



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

THINKING SKILLS

9694/01

Paper 1 Problem Solving

For Examination from 2011

SPECIMEN PAPER

1 hour 30 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.

INFORMATION FOR CANDIDATES

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

This document consists of **18** printed pages.



- 1 Next leap year my birthday is on a Friday 13th.

What is the chance that the month it is in has five Sundays?

- A 30 in 366
- B 1 in 7
- C 2 in 7
- D 11 in 12
- E certain

- 2 An amateur drama company is putting on a production of a musical. They have their own hall, which seats 100 people and where they charge \$4.00 for a ticket. The local arts theatre seats 300 and costs \$480 a night to hire. The facilities at the arts theatre are better, so the company can charge \$4.50 for a ticket there. All other expenses are equal in the two venues and have been covered already.

If they use the arts theatre, how many tickets would the company need to sell on any given night to ensure they make more profit than if using their own hall? [Profit = income minus costs.]

- A 18
- B 89
- C 196
- D 220
- E 221

- 3 In Bankland the banks are closed on two successive days, but not on Saturday and Sunday. You can deposit cheques with the cashier or, when the banks are closed, at the box outside the bank.

Cheque processing always starts on the first working day after the cheque is deposited. The bank always processes it within the same number of working days.

When you deposit a cheque on Monday the bank will then process the cheque and the money will be available on Sunday. When you deposit a cheque on Wednesday the money will be available on Monday. When you deposit a cheque on Friday the money will be available on Tuesday.

The weekend falls on:

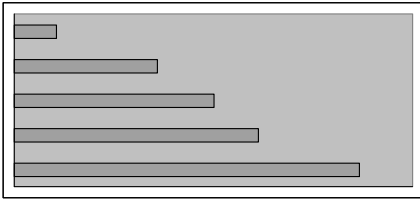
- A Monday and Tuesday.
- B Tuesday and Wednesday.
- C Wednesday and Thursday.
- D Thursday and Friday.
- E Friday and Saturday.

- 4 In an election for the President of the Student Union, the votes gained by each of the candidates are:

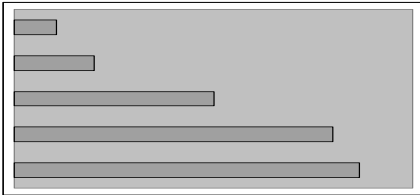
Stephen Armstrong	367
Jenny Cox	215
Dominic Foley	64
Petra Kennedy	520
Stephanie Palmer	300

Which one of the following charts, suitably labelled, accurately displays this result when the candidates' votes are put in ascending order?

