THINKING SKILLS   **9694/13**

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)

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 **17** printed pages and **3** blank pages.

[Turn over

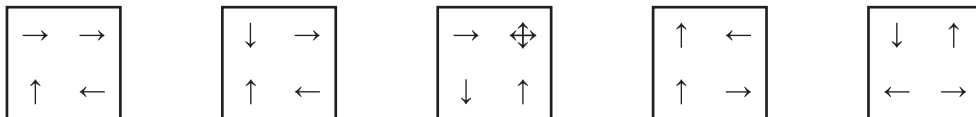**1** The prices for different pieces of furniture at a superstore are shown in the table below.

	Design			
	Donnol	Spair	Raddim	Bildun
Sofa (3 seat)	$120	$100	$90	$80
Sofa (5 seat)	$150	$150	$160	$120
Single Chair	$50	$40	$50	$30
Footstool	$60	$50	$60	$40

Ruth wishes to have enough seating for 7 people, so she has decided to buy one 5 seat sofa and two single chairs. She has also decided that she wishes to have all her furniture from the Raddim range.

What is the total cost of Ruth's order?

A $180

B $230

C $260

D $350

2 Twins is a card game. Every card is square and contains four symbols. Cards are dealt in a row onto a table and players attempt to identify pairs of cards that are the same as each other. Players are not allowed to touch any of the cards once they have been dealt, so they must mentally rotate cards, where necessary, to identify pairs.
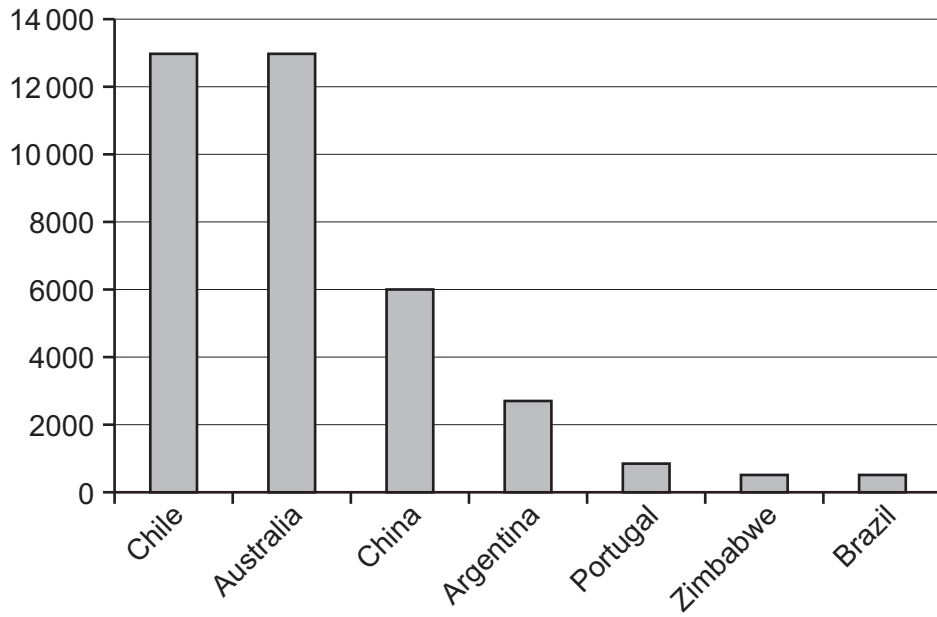
These cards are on the table at present.

