UCAT QUANTITATIVE REASONING QUESTION PACK 1

2019   **Time allowed: 24 minutes**

The examination consists of one section:

Section 1 - Quantitative Reasoning
1. Looks at your ability to solve numerical problems. You will have 12 minutes to answer 18 questions.

Surname	
Forename	
Date	

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Section 1 – Quantitative Reasoning

In the real exam you would have 1 minute to read these instructions.

In this section of the exam, you will be presented with questions that most often refer to charts and graphs containing data. Additional information may also be found within the question itself. Most questions will be shown as sets of four questions each connected to the same data.

In the real exam you would have access to an onscreen calculator to assist you with this section – so feel free to use a calculator for this section..

You have 24 minutes to answer 36 questions. It is in your best interest to answer all questions as there is no penalty for guessing. All unanswered questions will be scored as incorrect.

Data set 1 (QR0002)

Picture Perfect is a photography company that offers portrait photographs.They offer different prices for portraits of individuals, families, babies and pets. Additional features such as props, photoshop and non-standard backgrounds cost extra. Bundles are available which offer discounted rates for multiple photograph.

Photograph	Basic	Props	Photoshop	Custom Backgrounds
Individual	£20.00	+£5.00	+15% of the basic price	+£10.00
Family	£30.00	+£5.00	+15% of the basic price	+£10.00
Baby	£25.00	+£5.00	+15% of the basic price	+£10.00
Pet	£17.50	+£5.00	+15% of the basic price	+£10.00

Bundle discounts:
- 10% off total price for 3 photographs
- 15% off total price for 4 photographs
- 25% off total price for 5 or more photographs

1. **Debbie has has 3 children. She wants two family portraits and an individual portrait of all of them. She wants all of the photographs to be photoshopped. How much does she pay in total including the bundle discount?**

   A - £115.25
   B - £117.50
   C - £118.75
   D - £120.75
   E - £122.50

2. Bill wants to get portraits done of his two dogs. He has paid for props, photoshop and custom backgrounds for each portrait. How much does this cost in total?

A - £68.50
B - £69.25
C - £70.25
D - £71.50
E - £72.25

3. Bill is told that if he gets a portrait of himself as well he will then get a 10% discount overall. He decides to get a basic portrait done of himself with no additional features. How much more is his new total to the nearest pound?

A - £10.00
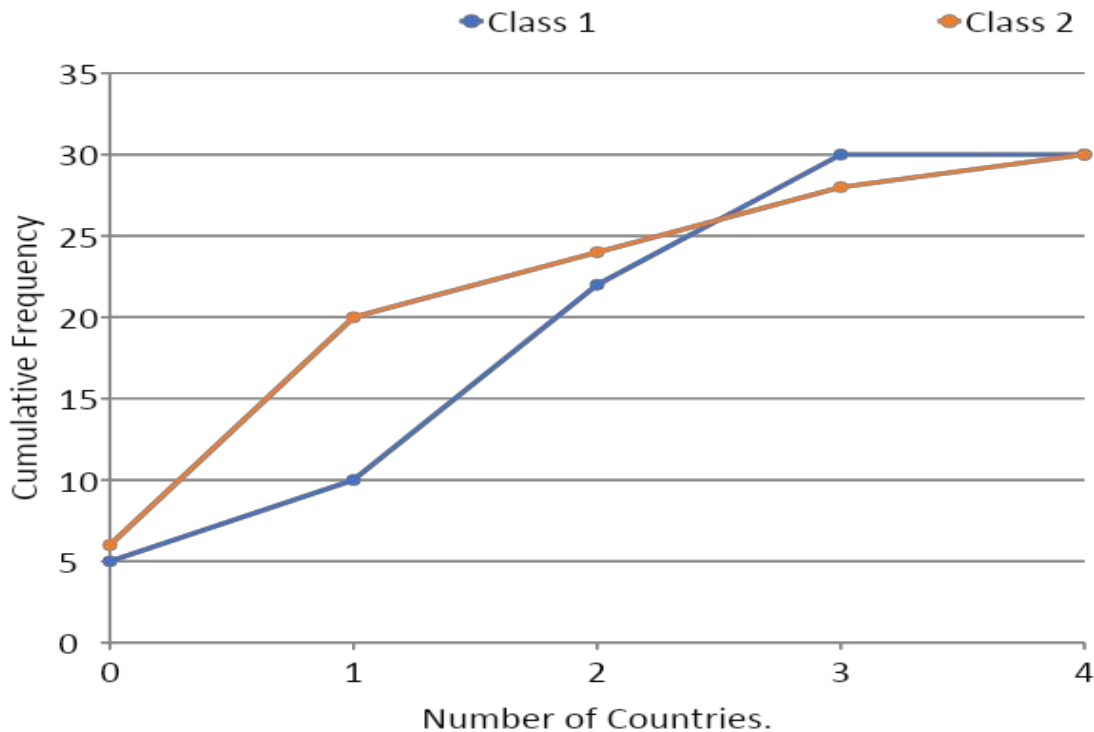B - £11.00
C - £12.00
D - £13.00
E - £14.00