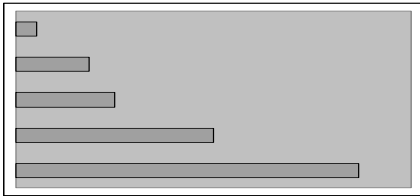
A



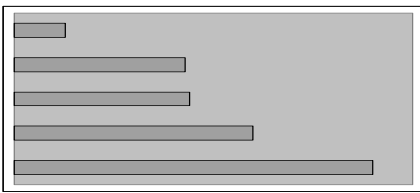
B



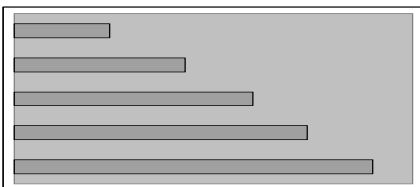
C



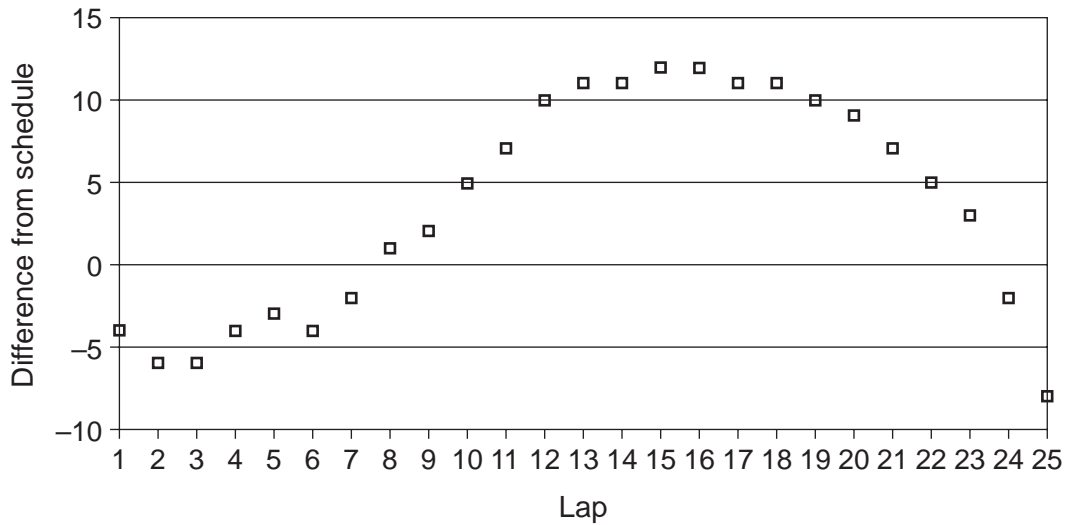
D



E



- 5 The runner Sven Hashmi recently tried to break his country's 10 km running record of 27 min 30 sec. In order to achieve this he had to run at an average time of better than 66 seconds for each 400 m lap. His **cumulative** progress is shown in the graph below. An entry of 4 means he was 4 seconds behind the schedule after the lap shown, whilst -2 means he was 2 seconds ahead of the schedule at that point.



How much ahead of the schedule did he run for the last 2000 m?

- A 5 seconds
 B 8 seconds
 C 9 seconds
 D 17 seconds
 E 19 seconds
- 6 A painter is given the task of painting numbers on the doors in a street. There are one hundred houses.

How many times does he need to paint the number 7?

- A 10
 B 11
 C 19
 D 20
 E 21

- 7 The table below shows the exchange rate for the Bol (B) and Uno (U) against the Dollar (\$) from January to December.

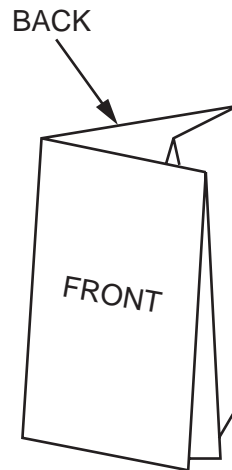
	<i>January</i>	<i>March</i>	<i>June</i>	<i>September</i>	<i>December</i>
<i>B per \$</i>	1.8	2.1	2	1.5	1.8
<i>U per \$</i>	1.2	1	1.5	2	1.2

\$1000 is invested in the currency market over this one year period, exchanging between the three currencies. Money can be changed into Bols or Unos in January, March, June, September and December.

Ignoring commission, what is the maximum amount of Dollars that could have been generated by December?

- A \$2000
- B \$2222
- C \$2333
- D \$2800
- E \$3150

- 8 A brochure is to be made by folding a sheet of A4 size paper as shown below. The paper is printed on both sides before folding.



Which one of the layouts below shows the correct positions of the front and back page?