The symbol ✛ means that a player may choose any direction of arrow in that position in order to try to make a pair of twins.
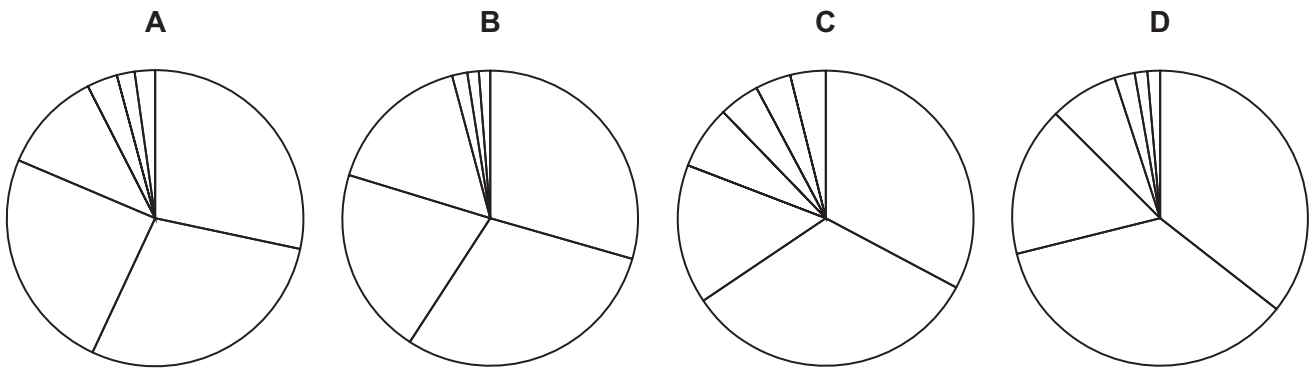
Which of the following arrows in place of the ✛ will make the middle card a twin of one of the others?

A ↑

B →

C ↓

D ←

3 The diagram below shows the 2012 production of lithium in metric tonnes by the world's major producers.

Which of the pie charts, if suitably labelled, would represent the same data?

| **A** | **B** | **C** | **D** |

4 In the world Hollis Games, 10 of the top countries were awarded medals in a range of sports. The table below shows statistics about the medals per population and per GDP awarded to each country.

Country	Population (millions)	Medals per million pop.	GDP ($billions)	Medals per $100B GDP
Zenzaya	5.1	2.16	274.1	4.01
Heisenburg	34.6	0.26	1474.0	0.61
Colundra	81.1	0.06	3167.0	0.16
Zunbania	9.6	0.11	145.3	0.69
Arbania	142.5	0.05	2486.0	0.28
Bocatania	8.2	0.49	361.0	1.11
Toslania	66	0.05	2238.0	0.13
Mangrovia	16.8	0.48	695.8	1.15
Rosalania	316.4	0.02	16240.0	0.04
Bingbangla	8	0.25	359.0	0.56

Which country was awarded the **least** number of medals?

A Rosalania

B Toslania

C Zenzaya

D Zunbania

5 Every week I buy four 2-litre bottles of lemonade whilst shopping at my local supermarket. Last week the bottles on the shelf were limited edition "2.5 litres for the price of 2 litres" bottles, and the supermarket also had a "buy 3 bottles, get another one free" offer.

In terms of cost per litre, by what percentage was the cost of my four bottles of lemonade lower than usual last week?

A 40%

B 45%

C 58%

D 67%

6 6 people are competing in an event which takes place over four days. On each day each of the 6 competitors is awarded a number of points between 0 and 5. On each day no two competitors are given the same number of points as each other. At the end of the third day the scores are 14, 10, 8, 6, 4 and 3. If there is a tie for first place at the end of the competition then all competitors on that score will be declared to be winners.

What information for the final day would always be sufficient to work out the winner or winners of the competition?

A Which competitor scored each of 0, 1, 2 and 3 points

B Which competitor scored each of 0, 1, 4 and 5 points

C Which competitor scored each of 1, 2, 3 and 4 points

D Which competitor scored each of 2, 3, 4 and 5 points

7 Clobbenstar is a two-player game in which both players attempt to score as many points as possible.

In the annual Rouffalana Clobbenstar Tournament, ten competitors play three games, each one against a different opponent. The trophy, and a prize of $200, is won by the person with the greatest total number of points from their three games, regardless of how many of the games they have won. There are also two $50 prizes: for the highest individual score in one game and for the largest winning margin in one game.

