AQA

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Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work

GCSE
STATISTICS

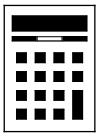
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Foundation tier Paper 2

Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.



Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross out any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
TOTAL	

Answer **all** questions in the spaces provided.

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1 Which of these sets of data has a different range to the others?

Circle your answer.

[1 mark]

1, 6, 6, 6 | 2, 3, 5, 7

3, 5, 6, 8 | 4, 4, 4, 8

1

2 Which of these is **not** a type of statistical experiment?

Circle your answer.

[1 mark]

field | classroom | laboratory | natural

1

3 Which of these diagrams is suitable for bivariate data?

Circle your answer.

[1 mark]

scatter diagram | choropleth map | bar chart | box plot

1

4 Four values have a median of 10.

Three of the values are 6, 10 and 10.

Circle the value that the 4th number could **not** be.

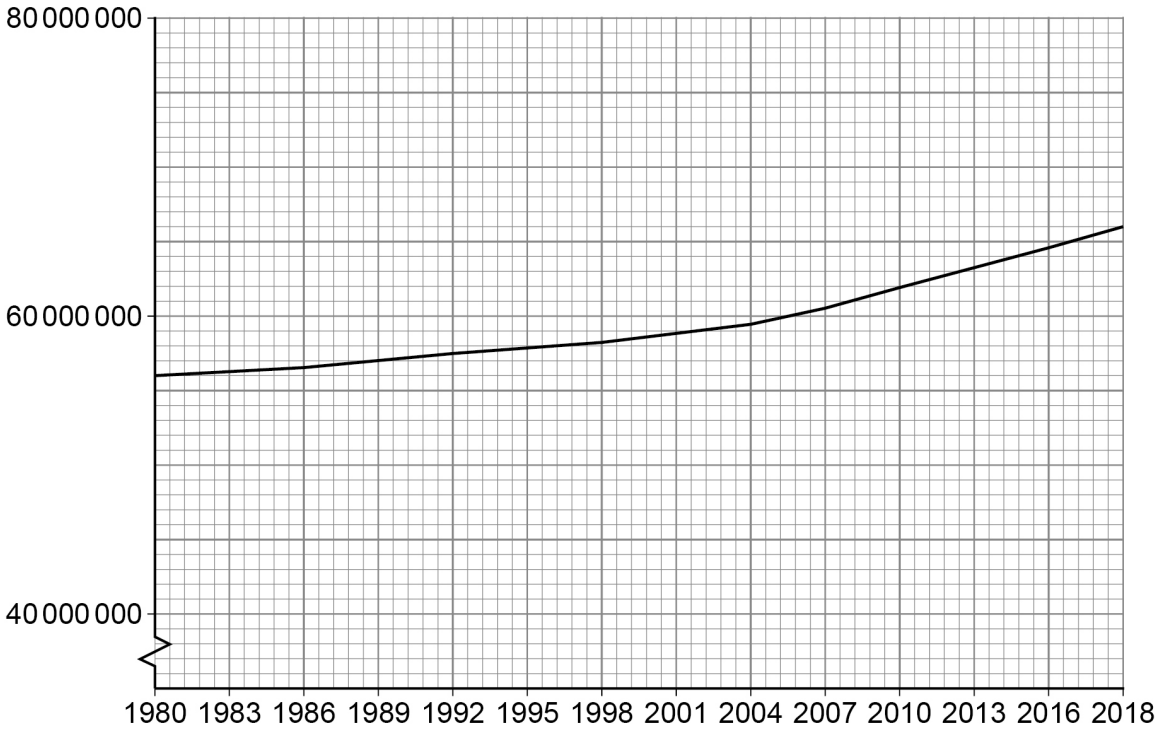
[1 mark]

100 | 12 | 10 | 6

1

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5 The graph shows the UK population from 1980 to 2018.



Source: ONS

5 (a) What was the UK population in 2018?

[1 mark]

Answer _____

5 (b) Describe the general trend in the UK population during these years.

[1 mark]

_____

_____

5 (c) In which year did the UK population reach 60 million?

[1 mark]

Answer _____

3

Turn over ►

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6 In a charity raffle 500 tickets are sold.

The prizes are,

- one holiday in Florida
- four weekend breaks in the UK
- 15 cash prizes of £50.

Tickets are chosen at random for the prizes.

Emma has one ticket.

6 (a) Write down the probability that Emma wins the holiday in Florida.

[1 mark]

Answer _____

6 (b) Work out the probability that Emma does **not** win any of the prizes.

Give your answer as a fraction in its simplest form.