A

		BACK
top		top
FRONT		

B

	BACK	
top	top	
FRONT		

C

top	top	
FRONT	BACK	

D

	top	top
	BACK	FRONT

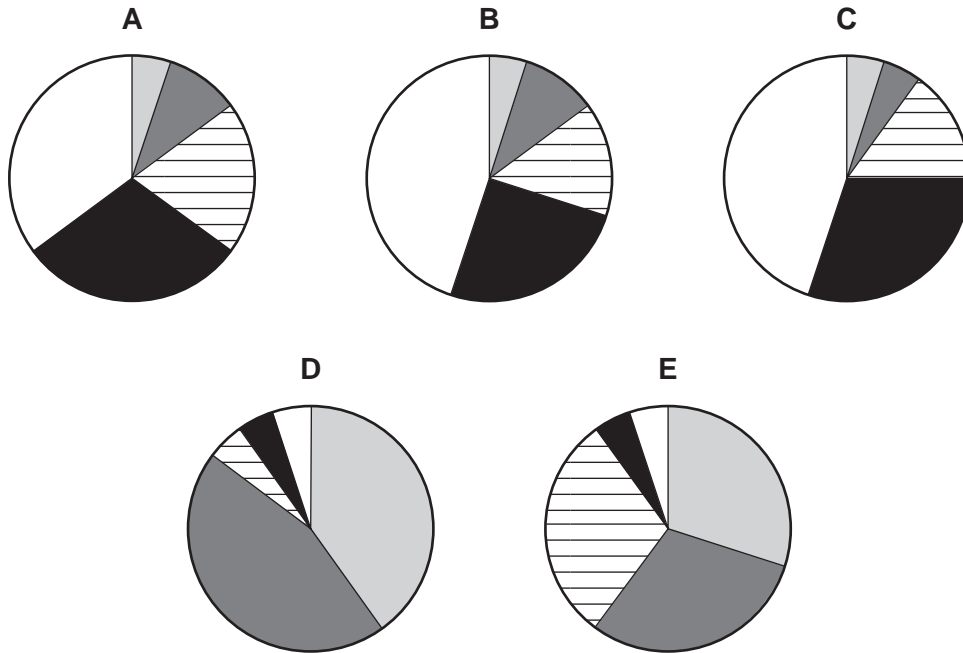
E

	BACK	
	top	top
		FRONT

- 9 In a general election in Eastavia, the percentage of the vote gained by each party was as follows:

Alliance	35%
Popular Front	30%
Anti-Reform Party	20%
Progressives	10%
United Reformers	5%

Which one of the following pie charts (suitably labelled) could represent this data?



- 10 A school teacher has no exercise books left, having just issued every student with one. The books contain 72 pages and are kept in the classroom so that they do not get lost.

The teacher sees his lower school students four lessons a week and the hardest working students use at most 2 pages in each class.

Upper school students attend classes three times a week and the most any student ever fills is 3 pages in each class. Books take two weeks to receive from ordering.

What is the longest time the teacher can wait before ordering fresh books?

- A 4 weeks
- B 5 weeks
- C 6 weeks
- D 7 weeks
- E 8 weeks

- 11 Peter travels to work by train and bus every day. He starts work at different times each day, but sometimes on the hour or sometimes at half past the hour. He gets to the train station 45 minutes before he is due at work and the train journey takes 20 minutes, after which he takes a bus from the station to work which takes 10 minutes. The train leaves every 20 minutes, starting on the hour. Some days Peter finds that he gets to work 5 minutes early. On all the other days he finds that he gets to work 5 minutes late.

Which one of the following could explain the times that Peter arrives at work?

- A The buses leave at 5 and 35 past each hour.
 - B The buses leave at 15 and 45 past each hour.
 - C The buses leave at 25 and 55 past each hour.
 - D The buses leave at 5, 25 and 45 past each hour.
 - E The buses leave at 15, 35 and 55 past each hour.
- 12 Harry lives at the top and Joe lives at the bottom of a hill 6 km long. Each Saturday they meet at a bench on the hill somewhere between their houses. They find that, if they both leave their houses at 10 am, they arrive at the bench at the same time. They both walk at 2 km/hr uphill and 6 km/hr downhill. After talking for an hour they each return home.

How much earlier does Joe arrive home than Harry?

- A They arrive at the same time.
 - B Joe arrives $\frac{1}{2}$ hour before Harry.
 - C Joe arrives 1 hour before Harry.
 - D Joe arrives $1\frac{1}{2}$ hours before Harry.
 - E Joe arrives 2 hours before Harry.
- 13 A 'guess the number of sweets' competition at a village fair only had five entries, and there was some surprise that Angela had got the number exactly right.

She had simply estimated the number of sweets across the base and up the side of the full, tall, square-based jar and calculated her answer from these figures.

These were the entries. How many sweets were there in the jar?

- A 343
- B 595
- C 612
- D 667
- E 726

- 14** A system of lifts takes people from the ground-floor of a sky-scraper to a top-floor restaurant. They can each carry a maximum of five people. A lift leaves the ground floor once a minute on the minute (i.e. one leaves at 12.00 exactly and then at 12.01 exactly and so forth). The following table shows when the diners arrived at the lifts.

