THINKING SKILLS   **9694/13**

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

                                            1 hour 45 minutes

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

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

There are **30** questions on this paper. Answer **all** the questions.

For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in pencil on the separate answer sheet.

Read very carefully the instructions on the answer sheet. Ignore responses numbered 31–40 on the answer sheet.

DO **NOT** WRITE IN ANY BARCODES.

INFORMATION FOR CANDIDATES

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

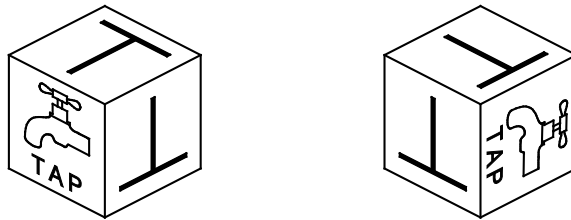This document consists of **16** printed pages.

Cambridge
International Examinations

[Turn over

1 Every Monday, while he is at work, Jeremy leaves his washing machine on to wash any shirts that need washing. He wears a clean shirt every day.

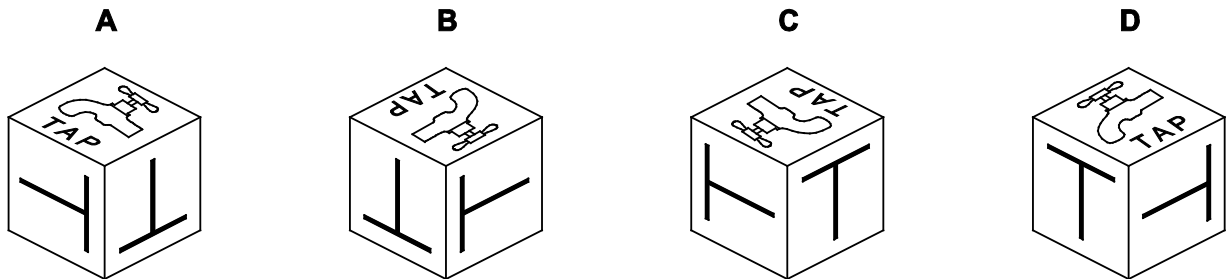How many shirts does Jeremy need?

A 6

B 7

C 8

D 9

2 Each of the cubes in a child's set of building blocks has the same letter of the alphabet on five of its faces and a picture of an object beginning with that letter on the sixth face.

Below are two views of the cube that features the letter T.

Which one of the following is another view of the same cube?

A	B	C	D

3 Daphne has been doing jobs for her parents at weekends and they have been paying her for what she does. She chose which jobs to undertake from the list below.

Job	Time taken to complete job	Payment
Washing car	1 hour 30 minutes	$6
Scrubbing kitchen floor	2 hours	$8
Supermarket shopping	3 hours	$12
Laundry	5 hours	$21
Vacuum cleaning and tidying	7 hours	$30

Daphne has been choosing which jobs to do purely on the basis of earning the most money possible. She must choose complete jobs – she cannot do part of one. In the interest of her education her parents will not allow her to work for more than eight hours any weekend.

This weekend another job is added to the list above – making breakfast for parents, taking one hour with a $4 payment.

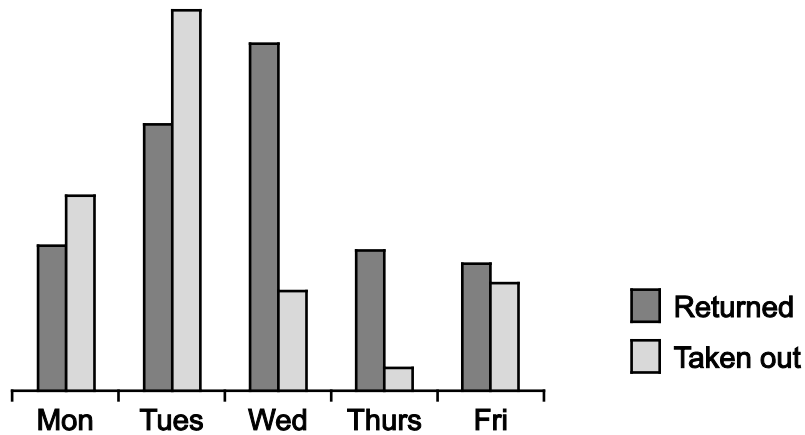How much **more** will Daphne earn this weekend compared to last weekend?