[3 marks]

_____

_____

Answer _____

4

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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7 There is a busy railway line at the end of Anya's garden.

One day she counts, in 20-minute periods, the number of trains going past in one direction, north to south.

Here are the data she collects.

Number of trains in 20-minute periods	Frequency
3	5
4	7
5	8
6	6
7	4

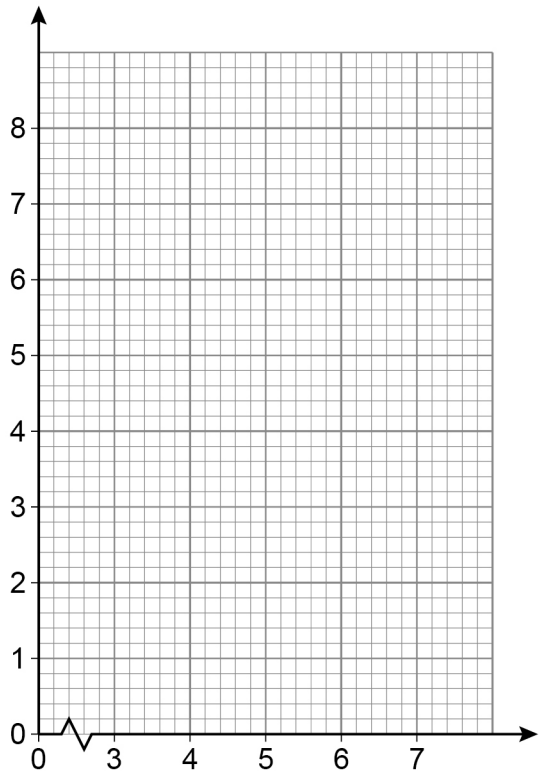
7 (a) Give a possible reason why there are no more than 7 trains in any 20-minute period.

[1 mark]

7 (b) Draw a bar line chart (vertical line diagram) for the data on the grid below.

Include labels for the axes.

[3 marks]



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7 (c) Give a reason why the modal number of trains per 20 minutes is 5.

[1 mark]

7 (d) A train passes Anya's garden going north to south at exactly 3.26 pm.

Use the mode to estimate the most likely time of the next train in that direction.

[1 mark]

Answer _____ pm

7 (e) There are far fewer trains going the other way, south to north.

Suggest a possible modal number of trains going the other way for the same set of 20-minute periods.

[1 mark]

Answer _____ trains

7

Turn over for the next question

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8 For people who voted in the 2019 General Election, the graph shows the percentage of votes for the three main parties for different age groups.

This graph has been removed due to third-party copyright restrictions.

8 (a) What percentage of voters aged 25–34 voted for the Labour Party?

[1 mark]

Answer _____ %

8 (b) Which party had the most similar percentage values across the age groups?

[1 mark]

Answer _____

Do not write outside the box

8 (c) Kez says,

"More people in the 55–64 age group voted Conservative than in the 45–54 age group."

8 (c) (i) Give a reason why Kez **might** be correct.

[1 mark]

8 (c) (ii) Give a reason why Kez **could** be wrong.

[1 mark]

8 (d) Diane says the graph must be wrong as each set of three bars does not add up to 100%.

Is Diane correct?

Tick (✓) a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

5

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9 (a) The cost of 12 items sold at an auction house one morning are given.

All values are in pounds.

6 10 10 12 12 15 16 20 20 30 80 155

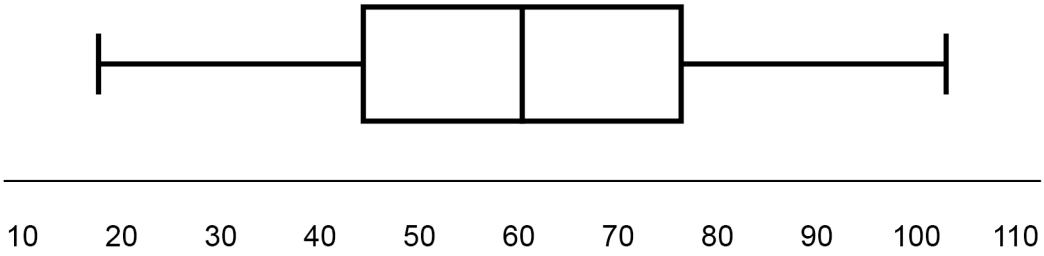
Which of these best describes the skew of these data?

Circle your answer.

[1 mark]

negative skew no skew positive skew

9 (b) The box plot shows information about the time in seconds it took to sell the items at the auction house that morning.