These are the results of the games played in this year's tournament.

First games			
Colin	105	Iris	92
Holly	118	Robin	96
Doris	97	Basil	84
Jay	124	Chad	71
Martin	116	Rose	101

Second games			
Rose	96	Holly	82
Jay	109	Martin	98
Colin	102	Chad	90
Iris	107	Doris	83
Robin	130	Basil	116

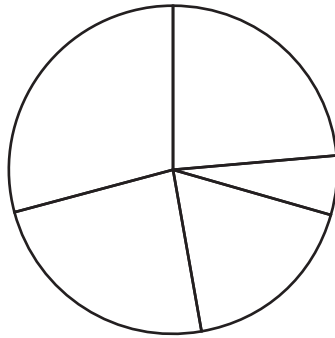| Third games			
Robin	104	Doris	98
Colin	115	Basil	103
Rose	109	Jay	91
Martin	122	Chad	75
Holly	97	Iris	90

Each of the three prizes was won by one of four brothers: Colin, Jay, Martin and Robin.

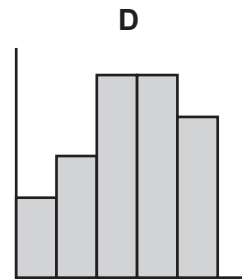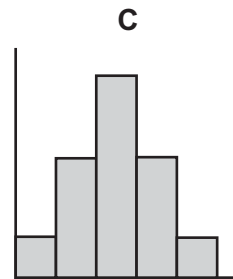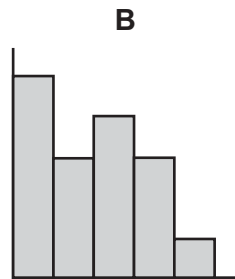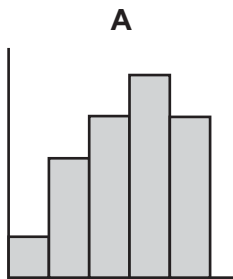Who was the only one of the brothers **not** to win a prize?

A Colin

B Jay

C Martin

D Robin

8 Last month in our town's annual dance competition, four couples competed in the final and were awarded marks out of 5 for five different disciplines.

The pie chart shows the marks awarded to one of the couples.

Which of these bar charts, suitably labelled, could represent this couple's scores?

A   B   C   D

9 Marge is buying a new dishwasher and she has chosen a particular model. She wants it delivered and she wants to take out insurance to cover the cost of any repairs that may become necessary. She also wants her old machine taken away. Marge knows a plumber who has offered to install the dishwasher free of charge.

The following table shows the costs from four local kitchen appliances stores.

Store	Dishwasher cost	Delivery charge	Installation charge	Old machine taken away	Insurance
AB electricals	$350	Free	$20	Yes	$100
Kitchens-to-go	$330	$20	$30	No	$80
Pearsons	$340	$15	Free	Yes	$90
Whites	$355	$10	$10	Yes	$75

Which store should Marge choose so that she pays the least possible amount for what she wants?

A AB electricals

B Kitchens-to-go

C Pearsons

D Whites

10 Personal computers collect fonts over time, but never delete them, so after a while the set of fonts can help to identify a computer, simply by looking at how it displays or prints a carefully designed document.

