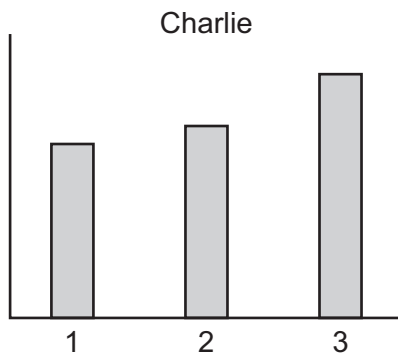
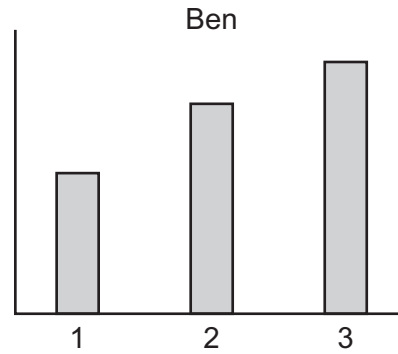
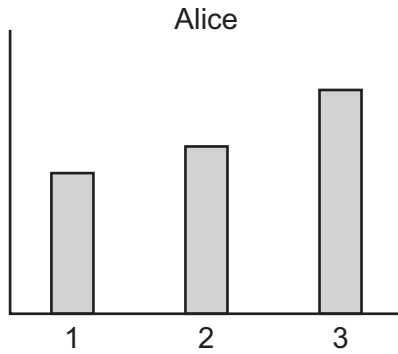
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

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



- 1 A company gives a bonus to all of its salespeople who show a greater percentage increase in sales from year 2 to year 3 than they did from year 1 to year 2. Four salespeople's sales are shown in the graphs below.



Which employee does **not** receive a bonus?

- A Alice
  - B Ben
  - C Charlie
  - D Derek
- 2 Jonathan is planning to visit a friend this weekend. He wishes to take gifts for each of the members of the family and he is buying them all from the same store. He will be buying one box of chocolates which costs \$15 for the whole family to share and one game for each of the three children. Each of the games costs \$10. The store offers a service to wrap any of the items that are bought. The cost of this service is 10% of the price of the item being wrapped. Jonathan only wishes to have the chocolates wrapped.

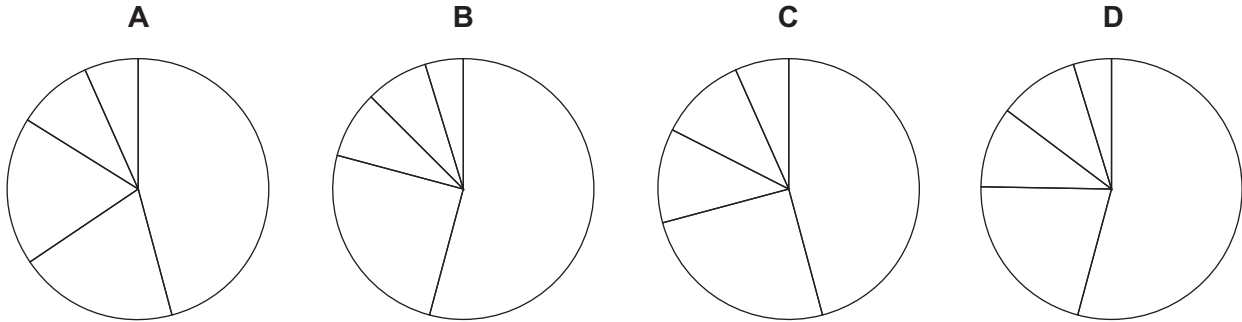
What will be the total price that Jonathan will pay to get his presents?

- A \$45.00
- B \$46.50
- C \$47.50
- D \$49.50

- 3 The numbers of different colours of cars sold on the island of Epsilonica are given in the following table.

<i>Colour</i>	Red	Yellow	Blue	Silver	Black
<i>Number of cars sold</i>	220	125	475	210	870

Which of the following pie charts could represent this data?



- 4 The table below shows the medals table for the top 15 nations at the Winter Olympics 2014.

	<i>Country</i>	<i>Gold medals</i>	<i>Silver medals</i>	<i>Bronze medals</i>
1	Russia	13	11	9
2	Norway	11	5	10
3	Canada	10	10	5
4	United States	9	7	12
5	Netherlands	8	7	9
6	Germany	8	6	5
7	Switzerland	6	3	2
8	Belarus	5	0	1
9	Austria	4	8	5
10	France	4	4	7
11	Poland	4	1	1
12	China	3	4	2
13	South Korea	3	3	2
14	Sweden	2	7	6
15	Czech Republic	2	4	2

No other nation won more than 10 medals.