A $1

B $2

C $3

D $4

4 500 people were interviewed and asked their opinion about redeveloping the railway station. Unfortunately, when a journalist received the data for publication, some data were missing. The table he received is shown below.

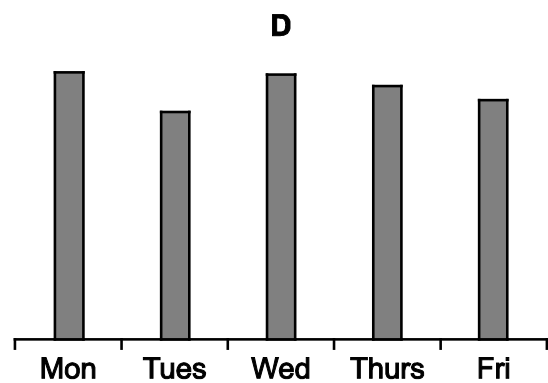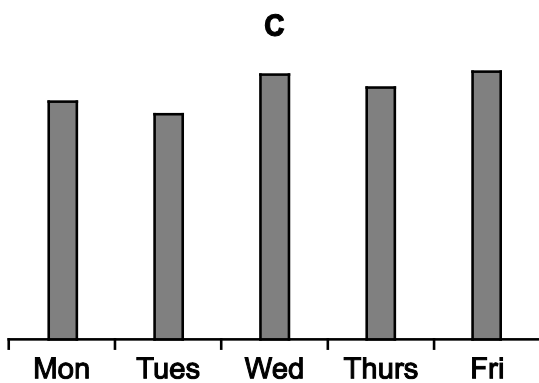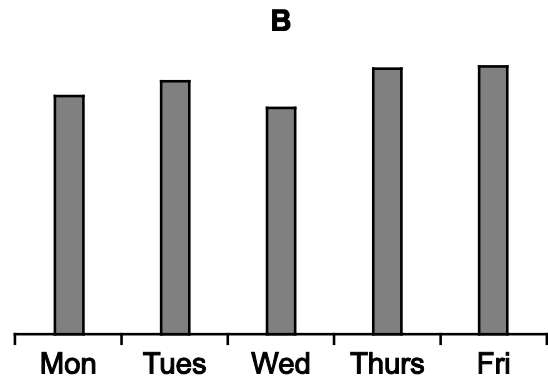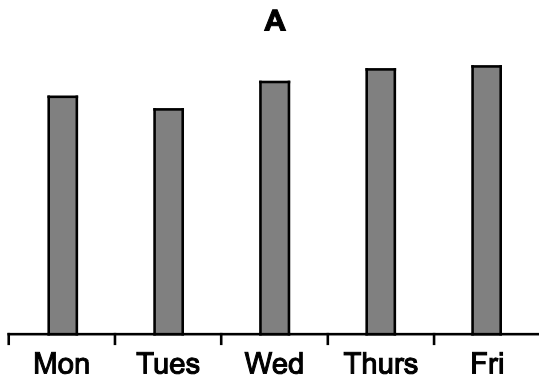| Gender	For	Against	Unsure
Male	123		37
Female	95	86	26
Total	**218**		

How many people in total voted against the development?
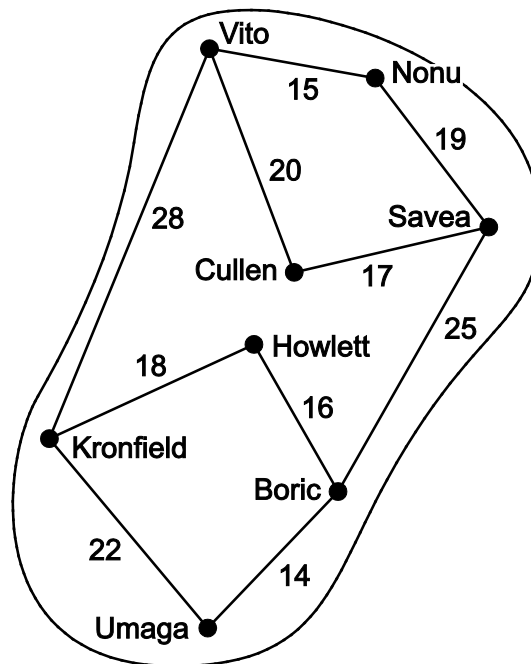
A 133

B 176

C 219

D 282

5 A small school library recorded the number of books returned and taken out each day during one week. These are shown in the following graph.