4. Laura and John have just had a baby. They want a portrait of the baby, an individual portrait of each of themselves and a family portrait. They opt for custom backgrounds and props but do not want photoshop. How much does this cost them in total including the bundle discount?

A - £130.25
B - £131.75
C - £132.50
D - £133.75
E - £134.25

Class 1 and 2 (each of which have 30 members) were asked about how many countries abroad they had visited within the last year.

1. **What was the maximum number of countries visited by those in class 1?**

    ☐ **A** - 2
    ☐ **B** - 3
    ☐ **C** - 4
    ☐ **D** - 28
    ☐ **E** - 30

2. **How many people in class 2 have been to exactly three countries?**

A - 28
B - 20
C - 10
D - 4
E - 2

3. **How many more people have been abroad in Class 2 than Class 1?**

A - 1
B - 2
C - 3
D - 4
E - 5

4. **How many people across the 2 classes had been abroad to 1 country?**

A - 12
B - 14
C - 17
D - 19
E - 21

A wildlife preservation charity which focuses primarily on conservation and on the rehabilitation of orphaned orangutans allocates its resources on a month by month basis. The allocation depends primarily on which area of the charity requires the most attention at that time and what campaigns are being run.
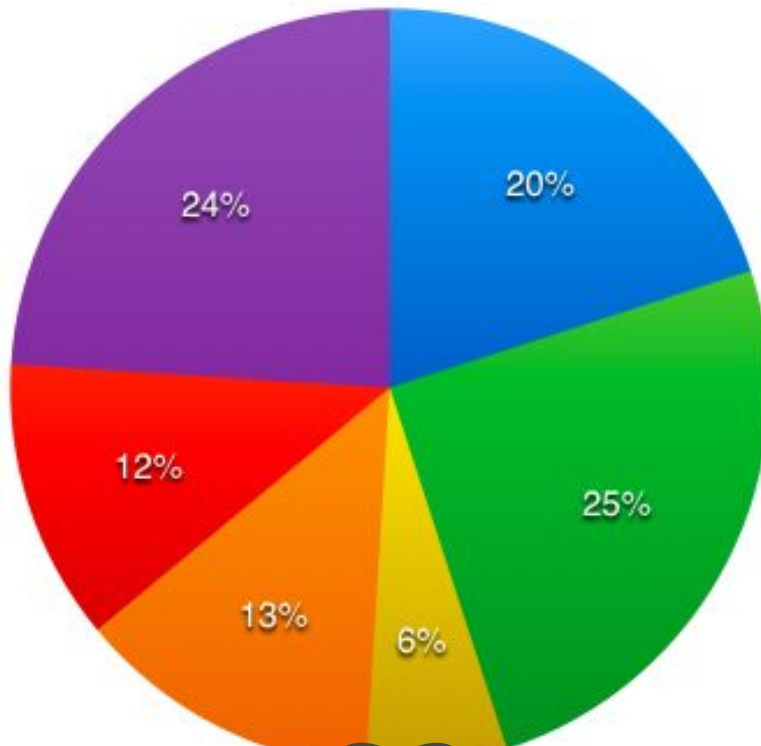
The areas requiring financial input are as follows:
- Staffing and personnel (A)
- Administrative and running costs (B)
- Lobbying governments (C)
- Fundraising and awareness campaigns (D)
- Land protection (E)
- Rehabilitating the orangutans - food, veterinarian costs etc. (F)