The convention is that it is the number of gold medals that determines a nation's position in the table. Only if there are equal numbers of gold medals are the number of silver medals considered, and similarly bronze medals are only considered if the number of silver medals is also equal.

Heidi from Zurich thinks this is the fairest way to compare the performance of countries, but Gudrun, who is from Vienna, thinks a better way would be to rank nations by the total number of medals won, regardless of the medals' colour.

How many places in the table would Austria be above Switzerland if Gudrun's method of ranking was adopted?

- A** 1
- B** 2
- C** 3
- D** 4

5 Maria wishes to buy a computer which costs \$3000, but she must take out a loan in order to do so. There are four options for paying off the loan, which are summarised below.

- Option 1: 12 payments of \$200, followed by 12 payments of \$100
- Option 2: 24 payments of \$160
- Option 3: 30 payments of \$125
- Option 4: 12 payments of \$150, followed by 6 payments of \$250

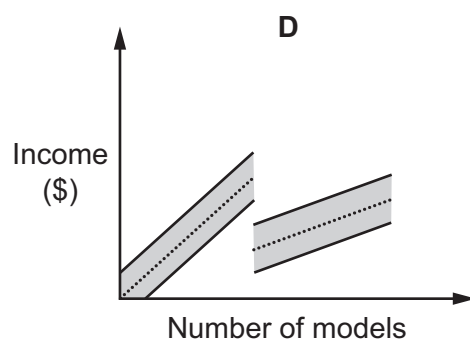
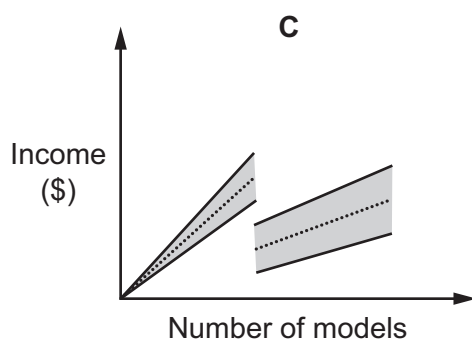
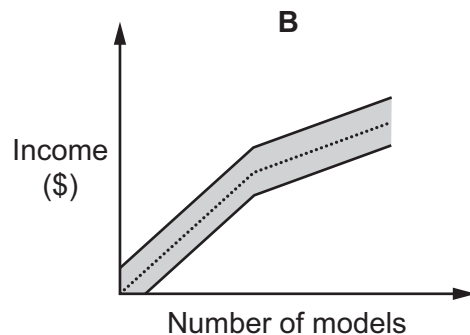
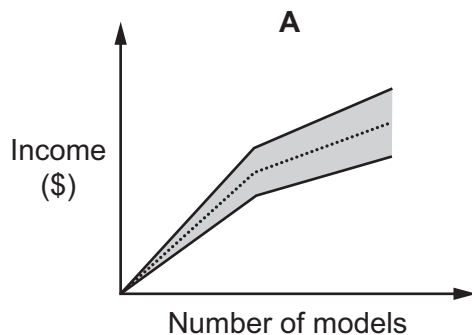
For each option, one payment is made every month. Maria cannot afford to pay more than \$180 per month, but wants the total that she pays to be as small as possible.

How much will Maria have to pay in total for the computer?

- A \$3300
- B \$3600
- C \$3750
- D \$3840

6 The tourism office has decided to allow companies to sell models of the town hall as souvenirs to visitors. They have decided that the guide price should be \$2.50 per model for the first 1000 models, and \$1.00 per model thereafter. The companies are allowed to vary their prices by up to 20% above or below the guide price.

In which one of the following graphs does the shaded region represent the range of incomes that the companies can expect to receive for the models?



- 7 Graham and James both need to buy some blank badges for the people attending meetings this weekend to write their names on. They both wish to spend the smallest amount of money for the badges. The prices for different packets of badges are given in the table below.

<i>Number of badges</i>	<i>Price</i>
5	\$1.00
10	\$1.90
20	\$3.50
50	\$8.00
100	\$15.00

There will be 40 people attending Graham's meeting and 30 people attending James's meeting.

How much in total can Graham and James save by buying the badges together?

- A** \$0.90  
**B** \$1.00  
**C** \$1.90  
**D** \$4.50
- 8 The residents of the houses in a road are to be given new metallic numbers to attach to their front doors. The houses are numbered from 1 to 100. The metallic figure for 6 can be used the other way up as a 9, so there is no separate figure for 9.