■ Returned
□ Taken out

Which one of these graphs, if suitably labelled, could show the total number of books present in the library at the end of each day during that week?

A

Mon Tues Wed Thurs Fri

B

Mon Tues Wed Thurs Fri

C

Mon Tues Wed Thurs Fri

D

Mon Tues Wed Thurs Fri

6 This map represents the only roads that currently connect the eight towns on the island of Toutnoir, and the distances in kilometres between neighbouring towns by road.

Work has started recently on the construction of a road between Cullen and Howlett which, when completed, will be 9 km long.

By how much will the shortest distance by road between Vito and Boric be reduced when the new road is opened?

A 14 km

B 17 km

C 19 km

D 23 km

7 In a game, Fred randomly selects two different whole numbers in the range 1 to 5, writes them on different pieces of paper and, at random, places one of them face up and the other face down. There are 20 different ways that this can be done. Margaret then guesses which piece of paper has the higher number written on it, and wins the game if she is correct. Her strategy for guessing is to say that it is the hidden number if she sees 1 or 2, and the visible number if she sees 3, 4 or 5.

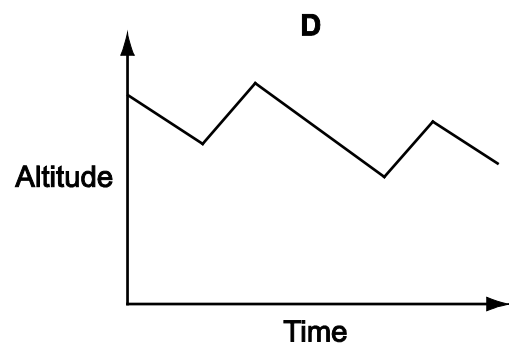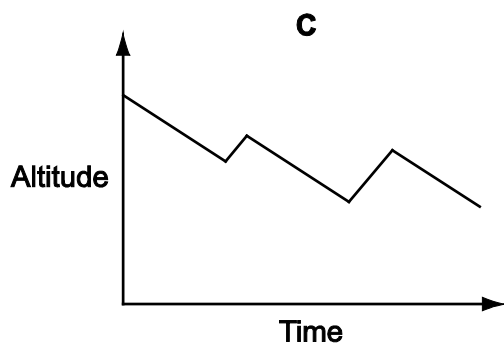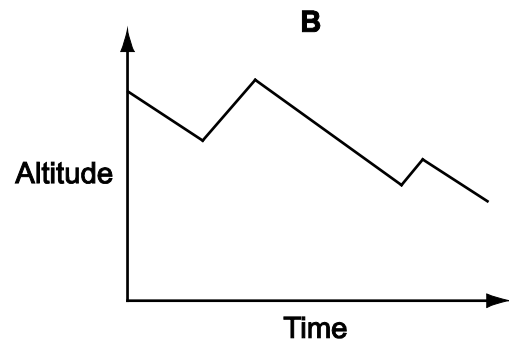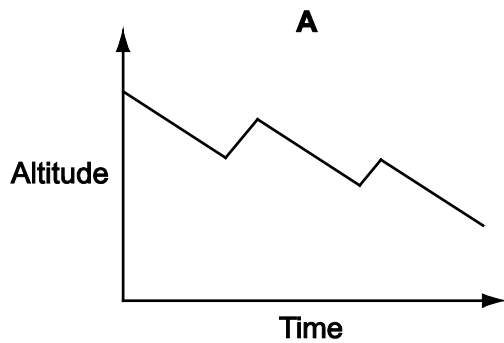How many of the 20 ways result in a win for Margaret?