Which of these best describes the skew of these data?

Circle your answer.

[1 mark]

negative skew no skew positive skew

2

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10 A Sixth Form college has 1000 students.

Students on different courses have different numbers of lessons.

Ben and Matt are investigating the hypothesis,

'Students with better GCSE grades have more lessons per week at the college.'

Ben is collecting the information about GCSE grades.

Matt is collecting the information about the number of lessons the students have.

10 (a) What type of data is 'numbers of lessons'?

Circle your answer.

[1 mark]

ordinal bivariate discrete continuous

10 (b) Ben gets a list of all the 1000 students who go to the college.

He decides to choose a systematic sample of 50 students using these steps.

Step 1 Start at the 25th student

Step 2 Pick every 50th student on the list

Ben has made an error in each step.

Write down a corrected version of each step.

[2 marks]

Step 1 _____

_____

Step 2 _____

_____

10 (c) Matt says,

"I'm going to choose a different sample using random sampling to get data about the number of lessons students have."

Why is this not a good idea?

[1 mark]

_____

_____

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10 (d) Ben and Matt correct their errors and collect appropriate data.

They input all the data to a spreadsheet.

Give **one** reason why it might be helpful to have the data in a spreadsheet.

[1 mark]

10 (e) Here are the top few rows of the spreadsheet.

Student	Average GCSE grade	Number of lessons per week
1	6	16
2	5	14
3	8	21
4	5	17
5	4	16
6	4	14
7	7	199
8	5	17
9	8	22
10	4	15
11	7	20

10 (e) (i) Identify the wrongly recorded value.

[1 mark]

Answer _____

10 (e) (ii) Suggest what they should do with this value.

[1 mark]

10 (e) (iii) Based on the data you can see, comment on the original hypothesis.

[1 mark]

8

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11 Pat has a security camera on the front of her house.

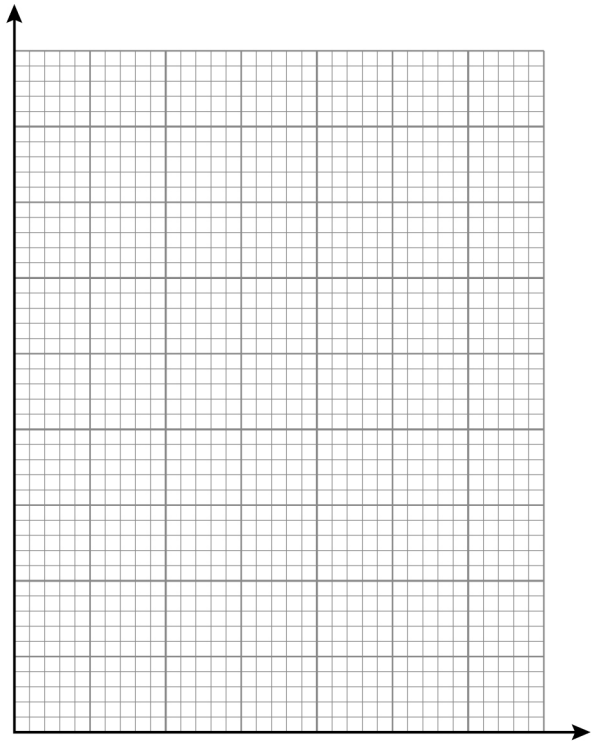
When it detects movement, an alert is sent to Pat's phone.

The periods of time between alerts for part of one day are represented by this table.

Time between alerts, t (minutes)	Frequency	Cumulative frequency
$0 < t \leqslant 5$	9	
$5 < t \leqslant 10$	25	
$10 < t \leqslant 15$	21	
$15 < t \leqslant 20$	17	
$20 < t \leqslant 25$	8	

11 (a) Draw a cumulative frequency graph for the data on the grid below.

[5 marks]



11 (b) Estimate the median time between alerts.

[1 mark]

Answer _____ minutes

Turn over ►

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11 (c) (i) Estimate the lower quartile and upper quartile of the times between alerts.

[2 marks]

Answer Upper quartile _____ minutes

Lower quartile _____ minutes

11 (c) (ii) Hence, estimate the interquartile range of the times between alerts.

[1 mark]

_____

_____

Answer _____ minutes

11 (d) Pat puts another camera at the back of the house.

The next day the data for the times between alerts is,

- median = 26 minutes
- interquartile range = 4 minutes.

Make **two** comparisons between the times between alerts for the two cameras.