<i>Time</i>	<i>Number</i>
12.00 – 12.01	10
12.01 – 12.02	3
12.02 – 12.03	2
12.03 – 12.04	1
12.04 – 12.05	8
12.05 – 12.06	11
12.06 – 12.07	5
12.07 – 12.08	9
12.08 – 12.09	3

Given that this represents the entire group of people eating at the restaurant, when did the last diner leave the ground floor in a lift?

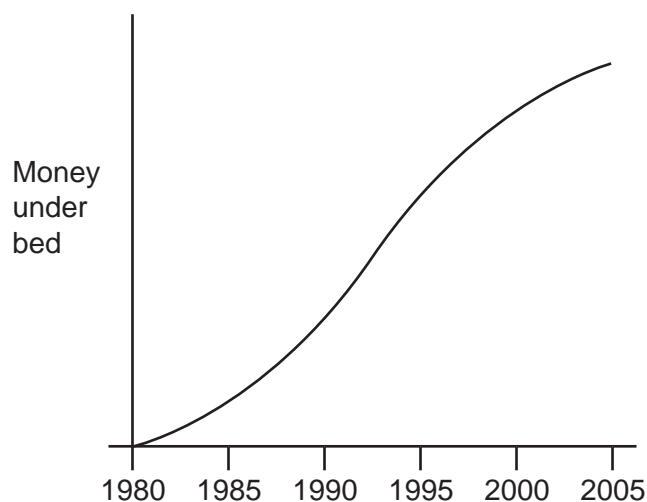
- A** 12.09
- B** 12.10
- C** 12.11
- D** 12.12
- E** 12.13

- 15 Ted needs to transport several boxes to his two friends. He has 7 boxes belonging to Alex and 8 boxes belonging to Chris. Chris also has 4 boxes at his house that belong to Alex, and Ted has agreed to move them as well. All of the boxes are the same size and Ted can fit 5 boxes in his car for each journey. The distance between houses is given in the table:

Between	Ted and Alex	Ted and Chris	Alex and Chris
Distance (miles)	3	5	2

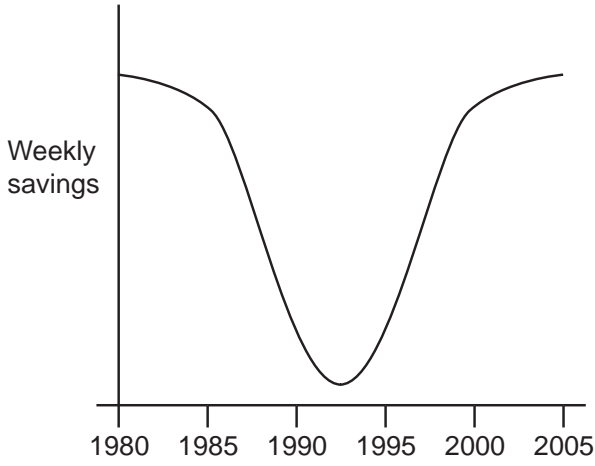
What is the shortest distance that Ted will need to drive to move all of the boxes and get home?

- A 18
 B 26
 C 30
 D 32
 E 36
- 16 Ian started saving in 1980 by putting money under his bed. He counted it every week and plotted his total savings. His graph looked like the one below.

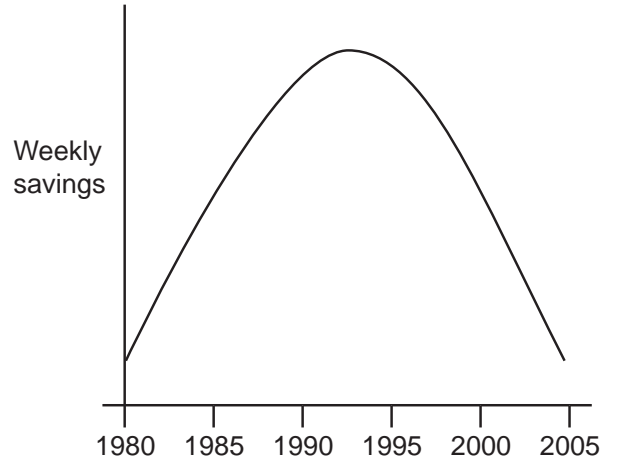


Which of the diagrams on the page opposite (not necessarily to the same scale) shows the weekly additions to his savings over the same period?