In January, the total income for the charity was £46,672.

The chart below shows the allocation of resources in January.

1. In January, there was an unexpected influx of rescued baby orangutans and so the cost of rehabilitating the animals had a sudden spike. In the month prior, the costs of rehabilitating the orangutans amounted to £6,543.74. How much more money was spent rehabilitating the orangutans in January compared with December?

A - £4657.54
B - £4736.28
C - £4984.63
D - £5127.43
E - £5473.27

2. In February, the total income for the charity was only £38,463, but the exact same amount was needed to be spent on staffing and personnel as in January. What percentage of February's budget, therefore, went towards staffing and personnel?

A - 21%
B - 22%
C - 23%
D - 24%
E - 25%

3. In March, £5646 was spent on land rehabilitation which represented 14% of the total budget for that month. What was the total budget in March rounded up to the nearest pound?

A - £38,375
B - £38,749
C - £39,184
D - £40,072
E - £40,329

4. In January, how much more was spent on administrative and running costs than was spent than was spent on staffing and personnel rounded up to the nearest pound?

A - £2128
B - £2334
C - £2522
D - £2698
E - £2864

A baker uses the following American recipe to make muffins. The recipe makes enough for 12 standard sized muffins or 6 large muffins.

- 1 cup of sugar
- 2 1/2 cups of flour
- 3 eggs
- 1 1/2 cups whole milk
- 200g chocolate chips
- 1 tsp raising powder

Cup measurements:

- 1 cup of flour equals 135g.
- 1 cup of sugar equals 200g.
- 1 cup of milk equals 240ml.
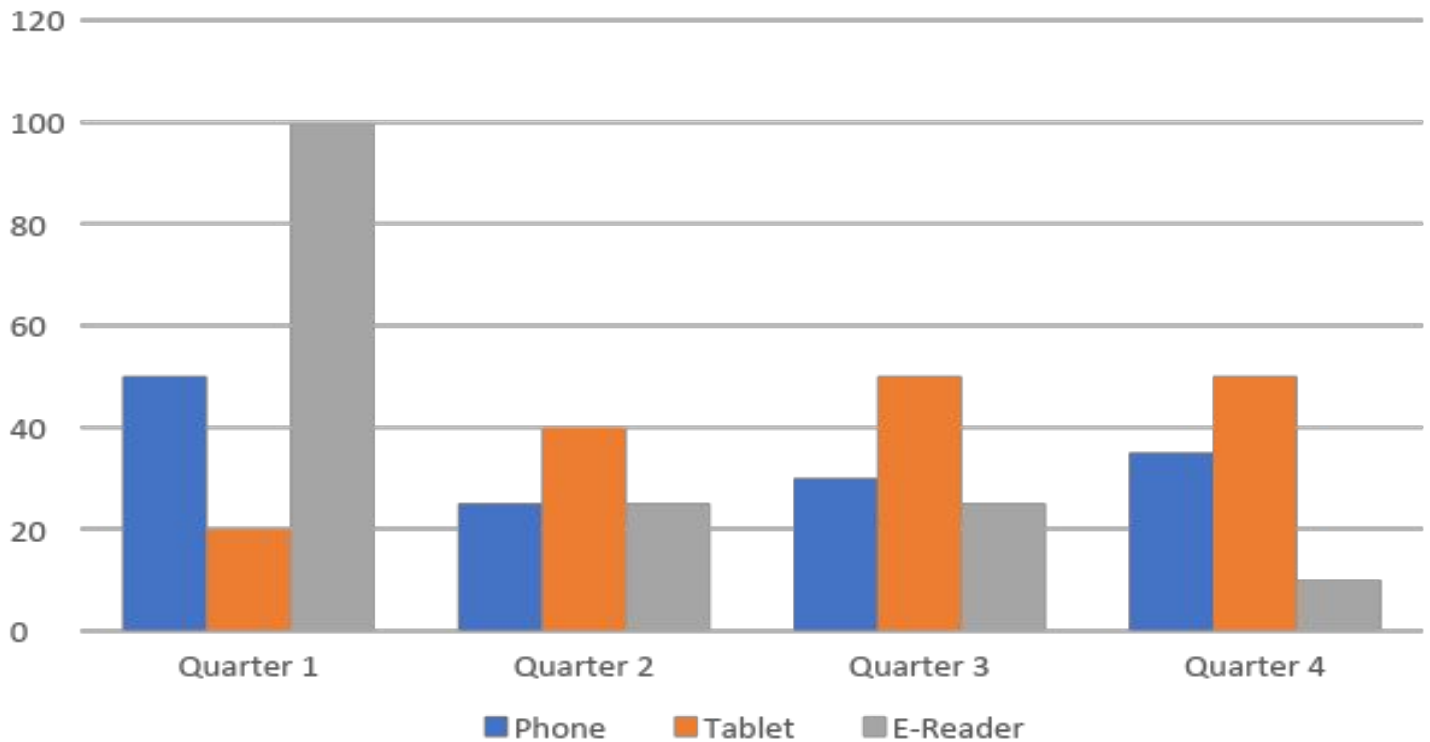- 1 cup of chocolate chips equals 150g.
- 1 gram equals 0.0353 ounces