A 10

B 12

C 15

D 16

8 Gliders are aeroplanes without engines which are flown by enthusiasts. The gliders are taken up into the sky by a motorised plane, then released and allowed to glide down to the ground. To rise in altitude, and therefore stay in the air longer, pilots look for thermals (which are columns of rising air).

A glider is taken to a height of 2000 m by an aeroplane. When gliding, it loses height at a rate of 50 m per minute. When in a thermal it rises at a rate of 100 m per minute.

After being released by the aeroplane, the pilot glides for 10 minutes, then encounters a thermal which causes him to rise for 3 minutes. He glides down for a further 12 minutes, then meets a second thermal which allows him to rise for 2 minutes, after which he glides down to the ground.

Which one of the following graphs best represents his altitude as a function of time?
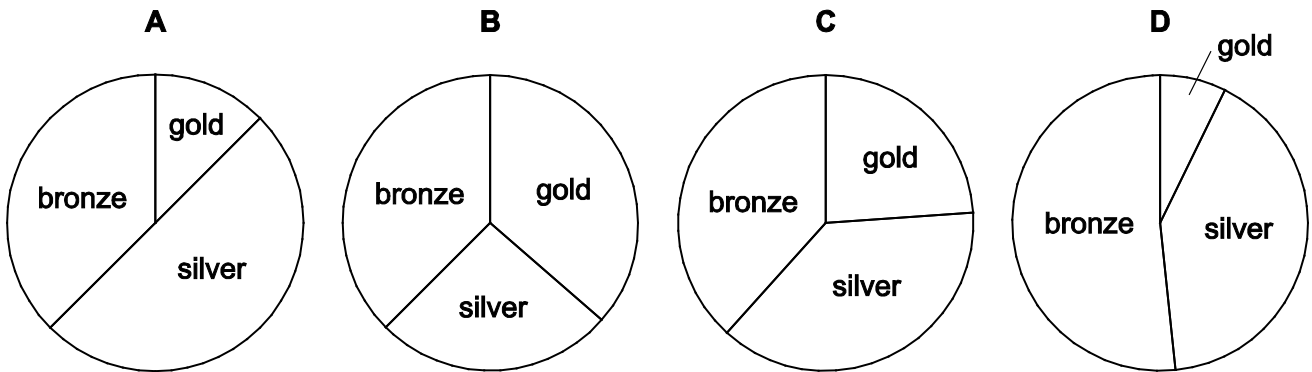
A

Altitude

Time

B

Altitude

Time

C

Altitude

Time

D

Altitude

Time

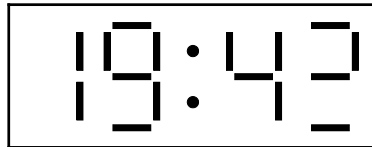**9** The Joynuzz Club has three categories of membership, as follows:

Gold membership — annual subscription $70
Silver membership — annual subscription $50
Bronze membership — annual subscription $30

This year the club has 15 gold members, 84 silver members and 105 bronze members, all of whom have paid the appropriate subscription.

Which of the following pie charts shows the club's income from this year's subscriptions according to membership category?

10 Visiting a friend yesterday evening, I noticed that the display on her digital clock was showing

She told me that two of the elements of the last digit had stopped working.

Which of the following could **not** have been the appearance of the last digit one minute later?

 [Turn over

11   A tug-of-war team is made up of eight people.

The following team was announced to represent the Titans at the Pullard Tug-of-War Championships:

Name	Weight
Jason Cunningham	86.1 kg
Ralph Evans	79.7 kg
Vincent Hoult	85.0 kg
Rory Hughes	91.6 kg
Ian Matheson	89.2 kg
Martin Mullan	78.4 kg
Luke Walker	81.8 kg
Liam Worthington	86.6 kg