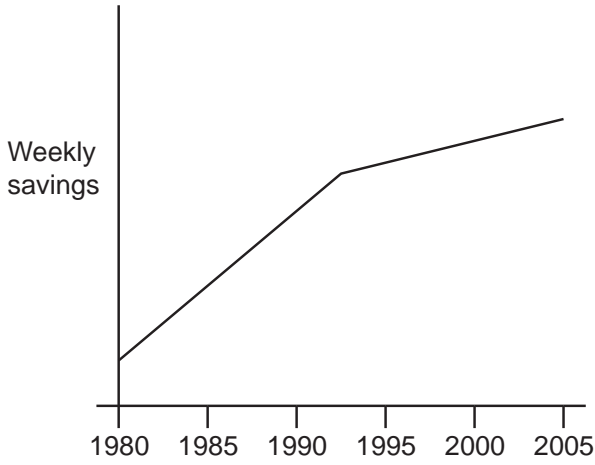
A



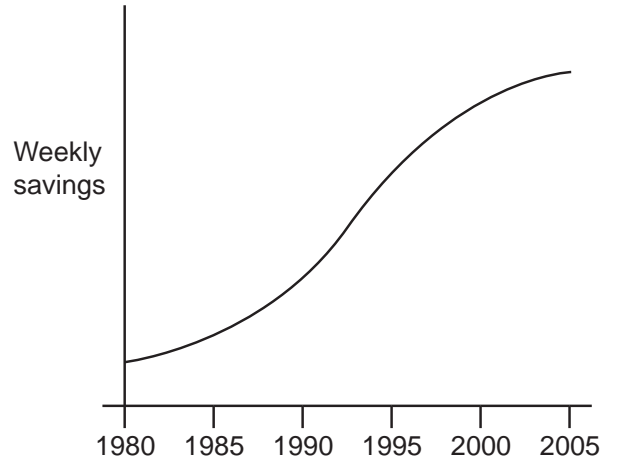
B



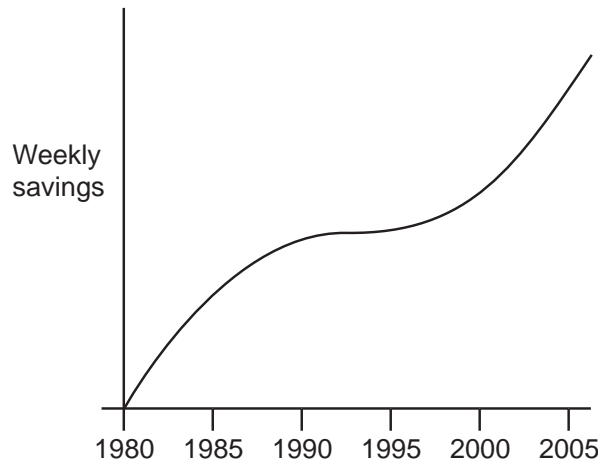
C



D



E



- 17 The staff and students at Denton College have collected 40 boxes of books to give to the charity Books for Africa. Mr Spencer has to transport all the boxes himself 50 km to the charity's distribution depot. He wants to spend as little money on petrol as possible to do this and has three vehicles he can use.

He can get 8 boxes in his own car and the return journey will cost \$14.