1. **If the baker decides to make 6 large muffins, how much flour, rounded to the nearest ounce, goes into one muffin?**

☐ **A** - 1oz
☐ **B** - 2oz
☐ **C** - 3oz
☐ **D** - 4oz
☐ **E** - 5oz

Data set 5 (QR0025)

The chart below shows the sales of three electronic devices in a popular electronics store in 2018.

1. **Which item sold the most across the year?**

   A - Phone
   B - Tablet
   C - E-Reader
   D - Two sold the same number
   E - All three sold the same number

2. **The E-Reader sold for £25 a device in Quarters 1 to 3 but was discounted by 20% in Quarter 4. How much revenue was made from sales of this device across the year?**

   A - £2500
   B - £3550
   C - £3600
   D - £3950
   E - £4000

3. **The E-Reader sold 120 units in the period of January to May. How many units did it sell in June?**

   A - 0
   B - 5
   C - 10
   D - 20
   E - 25

4. **When analyzing the sales of the two sales Employees Dan and Tom, the company found that in Quarters 1 and 2, Dan sold twice as many tablets as Tom did. How many tablets did Tom sell in Quarters 1 and 2?**

   A - 10
   B - 20
   C - 30
   D - 40
   E - 60

Data set 6 (QR0012)

A gym in central London offers different packages for monthly memberships and day passes. There is a joining fee of £20.00 for the monthly membership packages but not the day passes. The premium gym memberships offer access to the fitness classes, but the standard memberships don't. The fitness classes can be purchased independently of the memberships and do not require a joining fee.

	Standard Rate	Student Rate
5 Classes Pass	£50.00	£40.00
10 Classes Pass	£90.00	£72.00
20 Classes Pass	£160.00	£128.00

	Standard Membership	Premium Membership	Standard Student Membership	Premium Student Membership
Day Pass	£10.00	£12.00	£7.00	£9.00
One Month Pass	£30.00	£35.00	£25.00	£27.00
Six Month Pass	£150.00	£180.00	£120.00	£150.00
12 Month Pass	£240.00	£300.00	£180.00	£240.00

1. Jessica and Sarah are students looking to join the gym. Sarah is interested in the classes and wishes to purchase a 20 class pass. Jessica only wants to join for 6 months. She buys a day pass and a standard student membership for 6 months. Including the joining fee, how much more expensive is Jessica's gym package than Sarah's by percentage?