Last month the FBI identified that, at that time, a suspected spy's computer had the fonts Times NR, Impact, Arial, Verdana and Courier, but not Comic Sans or Wingdings.
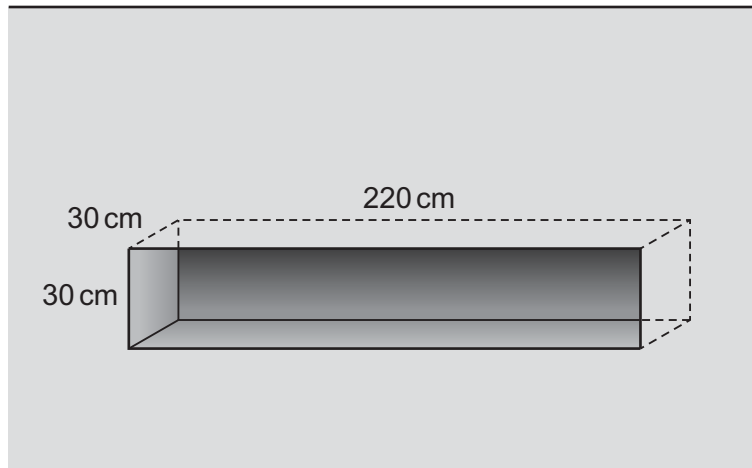
Today they have raided the apartments in which they think the spy lives. They found four personal computers with the following fonts:

	Fonts							
Alex	Times NR	Purisa	Courier	Arial	Verdana	Impact	Liberation	Wingdings
Boris	Arial	Courier	Times NR	Wingdings	Impact			
Stan	Times NR	Impact	Arial	Verdana	Droid	Purisa	Comic Sans	
Vlad	Impact	Arial	Verdana	Droid	Courier	Liberation	Purisa	

Whom should they arrest?

A Alex

B Boris

C Stan

D Vlad

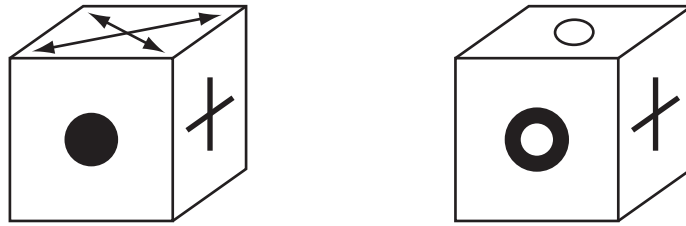**11** Sue has a space in the wall of her workroom as shown in the diagram.

It is 220 cm long, 30 cm high and 30 cm wide. She wishes to completely fill the space with boxes, with no parts sticking out. The shop sells boxes as follows:

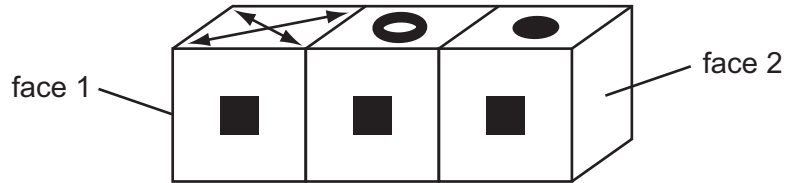| Width (cm)	Length (cm)	Height (cm)	Cost
30	40	50	$5.40
30	30	30	$4.00
40	30	60	$6.80
30	50	30	$5.20
40	40	30	$4.30
30	70	30	$7.60

What is the minimum possible cost of completely filling her space?

A $22.80

B $23.20

C $24.40

D $26.40

12

Above is a picture of two identical boxes. Below is a picture of three of these boxes placed in a line.

What are the shapes on the end faces, face 1 and face 2?

A One is ⬤ and the other is ✕

B One is ⬤ and the other is ◯

C One is ◉ and the other is ✕

D One is ◉ and the other is ◯

13 There are 80 coloured pencils in a pencil case. 50 are round and 30 are hexagonal. 5 are green, 15 are blue and 60 are red. 60 are full-length and 20 are half-length.

What is the smallest possible number of full-length, red, round pencils in the pencil case?

A 10

B 30

C 40

D 50

 [Turn over

14 Small cakes at the Honesty Tea Bar cost \$1.50 and large cakes cost \$2.50. Customers put their cake money into an honesty box. Last Tuesday 50 small cakes and 60 large cakes were taken with all customers taking just one cake. There was \$180 in the honesty box. Beatrice, who owns the Tea Bar, guessed that all honest customers paid exactly the right amount for the cake taken and dishonest customers paid nothing. She also thought that three times as many dishonest people would take a large cake as would take a small cake.