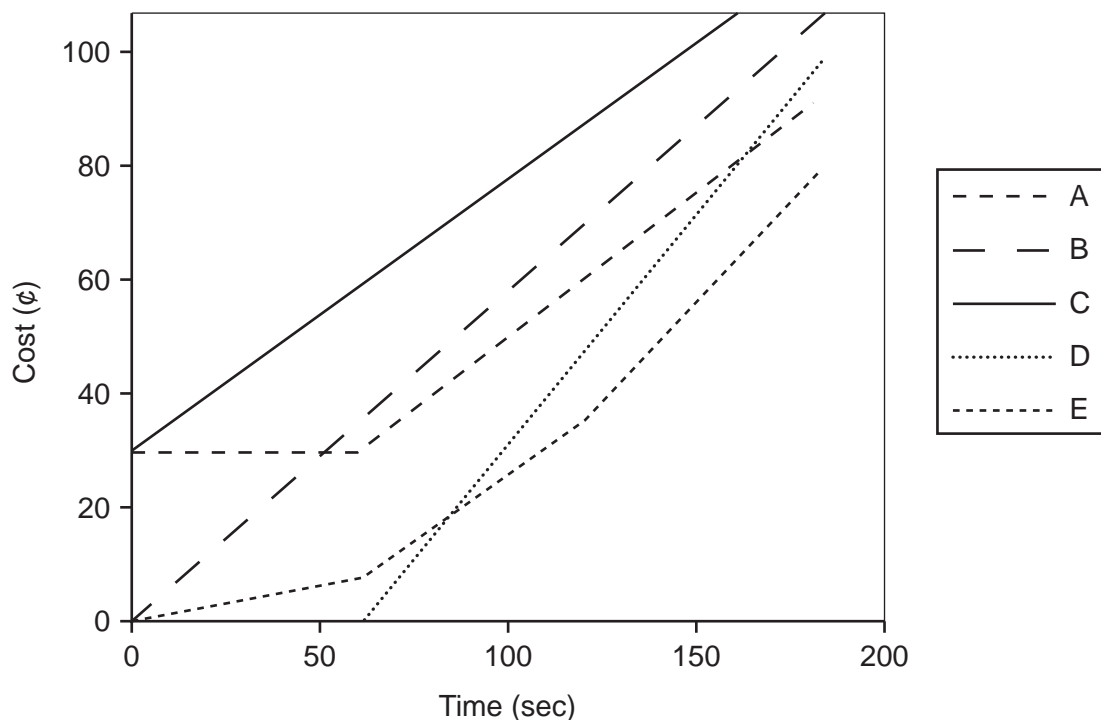
He can get 15 boxes in the school mini-bus and the return journey will cost \$23.

He can get 18 boxes in his friend's van and the return journey will cost \$28.

What is the lowest cost of transporting the 40 boxes, using any combination of these vehicles?

- A \$56
 B \$60
 C \$65
 D \$69
 E \$70
- 18 A mobile telephone company charges for its calls at 30¢ for the first minute then 0.5¢ per second.

Which line in the graph below represents this charge scheme?



- 19 160 boxes of copier paper have been delivered to the office block in which I work. I have been instructed to move them all from the ground floor to the storeroom on the 9th floor.

Each box weighs 12.5 kilograms, and I weigh 83 kilograms. The lift has a load limit of 400 kilograms.

There is nobody available to help me, and I do not intend to use the stairs at all.

Assuming that I have the lift to myself throughout, how many trips up to the 9th floor will I have to make?

- A 5
- B 6
- C 7
- D 8
- E 9

- 20 I want to give a gift to each person who is coming to my party. I can make the gifts from three types of component which I can order from a local shop. Each one requires 1 base, 1 centre piece and 2 handles. I have 53 people coming to the party, but I ordered enough materials to make 60 gifts. Unfortunately the shop got the numbers of centre pieces and handles the wrong way round. When I realised, I was only able to buy 16 extra handles at the shop in time for the party.

How many guests would **not** be able to have a gift?

- A 7
- B 8
- C 15
- D 22
- E 23

- 21 A school is arranging a trip to the zoo for a class. A teacher and a classroom assistant will travel with them but some extra adults will be needed, so parents will be asked to volunteer. The safety rules for trips state:

'There must be at least one adult for each 6 children aged seven or over, at least one adult for each 4 children under the age of seven, plus two extra adults to cope with any emergencies.'

The class has a mix of ages; there are 12 children who are 6 years old and 16 children who are 7 years old.

At least how many parents are needed to travel with the class?

- A 4
 B 5
 C 6
 D 7
 E 8
- 22 A group of nine friends go to play a game of Ten Pin Bowling. They each need to hire a pair of shoes specially designed for the surface they play on.