Reserves

David Cox	82.8 kg
Phil Houston	77.3 kg
Robin McKee	88.1 kg
Adrian Young	80.4 kg

Shortly before the event, Ian Matheson was forced to withdraw from the team due to injury and had to be replaced by one of the reserves. As a result, the average weight of the eight-man team was reduced by 1.1 kg.
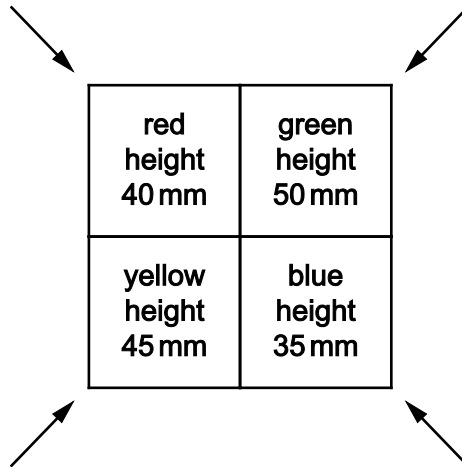
Who was Ian Matheson's replacement?

A   David Cox

B   Phil Houston

C   Robin McKee

D   Adrian Young

12   Andrea has just received her examination results. She took 6 examinations, getting different marks in all of them, but she was particularly pleased with the mark of 70 she was awarded in Biology. Her best score was 5 marks higher than the next best, which was 5 marks higher than the next, and this 5-mark difference continued down to her lowest mark.
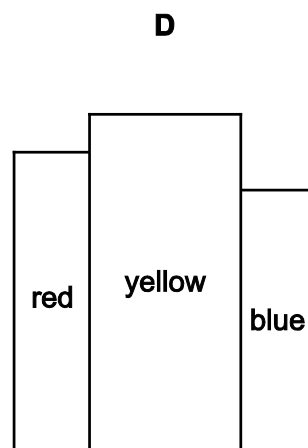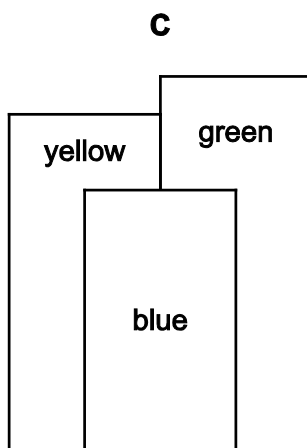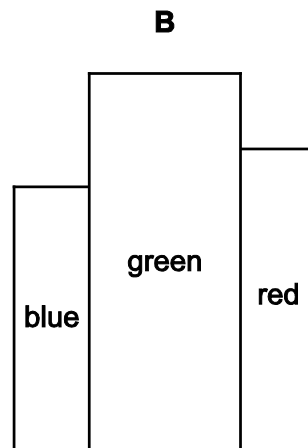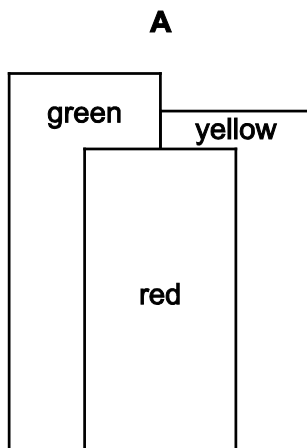
Which one of the following pieces of extra information may **not** be sufficient to allow the calculation of all her marks?

A   The average of the marks

B   The sum of all the marks

C   The sum of the highest and lowest marks

D   Four of the individual paper marks

13 Chris has some coloured, square building blocks. She builds four columns, each of a different colour and height as shown in the diagram (seen from above). The completed structure can be viewed from four different positions as shown by the arrows.

red height 40 mm	green height 50 mm
yellow height 45 mm	blue height 35 mm

Which of these is **not** a possible view of the columns?

A

green
yellow
red

B

green
blue
red

C

yellow
green
blue

D

red
yellow
blue

 [Turn over

14 Pippa, Qayla, Rebecca and Sharifah are making cookies according to the recipe below.

To make 30 cookies:

200 g butter
100 g sugar
300 g flour

This table shows the amounts of each ingredient that each person has.

	Pippa	Qayla	Rebecca	Sharifah
Butter (g)	100	200	200	100
Sugar (g)	100	50	100	150
Flour (g)	150	200	100	200

Which one of the following **pairs** of people, combining their ingredients, can together make the most cookies?

