**1.** The table gives information about the selling price and the mileages of 8 used cars.

|  |  |  |  |
| --- | --- | --- | --- |
| **Selling price  (to the nearest £500)** | **Mileage  (to the nearest 1000 miles)** |  |  |
| 11 000 | 78 000 |  |  |
| 8500 | 65 000 |  |  |
| 9500 | 39 000 |  |  |
| 7000 | 34 000 |  |  |
| 12 500 | 23 000 |  |  |
| 5000 | 105 000 |  |  |
| 9000 | 48 000 |  |  |
| 14 000 | 20 000 |  |  |

(*a*) Calculate Spearman’s coefficient of rank correlation for this information.

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**(4)**

(*b*) (i) Interpret the correlation between the selling price and the mileage of these used cars.

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(ii) Comment on the strength of the correlation.

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**(2)**

**(Total for Question 1 is 6 marks)**

**2.** Mrs Smith and Mrs Patel ranked the work of 8 students.

The table gives information about their ranks.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Student** | **Rank (Mrs Smith)** | **Rank (Mrs Patel)** |  |  |
| **A** | 4 | 6 |  |  |
| **B** | 8 | 4 |  |  |
| **C** | 1 | 3 |  |  |
| **D** | 6 | 1 |  |  |
| **E** | 2 | 7 |  |  |
| **F** | 7 | 8 |  |  |
| **G** | 3 | 2 |  |  |
| **H** | 5 | 5 |  |  |

(i) Calculate Spearman’s coefficient of rank correlation for this information.

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(ii) Interpret your answer.

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**(Total for Question 2 is 4 marks)**

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**3.** The table gives information about the heights, in cm, of ten athletes and their positions in a throwing competition.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Athlete** | **Height (cm)** | **Position** |  |  |  |
| A | 112 | 8 |  |  |  |
| B | 114 | 9 |  |  |  |
| C | 123 | 7 |  |  |  |
| D | 128 | 5 |  |  |  |
| E | 134 | 10 |  |  |  |
| F | 146 | 3 |  |  |  |
| G | 148 | 4 |  |  |  |
| H | 151 | 6 |  |  |  |
| I | 154 | 1 |  |  |  |
| J | 158 | 2 |  |  |  |

(*a*) Work out Spearman’s rank correlation coefficient for these data.

You may use the blank columns in the table to help with your calculations.

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**(3)**

(*b*) Interpret your answer to part (*a*).

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**(1)**

**(Total for Question 3 is 4 marks)**

**4.** Dr Farah collected some information about the Body Mass Index (BMI) and the finishing position in a marathon for each of ten male adults.

The table shows this information.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Adult** | **BMI** | **Finishing position** | **Rank of BMI** | ***d*** | ***d*2** |
| A | 18.4 | 3 |  |  |  |
| B | 19.5 | 2 |  |  |  |
| C | 19.8 | 1 |  |  |  |
| D | 20.5 | 6 |  |  |  |
| E | 21.2 | 4 |  |  |  |
| F | 22.5 | 5 |  |  |  |
| G | 23.7 | 9 |  |  |  |
| H | 25.3 | 10 |  |  |  |
| I | 26.7 | 7 |  |  |  |
| J | 29.3 | 8 |  |  |  |

(*a*) Calculate Spearman’s coefficient of rank correlation for this information.

You may use the columns in the table to help with your calculations.

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**(3)**

(*b*) (i) Describe the correlation.

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(ii) Interpret the correlation in the context of the information in the table.

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**(2)**

**(Total for Question 4 is 5 marks)**

**5** 8 people were in a cake baking competition.

Judge X and Judge Y each put the cakes in rank order.

Rank 1 is for the best cake.

Here are the results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cake** | **Judge X** | **Judge Y** |  |  |
| **A** | 1 | 5 |  |  |
| **B** | 6 | 8 |  |  |
| **C** | 2 | 4 |  |  |
| **D** | 5 | 2 |  |  |
| **E** | 4 | 1 |  |  |
| **F** | 3 | 7 |  |  |
| **G** | 7 | 6 |  |  |
| **H** | 8 | 3 |  |  |

(*a*) Work our Spearman’s coefficient of rank correlation for the information in the table.

You may use the blank columns in the table to help you with your calculations.

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**(3)**

(*b*) Interpret your answer to part (*a*).

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**(1)**

**(Total for Question 5 is 4 marks)**