Unfortunately, the bowling alley does not have the correct size shoe for all the friends. The shoe sizes available are shown in the table below.

<i>Shoe size</i>	6	8	9	11
<i>Number of pairs available</i>	3	2	2	3

The nine friends and their shoe sizes are shown below.

<i>Friend</i>	Alan	Bob	Carl	Don	Eva	Fred	Greg	Hank	Ivan
<i>Shoe size</i>	5	6	6	7	9	10	10	6	7

What is the maximum number of friends who will receive at most one size too big?

- A 3
 B 5
 C 6
 D 8
 E 9

- 23** Mr Jones teaches AON students at two levels and also teaches IGCSE students. In a single class the number of students must be between 15 and 25. The students of two AON levels can be enrolled in the same class. Mr Jones is paid \$25.96 per hour. He has 1 hour per week with each group of AON students and 4 hours per week with each group of IGCSE students.

The number of AON level 1 students: 183
 The number of AON level 2 students: 110
 The number of IGCSE students: 31

How much does Mr Jones earn per week from the classes?

- A** \$337.48
B \$363.44
C \$389.40
D \$519.20
E \$545.16
- 24** In a survey carried out on a group of 11 to 18 year-olds it was reported that 80% owned a personal stereo and 50% owned a bicycle.

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

- A** Half of those having a personal stereo also had a bicycle.
B All those surveyed had either a personal stereo or a bicycle.
C Half of those who had a bicycle did not have a personal stereo.
D 1 in 5 of those surveyed had neither.
E At least 30% had both a bicycle and a personal stereo.
- 25** Four men had to travel from one town to another, one hundred kilometres apart. There are five transport firms who all adopt different pricing policies.

Bus Company 1: Fixed price ticket \$28 each.
 Bus Company 2: Minimum charge for each passenger \$15 + \$1.20 for every 10 km travelled by each passenger.
 Railway: \$3 each for every 10 km travelled.
 Taxi: \$10.50 for every 10 km travelled (a single price covering everyone in the taxi).
 Airline: \$40 per person but a 40% discount for a group booking of 4 or more.

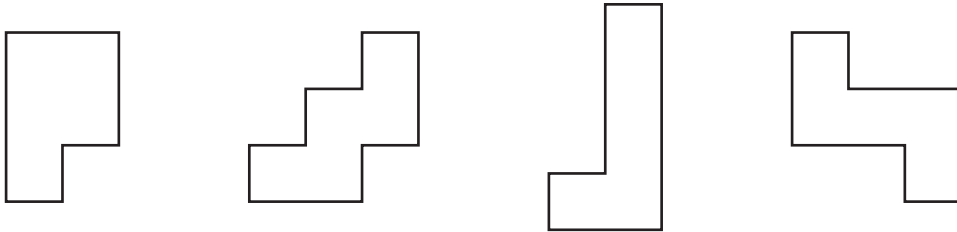
What is the lowest total cost to get the four men from one town to another?

- A** \$27
B \$28
C \$96
D \$105
E \$108

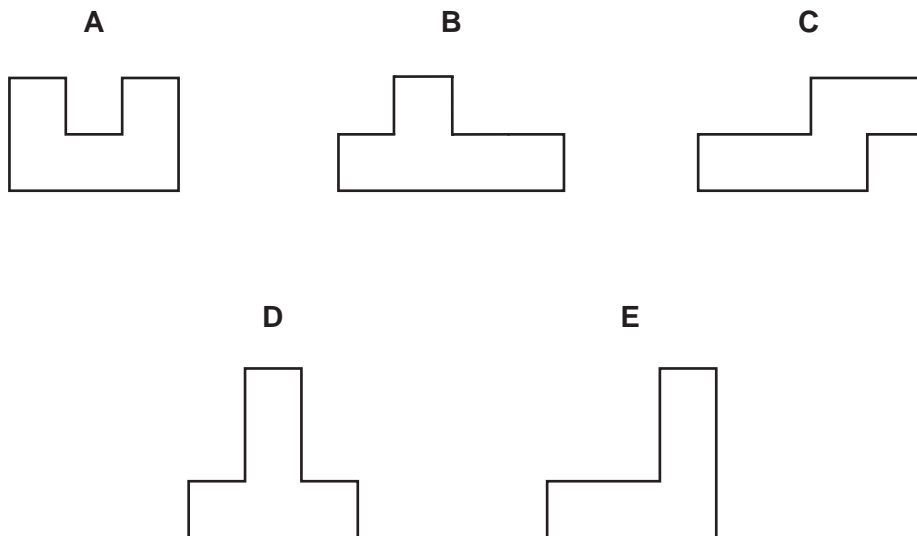
- 26 My daughter has a puzzle that consists of five pieces, each shaped differently but all with the same area, that can be fitted together to create a square.