   A - 12%
   B - 13%
   C - 14%
   D - 15%
   E - 16%

2. On the basis that there are on average 30 days in a month, how much cheaper is the daily rate of a six month premium membership compared to a single premium day pass?

   A - £7.00
   B - £8.00
   C - £9.00
   D - £10.00
   E - £11.00

3. How much cheaper is a student 20 classes pass per class compared with a standard 5 classes pass per class?

   A - £3.60
   B - £4.00
   C - £4.40
   D - £4.80
   E - £5.20

4. **Anthony is a student looking to join a gym for 4 months. He is debating whether to buy 4 one-month passes at a premium student rate or a six month pass at a standard student rate. Which is the cheaper option and by how much?**

A - Four premium one month passes, by £8.00.
B - Four premium one month passes, by £12.00.
C - Four premium one month passes, by £16.00.
D - Standard six month pass, by £8.00.
E - Standard six month pass, by £12.00.

Here are the breakdown of marks for the recent medical school finals exams broken down into modular topics.

	Anatomy	Pharmacology	Neuroscience	Genetics and Reproduction
Tanvir	20/32	47/60	7/25	18/20
Josh	17/32	31/60	14/25	20/20
Chris	18/32	55/60	12/25	15/20
Jack	30/32	54/60	3/25	5/20
Abishek	14/32	30/60	19/25	8/20
Shwetabh	22/32	39/60	20/25	19/20