How many figure 6s are needed?

- A** 30  
**B** 36  
**C** 40  
**D** 44

9 An agency wishes to advertise on the internet and has received the rates shown in the table below. The agency will insert three types of advert:

- a one-year advert which appears on all pages of the website;
- a six-month advert which appears between news feeds;
- three separate monthly adverts which appear on the Property page.

<i>Location and Type</i>	<i>1 month</i>	<i>6 months</i>	<i>1 year</i>
Top banner (shows on all pages)	\$195	\$995	\$1950
Frontpage (Top part of page)	\$135	\$690	\$1350
Frontpage (Top part of page – small advert)	\$90	\$460	\$900
Frontpage (Middle part of page)	\$110	\$560	\$1100
Frontpage (Middle part of page – small advert)	\$70	\$360	\$700
Frontpage (Lower part of page)	\$90	\$460	\$900
Frontpage (Lower part of page – small advert)	\$60	\$305	\$600
Frontpage (Between news feeds)	\$135	\$690	\$1350
Property page	\$60	\$305	\$600
Weather page	\$60	\$305	\$600
Motors page	\$65	\$330	\$650

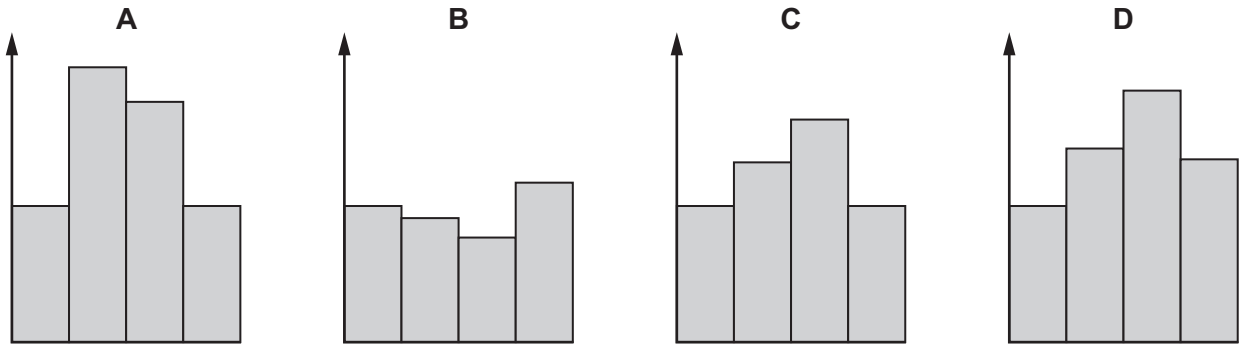
What is the total advertising cost to the agency?

- A \$2700
- B \$2820
- C \$3330
- D \$3900

- 10 This table summarises the amounts paid into and withdrawn from my savings account during the four quarters of last year.

	1st quarter	2nd quarter	3rd quarter	4th quarter
Paid in	\$200	\$400	\$350	\$200
Withdrawn	\$400	\$150	\$100	\$500

Which of the following charts, suitably labelled, could show the balance of the account at the end of each quarter?



- 11 Harrison intends to buy a new car and he has narrowed down his choices to four different models. Some details about these models are given in the following table.

Model	Engine size (cc)	Alloy wheels	Perimeter alarm	Key-free system	Fuel consumption (litres/100 km)	Automatic headlights
Runner	1100	No	No	No	4.8	Yes
Sprint	1400	Yes	Yes	Yes	8.2	Yes
Tourist	1200	Yes	No	Yes	5.2	No
Uber	1600	No	No	No	6.3	Yes

Harrison would like a car with an engine size of at least 1200 cc and with fuel consumption no more than 6 litres per 100 km. He would also like a perimeter alarm, a key-free system and automatic headlights, but he does not want alloy wheels. Harrison is prepared to compromise and he will buy a car that satisfies at least four of his wishes.

Which one of the following models will Harrison buy?

- A Runner
- B Sprint
- C Tourist
- D Uber



- 12** A catering company has been hired to provide food and drinks at a celebration evening. The amount of food and drink that they supply is based on the number of guests who will be present at the evening and if the exact numbers are not known then the company provides for the maximum number who could arrive. Invitations were sent out and the following three replies are possible:

“I will not be attending.”

“I will be attending alone.”

“I will be attending and will bring 1 guest.”

Those who replied that they will not be attending will not be allowed entry.