Unfortunately she has lost one of the pieces.

These are the pieces that she still has:



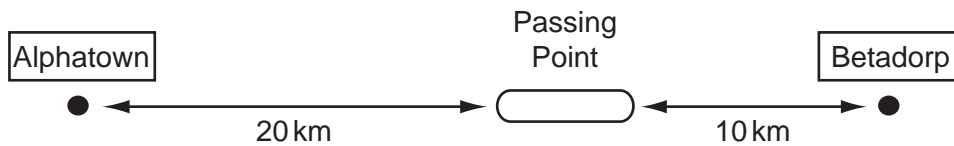
What is the shape of the missing piece? (Pieces may be rotated, but not turned over.)



- 27 There were 60 delegates waiting for taxis to the railway station after a conference and there was an hour until the last train left. Unfortunately, there were only four taxis operating that day and ready at the conference centre, all of different sizes. One taxi could take three people, one could take four, one could take five and the last one could take six people. The round trip from conference centre to the station and back takes twenty-five minutes. The journey takes the same time in both directions.

How many delegates missed their train?

- A 6
- B 18
- C 24
- D 36
- E 42



Two trains, running in opposite directions along a single line track between Alphatown and Betadorp, have to pass one another at the Passing Point. This Passing Point is no longer than necessary for the trains to pass.

The distances of the Passing Point from the towns are shown on the diagram. Train X leaves Alphatown 20 minutes before a second train Y leaves Betadorp. Train Y travels at an average speed of 60 kilometres per hour (km/h).

What average speed will train X have to travel at to ensure that neither train has to wait at the Passing Point?

- A 24 km/h
 - B 30 km/h
 - C 40 km/h
 - D 48 km/h
 - E 60 km/h
- 29 Romeo and Juliet both sat the same 25-question multiple choice English Literature examination paper. Immediately afterwards they discussed the paper and came to the conclusion that they both had the same number of correct answers. However, Romeo had run out of time and not managed to attempt the last 3 questions, whereas Juliet had answered all 25.
- When the results were announced Juliet's mark was 31 out of 50 but Romeo's was 34.
- Assuming that they really did answer the same number of questions correctly, which one of the following could **not** explain the difference in their marks?
- A Correct answers were awarded 2 marks each, but 1 mark was deducted for each incorrect answer.
 - B Correct answers were awarded 2 marks each, but 1 mark was deducted for each incorrect answer and each unattempted question.
 - C Some correct answers were awarded 1 mark, some were awarded 2 marks and some were awarded 3 marks, with no penalties for incorrect answers or unattempted questions.
 - D Some correct answers were awarded 1 mark, some were awarded 2 marks and some were awarded 3 marks, but 1 mark was deducted for each incorrect answer.
 - E Some correct answers were awarded 1 mark, some were awarded 2 marks and some were awarded 3 marks, but 1 mark was deducted for each incorrect answer and each unattempted question.

30 Two friends encode the text messages they send to each other on their mobile phones so that no one else can read them. The encoding system, used for each letter in turn of the message, is as follows:

1. Replace each letter by its equivalent with the alphabet reversed; so A becomes Z, B becomes Y, C becomes X, etc.
2. Replace each letter resulting from operation 1 by a two digit number according to its place in the alphabet; so A becomes 01, B becomes 02, etc.

What is the coded form of the word FOLIO?

- A** 1218151221
- B** 1221518121
- C** 2112151812
- D** 2118152112
- E** 2181512112