A Qayla and Rebecca

B Qayla and Sharifah

C Pippa and Rebecca

D Pippa and Sharifah

15 In the game of neo-football teams gain points by scoring either *perfgoals* or *ordgoals*. Perfgoals give a team more points than ordgoals, and unless a team scores at least one perfgoal in a game then it scores zero in that game overall. This latter rule meant that last Saturday, despite scoring 8 ordgoals, dominating the game and narrowly missing perfgoals on four occasions, Aphids lost to a weak Wasps side. The points scored in this game and the other games played last Saturday were

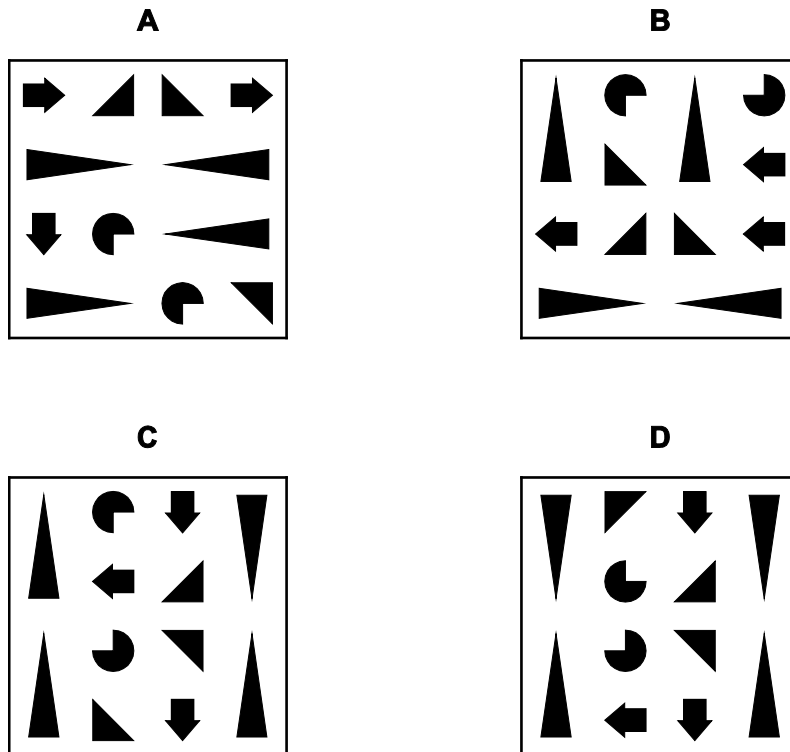| Aphids	0	Wasps	11
Lambs	23	Sheep	11
Mosquitos	22	Worms	21
Ladybirds	19	Moles	15
Locusts	14	Slugs	18

Which one of the following could explain these scores?

A A perfgoal scores 6 points, an ordgoal 5 points

B A perfgoal scores 7 points, an ordgoal 4 points

C A perfgoal scores 8 points, an ordgoal 3 points

D A perfgoal scores 9 points, an ordgoal 2 points

16 A puzzle has three pieces, onto which some shapes have been glued. The pieces each need to be turned over and fitted into a block, which has holes made in it for the shapes to fit into. The three pieces to be fitted into the block are as follows:

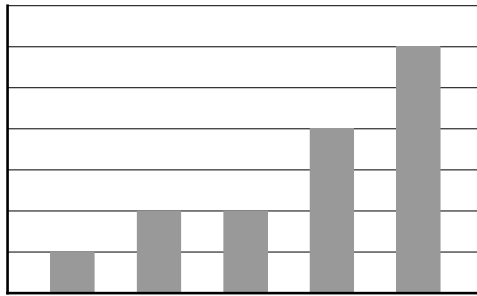Which of the following could show the block into which the pieces are placed?

A

B

C

D

17 Indigo is going to spend her holiday walking 250 km for charity. On Mondays, Wednesdays and Fridays she will walk 20 km each day. On Tuesdays and Thursdays she will walk 15 km each day. On Sundays she will walk 10 km. Every 4th day will be a rest day, unless it is a Saturday. On Saturdays she will walk 5 km and then go to the cinema, unless the previous day was a rest day, in which case she will walk 20 km.

Indigo will start her walk on a Monday.