Which of the following pieces of information is **not** needed by the catering company to decide how much food and drink to supply?

- A** The number of invitations that have not yet been replied to
  - B** The number of “I will not be attending” replies that have been received
  - C** The number of “I will be attending alone” replies that have been received
  - D** The number of “I will be attending and will bring 1 guest” replies that have been received
- 13** My kitchen clock is working properly but was showing 10:06, which I know is the wrong time, when I left to walk to my friend’s house for coffee. My friend’s clock, which was correct, was showing 10:28 when I arrived and 11:15 when I left. I walked home at the same speed as when I went, and when I arrived home my clock was showing 11:55. I then adjusted my clock to the correct time.

How many minutes back did I have to move my clock?

- A** 9 minutes
- B** 20 minutes
- C** 22 minutes
- D** 31 minutes

- 14 For the last four weeks, customers of Lohpryce Supermarket have received one \$2 voucher for every \$20 spent in one visit.

Chris, Kim and Pat are three friends who go shopping together once a week at Lohpryce. These are the amounts that they have spent at Lohpryce during the last four weeks.

	Chris	Kim	Pat
Week 1	\$99.73	\$94.12	\$85.08
Week 2	\$78.20	\$99.36	\$93.71
Week 3	\$98.62	\$96.55	\$77.34
Week 4	\$92.48	\$78.18	\$85.40

All three now have 15 vouchers, but Kim has pointed out that they could have received more vouchers between them if they had thought to put all their purchases together each week, as if they were a single customer.

How many more vouchers in total could they have received if they had employed this strategy?

- A 6
- B 7
- C 8
- D 9



- 17 Twenty-four teams will take part in this year's Squareball World Cup tournament.

In the first stage of the tournament the teams will compete in four groups of six. Within each group all the teams will play each other once.

The top two teams from each group will progress to the second stage, where they will compete in a single league. Here, each team will carry forward the result from the match against the team they have already played in their group and play each of the other teams once.

The top two teams at the end of the second stage will play again in the final to determine the winners of the Cup.

How many matches will be played altogether during this year's Squareball World Cup tournament?

- A 85  
 B 89  
 C 97  
 D 101
- 18 There was a secret ballot for becoming the president of Poppleton Poetry Club. The six members of the committee all had two votes and could use one of these votes to vote for themselves. The result of the ballot was:

<i>Committee member</i>	<i>Votes</i>
Ann	4
Beth	3
Charlie	2
Daphne	1
Eric	1
Fiona	1

Fiona knows that each committee member used one of their votes for himself or herself, and she also voted for Charlie.

Which one of the following pieces of information would be sufficient for Fiona to work out who else each member voted for?

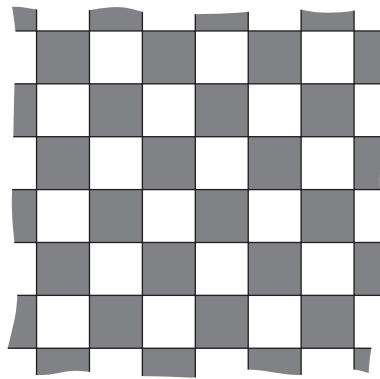
- A Who Ann and Beth voted for  
 B Who Beth and Charlie voted for  
 C Who Charlie and Daphne voted for  
 D Who Daphne and Ann voted for

- 19 Packets of crisps are normally 50 cents each at my local shop. In a hurry yesterday, I went into the shop, picked up 8 packets of crisps, gave the assistant \$4 and headed for the door. The assistant called me back to give me 80 cents change. "Special offer this week," she explained.

Which one of the following offers would **not** explain the 80 cents change I received?

- A All packets 20% off
- B Buy 2 packets, get a third packet for 10 cents
- C Buy 3 packets, get a fourth packet for 10 cents
- D Buy 4 packets, get a fifth packet free

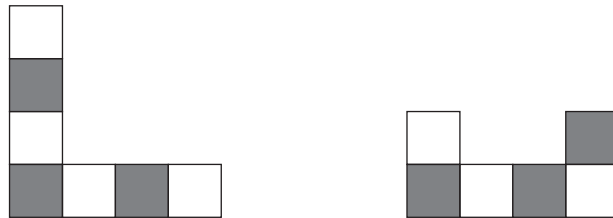
20 I recently laid a carpet with the following pattern.



Due to the awkward shape of the room, I had to cut four pieces out to make it fit.