If Beatrice's suppositions are correct, how many customers were dishonest?

A   15

B   18

C   20

D   24

15 The currency in Fertos consists of *bibus*, *copiks*, *dimos* and *erhks*. 3 *copiks* are worth 2 *dimos*, 2 *bibus* are worth 1 *copik*, and 1 *erhk* is worth 4 *dimos*.
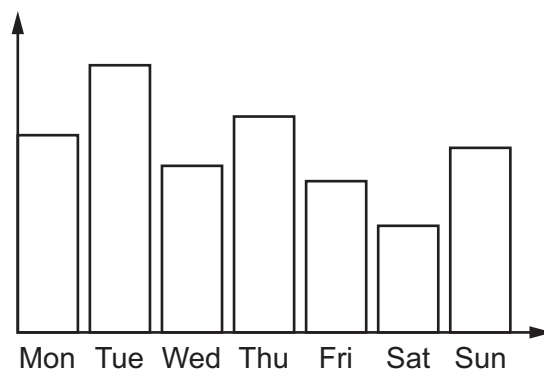
How many *bibus* are worth 2 *erhks*?

A   6

B   8

C   12

D   24

16

**Celheit Weather Station
Hours of Sunshine
June**

Monday 1st	7.7	Thursday 11th	9.6	Sunday 21st	7.8
Tuesday 2nd	12.4	Friday 12th	3.4	Monday 22nd	8.1
Wednesday 3rd	8.4	Saturday 13th	4.7	Tuesday 23rd	10.9
Thursday 4th	10.5	Sunday 14th	8.4	Wednesday 24th	6.7
Friday 5th	13.7	Monday 15th	8.9	Thursday 25th	8.8
Saturday 6th	8.2	Tuesday 16th	11.5	Friday 26th	6.2
Sunday 7th	10.7	Wednesday 17th	4.1	Saturday 27th	4.3
Monday 8th	9.1	Thursday 18th	6.5	Sunday 28th	7.5
Tuesday 9th	13.6	Friday 19th	5.9	Monday 29th	11.5
Wednesday 10th	8.7	Saturday 20th	6.6	Tuesday 30th	9.2

This bar chart, which has so far only been partially labelled, shows the hours of sunshine recorded at Celheit for one particular week in June.

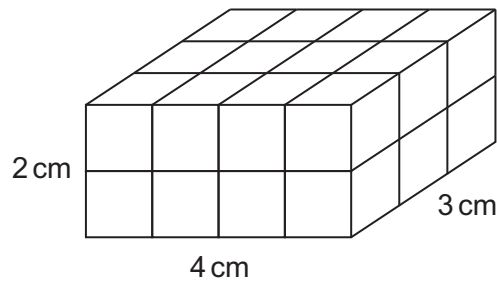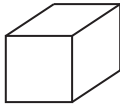Which week's hours of sunshine does the bar chart show?

A 1st to 7th

B 8th to 14th

C 15th to 21st

D 22nd to 28th

17 The main commuter train from London to Kent leaves at 17:45, running non-stop to Faversham, a distance of 84 km. It travels at an average speed of 90 km/h. In front of the express, a local train travels from Chatham to Faversham, a journey of 27 km. This train has five 2-minute stops and runs at an average speed of 54 km/h between stations. In order not to delay the express, the local train arrives in Faversham exactly 4 minutes before it.

At what time does the local train leave Chatham?

A 17:55

B 17:57

C 18:00

D 18:07

18 A child's toy consists of solid wood building blocks which are cubes of side 1 cm. He can stick them together to make a large block as shown in the diagram below.

2 cm   3 cm

4 cm

He colours all the outside faces of the large block. When he takes the large block apart, what is the total surface area not coloured?