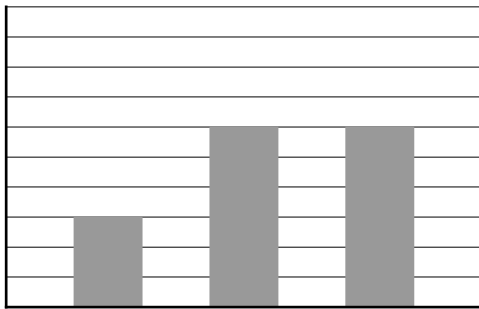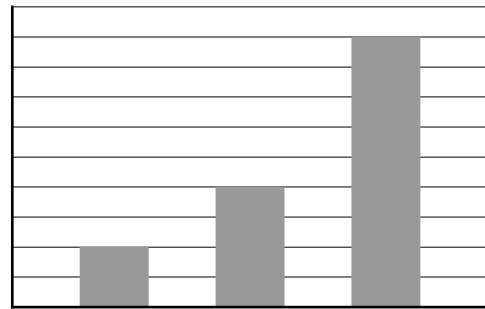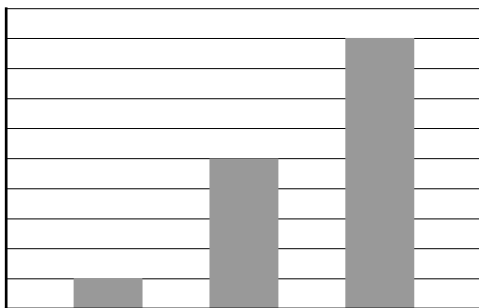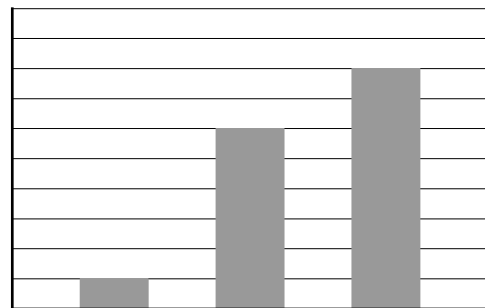On which day of the week will she finish her 250 km walk?

A   Friday

B   Saturday

C   Sunday

D   Monday

18

The bar chart shows the sales last week at the 5 departments in Daphne's shop. She is thinking of either merging 3 departments together or making two mergers each of 2 departments. Either way she will end up with 3 departments.

Which of the following charts could **not** represent last week's sales at her proposed new 3 departments?

A

B

C

D

19 In a sports college there are 90 students. 50 students play basketball and 45 play hockey. 18 students play both basketball and hockey.

How many students play neither basketball nor hockey?

A 5

B 13

C 27

D 32

20 A concert is being planned and the price for tickets needs to be set. When a similar event was held last month tickets cost $6 each and 950 were sold.

The organiser of the concert assumes that every time that the price is increased by $1 the number of tickets sold will decrease by 100.

The price of a ticket must be set as a whole number of dollars.

What price should be set for the tickets to achieve the maximum possible income?

A $7

B $8

C $9

D $10

21 Naeema's car will travel on average 40 miles per gallon of fuel. She sells it and buys a car which will travel on average 50 miles per gallon of fuel.

If she uses her new car the same amount as she used her old car, how much less fuel will she use?

A 5%

B 10%

C 20%

D 25%

22 I need to treat my rectangular lawn, which measures 15 m x 8 m, with weedkiller.

The guidance on the container of concentrated liquid weedkiller that I have bought recommends three applications, on successive days. It recommends that the weedkiller is prepared using 1.5 litres of water per square metre of lawn. For the first application, 5 ml of weedkiller should be added per litre of water; for the second and third applications, 2 ml of weedkiller should be added per litre of water.

Assuming that I follow the recommendations, how much of the concentrated liquid weedkiller will I use altogether?

A 1080 ml

B 1440 ml

C 1620 ml

D 2160 ml

23 Stuart bought a collection of 160 CDs for $570. He has hired a market stall from 09:00 to 18:00 today at a cost of $6 per hour, and is selling the CDs for $8 each.

It is now 14:00 and Stuart has just sold his 60th CD. He has decided to reduce the price as far as possible, but he wants to be able to make a profit of at least $100, after all his costs, if he sells half of the remaining CDs. He will still charge a multiple of $1 for each CD.