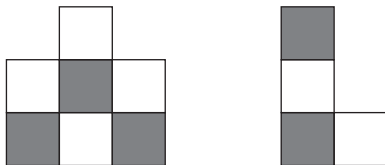
I was able to stitch the four pieces together to make a rectangular mat with exactly the same pattern as the whole carpet.

These were two of the pieces.

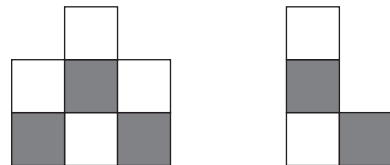


Which one of the following pairs could have been the other two pieces?

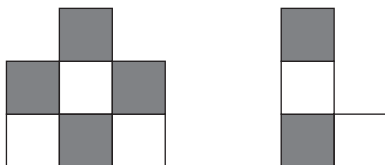
A



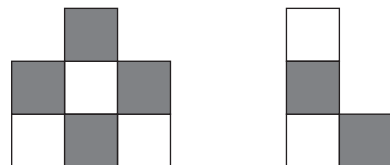
B



C



D



- 21** Conducted tours of the Roman ruins at Wottabor take place daily. Tours take 50 minutes. A tour begins every 10 minutes throughout the day from 09:15 onwards, except that no tours begin between 13:00 and 13:30. The last tour of the day finishes at 17:15.

How many conducted tours of the ruins take place each day?

- A** 41
- B** 44
- C** 46
- D** 49

- 22** The republic of Blueland is governed by the party with the highest number of elected representatives. Blueland is split into five regions with voting populations of 30 000, 40 000, 50 000, 60 000 and 70 000. Each region has one representative who is elected by receiving at least 50% of the votes in that region, provided that no less than 20% of the region voted.

Last year the Pink party won the election, having three of the five representatives elected. The total number of votes cast was 190 000.

What is the minimum number of votes that the Pink party could have received last year?

- A** 12 000
- B** 30 000
- C** 60 000
- D** 85 000

- 23** A boy has the same number of sisters as brothers, but each of his sisters has only half as many sisters as brothers.

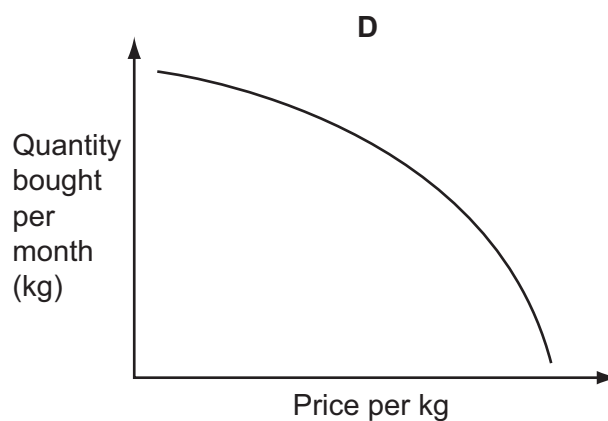
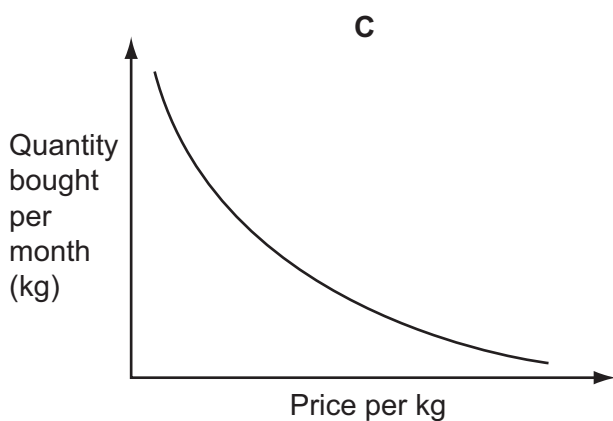
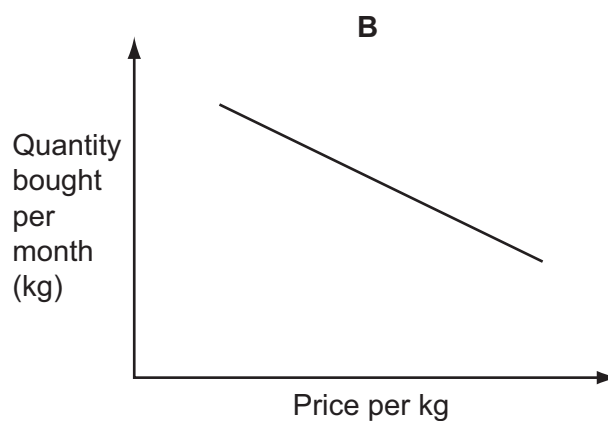
How many brothers and sisters are there altogether?