[2 marks]

Comparison 1 _____

_____

Comparison 2 _____

_____

11 (e) Give **one** reason why these comparisons might not be valid.

[1 mark]

_____

_____

12

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12 Ashwen and his family are going on holiday.

His father hopes to persuade Ashwen to go camping in England.

Ashwen investigates whether camping is the most popular type of holiday in England.

12 (a) Write down a possible hypothesis for Ashwen to use.

[1 mark]

12 (b) Ashwen asks some of the students he meets around school whether they are going on holiday in England this year, and, if so, what type of holiday it will be.

12 (b) (i) Name the sampling method Ashwen is using.

[1 mark]

Answer _____

12 (b) (ii) Give **one** advantage and **one** disadvantage of Ashwen using this method.

[2 marks]

Advantage _____

Disadvantage _____

Question 12 continues on the next page

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12 (b) (iii) Ashwen's teacher suggests random sampling would have been a better method.

Describe how Ashwen could obtain a random sample from his school.

[3 marks]

12 (c) Ashwen wants to collect data from at least 30 students.

Give **two** reasons why he should have an initial sample size greater than this.

[2 marks]

Reason 1

Reason 2

12 (d) Ashwen finds that 4 out of 40 of the students he asks, who are going on holiday in England, are going camping.

Comment on this result in the light of your hypothesis in **part (a)** and his father's hopes.

[2 marks]

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12 (e) Ashwen's father is also trying to decide **when** to go on holiday.

He goes to the Visit England website and finds these data for 2017.

Holidays – England	Trips	Nights	Spend
	Million	Millions	£Millions
Month Trips Started			
January 2017	1.77	3.91	£421
February 2017	2.11	5.37	£414
March 2017	3.03	8.12	£665
April 2017	4.54	14.17	£928
May 2017	4.54	14.99	£1038
June 2017	4.44	14.99	£1115
July 2017	5.77	26.53	£1559
August 2017	7.45	30.20	£1802
September 2017	4.28	14.26	£991
October 2017	4.01	11.92	£926
November 2017	2.69	6.61	£563
December 2017	2.62	6.75	£600

12 (e) (i) Use the information in the table to show that the average spend per trip started in January is £238 to the nearest pound.

[1 mark]

12 (e) (ii) Why is this value approximate?

[1 mark]

Question 12 continues on the next page

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12 (e) (iii) Estimate the average spend per trip started in **August**.

Give your answer to the nearest pound.

[2 marks]

Answer _____

12 (e) (iv) Compare your values for January and August.

Give a possible reason for any difference you find.

[2 marks]

Comparison _____

Possible reason _____

17

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13 (a) The total number of cars on the road in the UK in 2017 was 32 000 000.
The number of cars stolen in the UK in 2017 was 86 000.

Calculate the risk of a car being stolen in 2017.
Give your answer as a percentage.

[2 marks]

Answer _____ %

13 (b) The risk of a car being stolen in 2013 was 0.21%.

13 (b) (i) Compare the risk of a car being stolen in 2013 with the risk in 2017.

[1 mark]

13 (b) (ii) There were 30 900 000 cars in the UK in 2013.

Calculate an estimate of the number of cars that were stolen in 2013.

[2 marks]