1. **Who scored the lowest in Pharmacology?**

   A - Chris
   B - Josh
   C - Abishek
   D - Tanvir
   E - Shwetabh

2. **What was the mean percentage of marks for Neuroscience?**

   A - 75%
   B - 12.5%
   C - 50%
   D - 25%
   E - 37.5%

3.   In order to pass the exams, you have to score more than 50% on all modules. How many need to resit?

A - 1
B - 2
C - 3
D - 4
E - 5
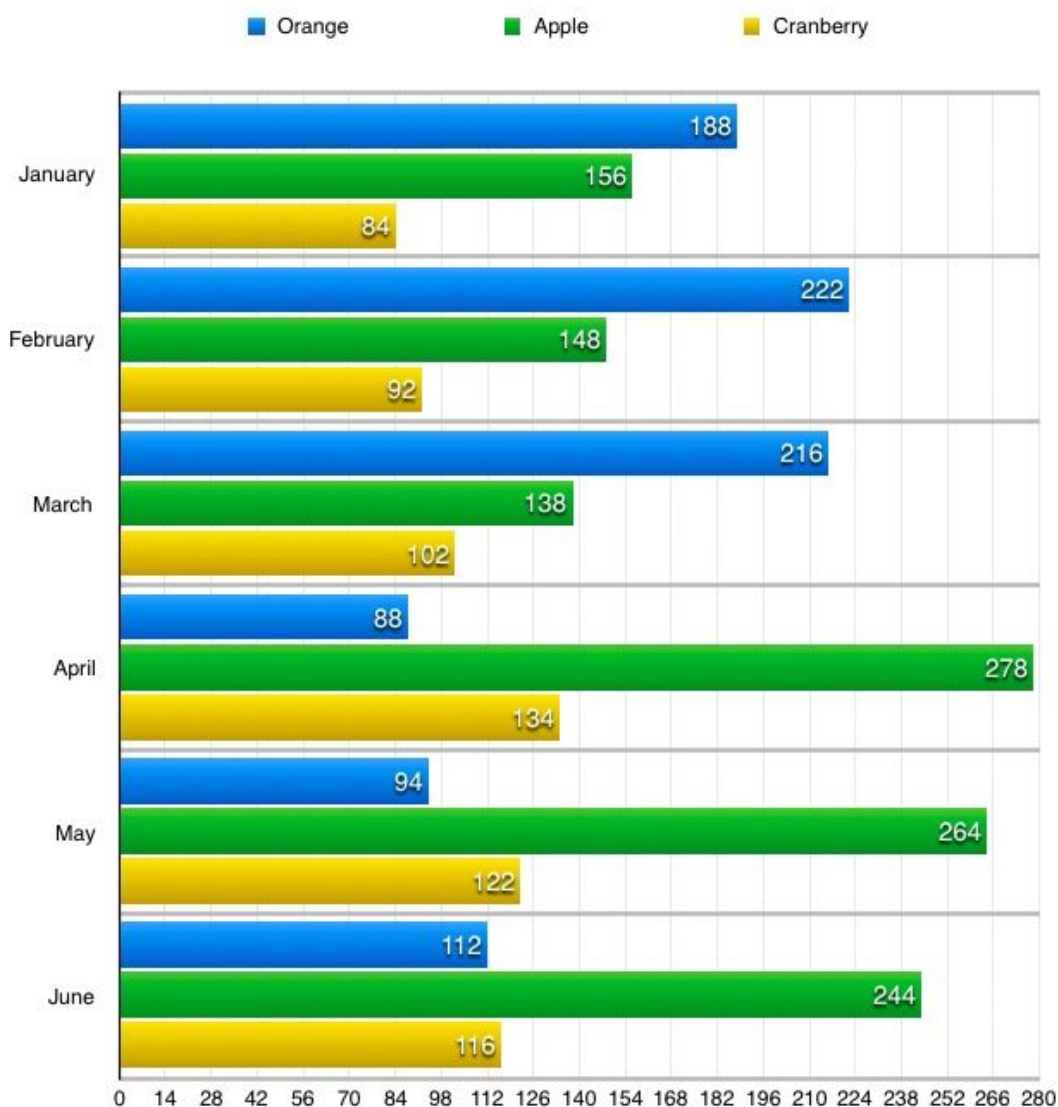
4.   Jack resits his Neuroscience exam. He gains 17 more marks. What is his percentage increase in marks?

A - 80%
B - 17%
C - 68%
D - 3%
E - 12%

Data set 8 (QR0017)

Below is a graph quantitating the popularity of different juices served on a flight from Hong Kong to London which flies 8 times a month. The graph shows the number of cartons sold per month.

1 carton has 750ml of juice.
1 serving of juice equals 150ml.

To illustrate, in January, there were 156 cartons of apple juice served across all 8 flights, which equates to 117L of apple juice.

1. In April there was an E. coli contamination of citrus fruits which resulted in a drop in popularity of orange juice. By what percentage did the popularity of orange juice drop between March and April?

   A - 59%
   B - 60%
   C - 61%
   D - 62%
   E - 63%

2. The catering manager wants to know how many litres of juice were served per flight in January. Taking into account all 3 types, rounded to the nearest litre, how many litres of juice were served per flight in January?

   A - 38L
   B - 39L
   C - 40L
   D - 41L
   E - 42L

3. How many servings of juice in total were served in February?

   A - 2190
   B - 2240
   C - 2270
   D - 2310
   E - 2360

A salon offers the following services at a range of prices depending on whether it is done by a senior, intermediate or junior professional. Student get a 15% discount, loyalty customers get a 10% discount and loyalty students get a 20% discount. Every 5th week, wash and blow dry is half price.

Service	Senior	Intermediate	Junior
Permanent colour	£50.00	£35.00	£25.00
Semi-permanent colour	£40.00	£30.00	£20.00
Full head highlights	£40.00	£30.00	£25.00
Half head highlights	£25.00	£20.00	£15.00
Hair cut	£45.00	£30.00	£22.50
Wash and blow dry	£20.00	£17.50	£15.00
Manicure	£25.00	£20.00	£15.00

1. **Sandra is a loyalty customer. She wants full head highlights and a hair cut. The highlights will be done by a senior employee and the hair cut by an intermediate employee. How much does this cost in total?**

   A - £59.00
   B - £60.00
   C - £61.00
   D - £62.00
   E - £63.00

2. Frances is a student who wants a permanent colour, hair cut and a wash and blow dry. At first she wants to get it done by an intermediate employee but she changes her mind and opts for a junior. How much cheaper is the total cost by percentage if she gets it done by a junior?