- A** 3
- B** 4
- C** 5
- D** 7

- 24 The table below shows the average monthly price of potatoes facing consumers and the monthly expenditure (to the nearest \$1000) on potatoes in the main market of a city.

Month	September	October	November	December	January	February
Price per kg	\$0.70	\$0.90	\$0.50	\$1.30	\$2.30	\$3.00
Expenditure	\$25 000	\$24 000	\$24 000	\$24 000	\$25 000	\$26 000

Which one of the following graphs, with suitable scales added to the axes, would best illustrate the relationship between the price of potatoes and the quantity in kilograms bought by consumers?





- 25 I need to make some photocopies ready for a meeting next week and I have been given these prices by the local company.

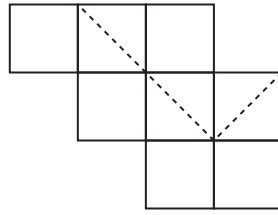
<i>Number of copies</i>	50	100	200	500	1000
<i>Price (\$)</i>	25	30	40	45	70

Prices for photocopying are calculated from a cost per sheet and may also include a fixed charge for the service. Sometimes there is an offer that the price is reduced when the order is more than a certain amount. In such cases the reduced price applies to all copies in the order.

Which of the following could describe the way in which the prices for photocopying are determined?

- A No fixed charge for the service and a reduction in the price per sheet if the order is more than 250 copies
- B A fixed charge for the service and a reduction in the price per sheet if the order is more than 250 copies
- C A fixed charge for the service, but the fixed charge is not applied if the order is more than 250 copies
- D A fixed charge for the service and a percentage reduction on the overall price if the order is more than 250 copies

- 26 Kaye is making a new logo for her company. She makes the shape below by gluing together 8 squares and then she cuts along the dashed line.



She separates the two pieces, paints them grey on both sides and waits for them to dry. Then she rearranges them, without overlapping.

Which of these designs can she **not** make?

**A**



**B**



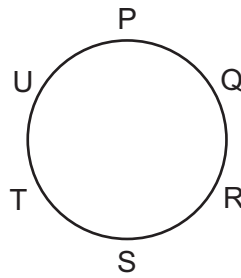
**C**



**D**



- 27 At a dinner, for the main course six guests were seated around a table as shown in the plan view below, with P directly opposite S, Q directly opposite T and R directly opposite U.



After the guests stood up to fetch their dessert, they sat down so that no one was sitting immediately next to anyone that they were previously sitting next to.

Which statement regarding their new seats is true?

- A P cannot be sitting directly opposite Q
  - B Q cannot be sitting directly opposite S
  - C R cannot be sitting directly opposite U
  - D S cannot be sitting directly opposite R
- 28 Recently a law was passed in Bolandia meaning that it is no longer necessary for a customer to be given change for a purchase if he or she cannot provide the exact money. Bolandian coins are available with values of 1¢, 5¢, 25¢, 50¢ and \$1. Accordingly, Frank adjusted his prices to make sure that paying the exact amount would always require at least six coins. On Monday his first customer bought one item, priced below \$2, but had only 50¢ and \$1 coins with him.

What is the maximum possible extra profit that Frank could have gained on this item as a result of the policy of not giving change?

- A 41¢
- B 42¢
- C 46¢
- D 49¢

- 29** Jake owns a convenience store. Two weeks ago he introduced an offer on packets of pasta. They are sold at \$3.60 each, but three can be bought for \$10. In the second week of the offer he sold more packets of pasta than the first week, but received less money in payment overall for sales of pasta. No customer bought more than three packets of pasta in either week.

What is the smallest number of extra customers that could have taken advantage of the offer in the second week for this to happen?

- A** 1
- B** 2
- C** 4
- D** 5

- 30** There are three bus services that run from the bus stop at the end of my street and go to the city centre. As they all take different routes, they take different lengths of time. The quickest bus takes 25 minutes, while the others take 35 and 55 minutes.

All of the bus services leave every 30 minutes and I am able to catch a bus from the end of my street every 10 minutes starting from 8am, but I cannot remember in which order the buses arrive. I need to meet a friend at 10:50 in the city centre.

What is the latest time I could arrive at the bus stop and still be sure to get to the city centre in time?

- A** 09:50
- B** 10:00
- C** 10:10
- D** 10:20

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