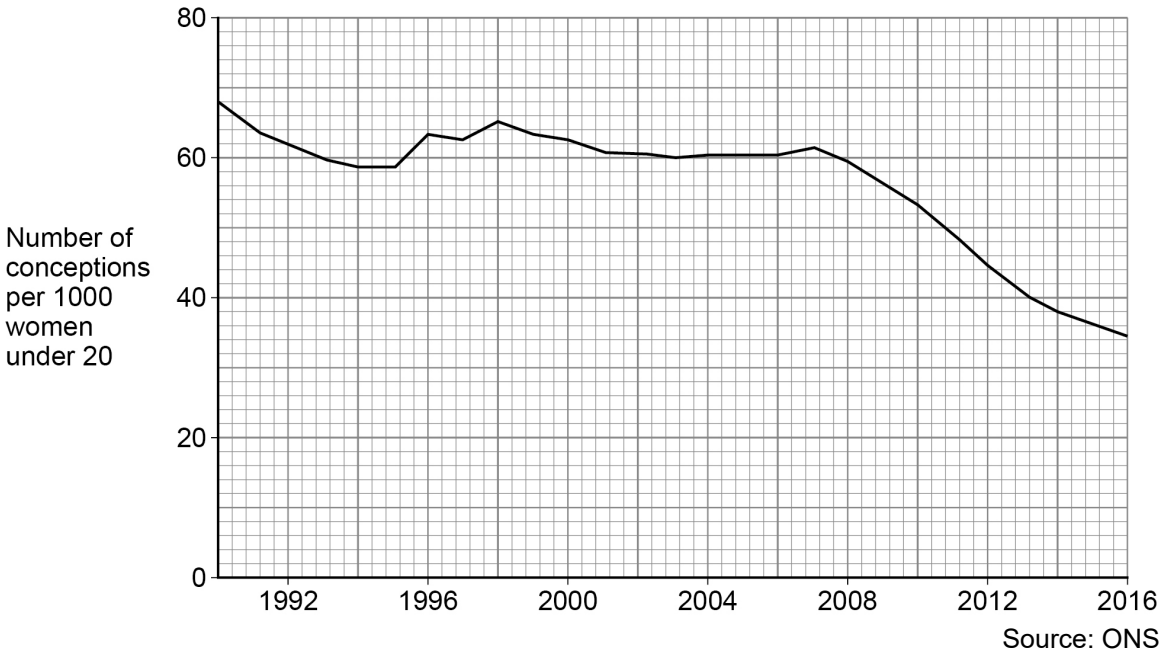
Answer _____

5

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14 The graph shows the number of conceptions per 1000 women **under 20** in England and Wales.

A conception is when a woman becomes pregnant.



Source: ONS

14 (a) (i) Make **two** comments about the patterns in the data.

[2 marks]

Comment 1 _____

_____

Comment 2 _____

_____

14 (a) (ii) Give **one** possible reason for the overall trend in the data.

[1 mark]

_____

_____

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14 (b) Draw lines to connect the statements with whether they are likely to be correct or not.

[2 marks]

Less than 5% of women under 20 became pregnant in 2012	Definitely correct
There were fewer than 40 babies born to women under 20 in 2016	Probably correct
Fewer women **under 21** became pregnant in 2016 compared to 1992	Definitely incorrect

5

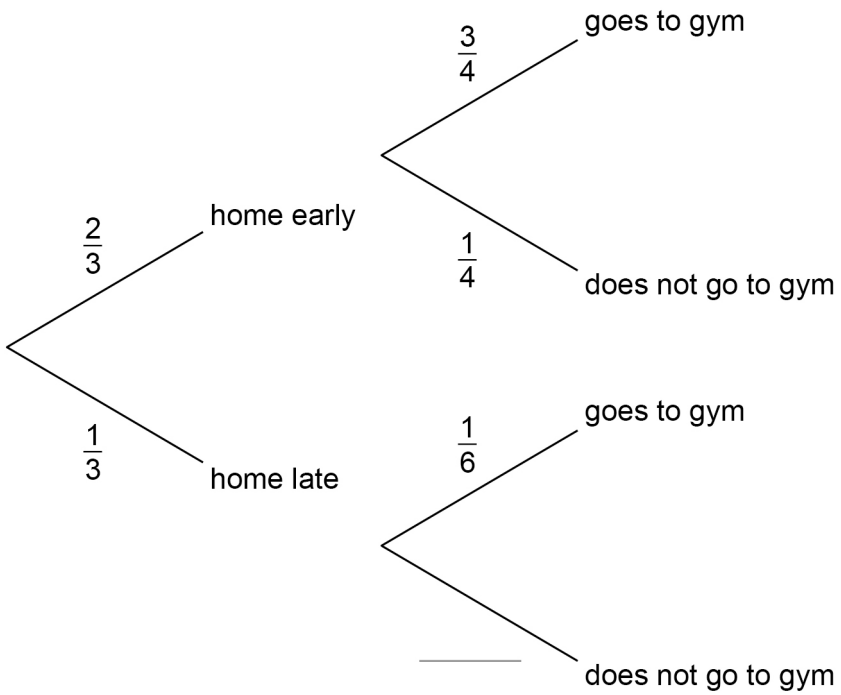
Turn over for the next question

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15 Darcey sometimes goes to the gym after work.

The probability of going to the gym is affected by whether she arrives home early or late.

The probabilities are shown in the tree diagram.



15 (a) Write the missing probability on the tree diagram.

[1 mark]

15 (b) What does the probability of $\frac{3}{4}$ represent in this context?

[1 mark]

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15 (c) Calculate the probability that, on a randomly chosen work day, Darcey will get home late and go to the gym.

[2 marks]

Answer _____

15 (d) Next year Darcey will work 225 days.

She only goes to the gym on a work day.

Estimate the number of times Darcey will go to the gym next year.

[4 marks]

Answer _____

8

END OF QUESTIONS

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