A $52 \, cm^2$

B $92 \, cm^2$

C $144 \, cm^2$

D $196 \, cm^2$

19 Two stores have special offers on sales of notebooks. In the first store the books are priced at $4 each, but three for $10 (so, for example, seven would cost $24). At the second store there is a different price for notebooks and an offer of one free notebook for every three bought.

The total cost to get 10 notebooks is the same for both stores.

What is the difference between the total cost of 16 notebooks at each of the two stores?
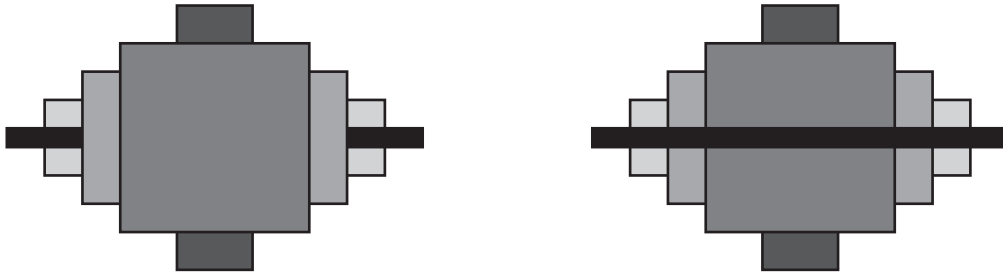
A   The notebooks will be $1.25 cheaper from store 1

B   The notebooks will be $0.40 cheaper from store 1

C   The notebooks will be $3.00 cheaper from store 2

D   The notebooks will be $3.20 cheaper from store 2

20 A weekly quiz that I take part in consists of 50 general knowledge questions. The scoring system is as follows:
  - 5 points are awarded for each correct answer
  - 3 points are deducted for each incorrect answer
  - there is no penalty for the first two questions not attempted by a team, but 1 point is deducted for all further 'passes'.

Last week the winning team scored a total of 205 points.

How many questions did last week's winning team answer correctly?

A   41

B   42

C   43

D   44

21 A package for computer graphics allows objects to be either pulled to the front or pushed to the back of a group.

What is the greatest number of pulls and/or pushes needed to rearrange a figure with five objects to any other?

A   2

B   3

C   4

D   5

22 The 40 members of an orchestra are to be given a free mug of tea or coffee during the half-time interval in their concert. Mugs of tea can be made individually or poured from pots which hold enough tea for 8 mugs. Mugs of coffee can be made individually or poured from pots that hold enough coffee for 6 mugs. The cost of producing a pot of tea or a pot of coffee is $1.80. The costs of producing individual cups of tea and coffee are $0.25 and $0.40 respectively.

20 members of the orchestra will only drink tea while 16 will only drink coffee. The organisers want to minimise the cost of providing the drinks.

What is the minimum cost of providing drinks for all of the members of the orchestra?

A $9.80

B $10.50

C $10.60

D $10.80

23 Cobblers is a store where you can get a 'meal deal' for $4.50. This means you can choose any main course, any side dish, and any drink for a total of $4.50. You can buy all items separately if you prefer. There are 5 mains, 5 sides and 5 drinks. The prices of these are in the table below.

Main	$3.00 $3.10 $3.30 $3.50 $3.60
Side	$0.90 $1.00 $1.25 $1.50 $1.60
Drink	$0.90 $0.95 $1.10 $1.20 $1.25

In addition, Cobblers has a 'buy one get one free' offer on drinks, meaning if you buy two drinks you just pay for the more expensive drink. Jane is reviewing the food at Cobblers and wants to buy one of each main, each side and each drink.

What is the cheapest price for which she can obtain one of each item?

A $20.35

B $21.60

C $22.45

D $22.50

24 The result of competition on different railway routes can result in the prices of tickets seeming to be almost random. People are allowed to use more than one ticket to make a journey, so long as the end of one is the start of the next.