A - 15%
B - 18%
C - 24%
D - 28%
E - 35%

3. Liz is both a student and a loyalty customer. She wants a hair cut and a wash and blow dry. She has had 4 wash and blow dries prior to this. She gets it done by a junior employee. How much more expensive would it be if she wasn't a student, not a loyalty customer, she had only 3 wash and blow dries before and she got it done by a senior staff member?

A - £41.00
B - £49.75
C - £54.01
D - £57.64
E - £64.12

An investment bank has three offices - one in London, one in New York and one in Hong Kong. They are trying to arrange a meeting which would be at a suitable time for all of them. When it is 13:00 PM in London on the 6th of October, it is 20:00 PM in Hong Kong on the same day and 8:00 AM in New York on the same day. The latest a meeting can go on until is 23:00 PM in any country, and the earliest one can start is 5:00 AM.

1. **How long is the window period in which all three offices can all have a meeting together?**

   A - 1 hour
   B - 2 hours
   C - 3 hours
   D - 4 hours
   E - 5 hours

A second hand clothes shop sells clothes according to the prices in the table below. There are bundle deals on multiple items. Buying two items gets a 10% discount. Buying three items gets a 15% discount. Buying four or more items gets a 20% discount.

Clothing item	Price
T-shirts and tops	£3.00
Trousers	£4.00
Shorts and skirts	£3.00
Dresses	£4.00
Shoes	£6.00
Jewellery	£2.50

1. **Rosa is a first time customer at the second hand clothes shop. She buys a pair of trousers, a dress, a pair of shoes and a necklace. How much does her total come to?**

   A - £13.20
   B - £14.00
   C - £14.85
   D - £15.15
   E - £15.40

2. **Christopher buys a pair of shoes a top and a pair of trousers. He changes his mind and puts the top back. How much less does he end up spending?**

   A - £1.90
   B - £1.95
   C - £2.00
   D - £2.05
   E - £2.10

3. **Rachel buys two pairs of shoes, a dress, a ring and a skirt. Ellie buys one pair of shoes, a skirt, two tops and a dress. Whose bundle is more expensive and by how much rounded to the nearest penny?**

   A - Rachel's, by 87p.
   B - Rachel's, by £2.00.
   C - Ellie's, by 98p.
   D - Ellie's, by £1.42.
   E - Ellie's, by £2.38.

Data set 12 (QR0018)

A 750ml bottle of mineral water has different quantities of minerals dissolved into it as shown by the table below.

Mineral	Quantity (mg/l)
Calcium	41
Magnesium	8
Sodium	11
Potassium	1
Sulphate	12
Bicarbonate	134
Chloride	10
Nitrate	8

A 2L bottle of the same water has its minerals in the same proportions, as shown here to the nearest decimal place.

Mineral	Quantity (mg/l))
Calcium	109.3
Magnesium	
Sodium	29.3
Potassium	
Sulphate	32
Bicarbonate	
Chloride	26.7
Nitrate	21.3

1. **Which of the following shows the correct missing values?**

A - Magnesium: 19.7. Potassium: 3.3. Bicarbonate: 357.3.
B - Magnesium: 23.3. Potassium: 2.7. Bicarbonate: 319.3.
C - Magnesium: 21.3. Potassium: 2.7. Bicarbonate: 357.3.
D - Magnesium: 19.7. Potassium 2.7. Bicarbonate: 319.3.
E - Magnesium: 23.3. Potassium: 3.3. Bicarbonate: 327.3.

END OF EXAM PAPER

And breathe! Take a break and then come back and mark this paper to see how you've done.