What should he reduce the price of each of the remaining CDs to?

A $2

B $3

C $4

D $5

24 A train leaves the station at 13:10 and 13:40 and then every 30 minutes until 22:10. When Tom leaves work it takes him either 5 minutes or 40 minutes to reach the station, depending on whether he visits his friend on the way. Sometimes Tom gets to the station 5 minutes before a train leaves, and sometimes 20 minutes before.

Which one of the following could explain this?

A Tom finishes work at 16:45 every day

B Tom finishes work at 17:00 every day

C Tom finishes work at 16:45 every day, but leaves 10 minutes later if he is visiting a friend

D Tom finishes work at 17:00 every day, but leaves 5 minutes earlier if he is visiting a friend

25 Oranges can be bought individually for 10¢ each or in bags of 6 for 50¢ or bags of 10 for 80¢. Peter needs 47 oranges. He will make one purchase from the shop and if he buys too many oranges, he will sell the extra oranges for 5¢ each. He wants the overall cost of the oranges (once he has sold any extras) to be as small as possible.

How much will Peter pay when he buys the oranges?

A $3.80

B $3.85

C $3.90

D $4.00

26 The powder called Petsup is a new healthy dietary supplement for a variety of pets. It consists of a mixture of Ingredient A and Ingredient B. The suitable proportion of A and B is different for different types of pets, but there is always at least as much B as A. Currently, there are a number of different blends on the market as shown in the table below.

Blend	Percentage of A in blend	Percentage of B in blend	Price per 100 g
Petsup Bronze	50	50	$3.00
Petsup Silver	30	70	$6.00
Petsup Gold	20	80	$7.00
Petsup Platinum	10	90	$8.00

Customers who want a different blend buy suitable amounts of two of the Petsup blends, and mix them together. Marianne is thinking of putting a new blend on the market containing 40% of A and 60% of B. She thinks she can sell this blend for no more than the price per 100 g that people would pay if they bought two of the current Petsup products and mixed them together to produce a 40 : 60 blend.

What is the highest price per 100 g that Marianne can charge for the new blend?

A $4.25

B $4.33

C $4.50

D $5.00

27 On my way to work this morning I walked with my friend for the first 1/4 of the distance, at which point he had reached his work. I looked at my watch and realised that I had been walking at 2/3 of my normal pace and so I would have to walk more quickly to get to work at my normal time. I normally arrive at work 5 minutes early, so I was still able to get to work exactly on time by walking at my normal pace for the remaining 3/4 of the journey.

How long does it normally take me to walk to work?

A   20 minutes

B   30 minutes

C   40 minutes

D   60 minutes

28 Clare, Marie and Sheila have birthdays on the 10th, 20th and 30th of March. This year none of their birthdays occurs at a weekend.

Which day of the week cannot be any of the three birthdays?

A Monday

B Tuesday

C Wednesday

D Thursday

29 There are 500 members of the Erewhon Magic Society. Merlin wanted to change the name of the Society. The Society's rules only allow this to happen after all members have been given the opportunity to vote for or against the name change. The name change would take place only if at least 50% of all members voted and at least 60% of the votes were in favour of the change.

Merlin learns that the total number of votes in favour of the change was 180.

Which of the following scenarios would mean that the name would definitely be changed?

A Less than 60% of members voted and more than 25% of the votes were against the change

B More than 50% of members voted and more than 50% of the votes were in favour of the change

C More than 60% of the votes were in favour of the change and more than 20% of all members voted against the change

D There were more votes in favour of the change than there were votes against the change or members who did not vote

30 In a monthly competition participants are asked a total of 20 questions. A prize of $30 is awarded to the person answering the most questions correctly or is shared equally if there is a tie. After the third month only four people had won any money at any of the competitions.

Ann and Yvonne are two friends who have taken part in all three competitions so far and they are two of the people who have won some money. Ann has answered a total of 51 questions correctly during the three competitions and Yvonne answered a total of 56 questions correctly.

What is the greatest amount by which Ann's total prize money could exceed Yvonne's?

A $20

B $30

C $50

D $60