The prices of tickets for different journeys are shown below.

P				
$3	Q			
$6	$2	R		
$11	$6	$5	S	
$15	$11	$7	$4	T

What is the cheapest total fare that can be used to get from P to T?

A $12

B $13

C $14

D $15

25 Peter, Quincy, Rob and Simon are swimming the four legs of a 4 x 50 metres swimming race. Each leg of the race is timed electronically, but afterwards some of the information is accidentally deleted. It is known that Simon always swims twice as quickly as Quincy and that Rob's time is always 50% more than Simon's time.

Which one of the following pieces of information would be sufficient to enable Quincy's time to be found?

A   Peter's time is 18 seconds less than Rob's time

B   Simon's time is 16 seconds less than Rob's time

C   The average time per leg is known

D   The total time for the race is known

26 In a Pub Quiz, the questions are asked in groups of five. In each group of questions, four are standard and the fifth is harder and worth twice as many points as each of the four standard questions. Each wrong answer is penalised by the same amount of points, regardless of whether it is an answer to a standard or harder question.

Jimmy is taking part in the quiz and he gives an answer to every question. In one particular group of five questions, he scores a total of 5 points.

Which one of the following scoring systems could have been used for this Pub Quiz?

A   Award 1 point for a correct standard question, deduct 1 point for an incorrect answer

B   Award 2 points for a correct standard question, deduct 1 point for an incorrect answer

C   Award 3 points for a correct standard question, deduct 1 point for an incorrect answer

D   Award 3 points for a correct standard question, deduct 2 points for an incorrect answer

27 At the local store, chocolate bars are sold for a fixed price each, no matter how many are bought in a single purchase. The price is a multiple of 5¢. Richard always goes to the store on a Tuesday and buys as many chocolate bars as he can for $5. This leaves him with 80¢ change.

This week the price of each bar was reduced by 35¢. Richard again bought as many bars as he could for $5 and this time he was left with 10¢ change.

How many more bars of chocolate than usual did Richard buy this week?

A   2

B   3

C   4

D   5

28 A breakfast cereal company makes batches of muesli that includes dried fruit. They buy fresh fruit and dry it themselves. Their muesli contains apple, banana and strawberry, each of which is dried until it has a water content of 10% by weight. Each batch includes 50 kg of dried fruit: 30 kg apples, 10 kg bananas and 10 kg strawberries. The water content by weight of the fresh fruit is 85% for apples, 75% for bananas and 90% for strawberries.

How many kg of fresh bananas does the producer need to make each batch?

A 36 kg

B 40 kg

C 75 kg

D 100 kg

29 The local football league awards 3 points for a win, 2 points for a scoring draw, 1 point for a scoreless draw and no points for a loss. At the start of March the top of the league table looked like this:

Yoxall   38 points

Alrewas   36 points

Rosliston   34 points

Tatenhill   32 points

In the next 6 weeks, these four teams played one another twice, and these were the only matches that they played. The table then looked like this:

Rosliston   48 points

Alrewas   46 points

Yoxall   41 points

Tatenhill   40 points

Which of the following statements about the series of matches **could** be true?

A All the matches were drawn

B Each team lost at least two matches

C One team won all their matches

D Yoxall did not win any matches

30 In a particular game matches are played between two players over a series of rounds. At the end of any round one player will score 1 point and the other player will score 0. Draws are not possible. If a player's score is three points more than their opponent then the match ends with a win for that player. If a total of 7 points are scored then the match automatically ends with a win for the player in front.

Four friends recently played this game in a knockout tournament. Jason and Karen both won their first matches and so played each other in the final. Jason was disappointed because he lost the final, but scored more points in total in the tournament than Karen did.

How many points were scored in total over the three matches?

A 15

B 17

C 19

D 21

BLANK PAGE

BLANK PAGE

BLANK PAGE