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|  | Faculty of Business, Law and Digital Technologies | |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **STUDENT NO.** |  |  |  |  |  |  |  |   **AN0001 – WORKING WITH NUMBERS SPECIMEN PAPER**  ***Please note that these are the instructions as they will appear on the paper*** | | |
| TIME CONSTRAINED ASSESSMENT  **DATE** | |
| **DURATION – 2 HOURS 15 MINUTES (including time allowance for online TCA management)** | | |
| **INSTRUCTION**  **General Instructions** | |

This is an individual assessment. You must complete the assessment on your own without assistance from anyone else.

Anyone suspected of submitting work that is not their own will be investigated under the University’s Academic Misconduct policy.

By submitting this assignment, you are confirming that this is your own work and that you abide by the University assessment regulations.

**Specific Instructions for this Paper**

Type your student number in the box at the top of this page.

Answer ALL questions, in the space provided.

You MUST show your workings. A correct answer without any workings will score a maximum of 1 mark.

When typing calculations, you do not need to worry about formats for equations, powers etc. For example, 54 can be typed as 5^4 or ‘5 to the power 4’.

Non-programmable calculators are permitted.

This is an open-book assessment; you are permitted to use your notes and books.

You are advised to use a PC to submit your answer.

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**Show your workings.**

**QUESTION ONE (10 Marks)**

**a)** An item priced at £50 is to be increased by 7%. Calculate the new price.

Answer…………………………..

**b)** An item priced at £80 is to be reduced by 8.5%. Calculate the new price.

Answer……………………………

**c)** The price of an item has just been reduced by 30% to £35. What was the price before the reduction?

Answer…………………………..

**d)** The price of an item including 20% VAT was £192. What was the price before VAT?

Answer…………………………..

**e)** An item priced at £27.99 was reduced to £18.99. What was the percentage decrease?

Answer……………………………

**QUESTION TWO (10 MARKS)**

**a)** The three shareholders in a business (Jim, Karen, and Lee) share out the profits in the ratio 9:4:2

Last year Lee received £9,500. What was the total profit?

**b)** A bakery makes 3 types of cake – large, medium, and small. The profit that they make on each type (large, medium, small) has a ratio of 4:2:1 i.e. they make 4 times as much profit on a large cake compared to a small one.

Last week they sold 48 large cakes, 75 medium cakes, and 123 small cakes. Their total profit was £981.15.

How much profit do they make per unit on each type of cake?

**QUESTION THREE (8 Marks)**

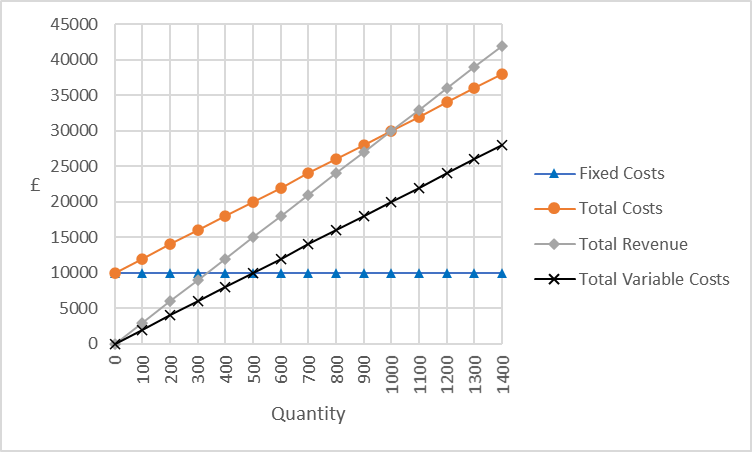
**a)** Complete the table below, finding the value of 3x for different values of x.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 |
| 3x |  |  |  |  |  |  |  |

Hence find an approximate solution to the equation 3x = 6

**QUESTION FOUR (10 Marks)**

**a)** The graph below shows the monthly costs and revenue (vertical axis) against the number of units (horizontal axis) for a product.



Using the graph and/or any relevant calculations identify:

**a)** the variable cost per unit

**b)** the selling price of the product

**c)** the number of units that must be sold each month in order to break even

**QUESTION FIVE (15 Marks)**

***For this question you may find the compound interest formula useful:***

**a)** £5,000 is invested in an account that receives 3% compound interest per year. Calculate the value of the investment after 5 years.

Answer…………………………..

**b)** If the investment in part a) receives 0.25% compound interest per month rather than 3% per year, how much extra interest will it receive during the 5 years?

Answer………………………….

**c)** At what annual rate ofcompound interest would an investment of £2,000 made now be worth £3,000 in 5 years’ time?

Answer………………….…..

**d)** You require £10,000 in 4 years’ time. An amount will be invested today and will receive 5% compound interest per year. How much needs to be invested today?

Answer……………………….

**QUESTION SIX (12 Marks)**

**a)** A certain model of car retails for £7,000 in the UK and for €6,500 (Euros) in Belgium. What is the percentage difference in the price between the two countries? (exchange rate is £1 = €1.14)

Answer………………………….

**b)** A bureau de change at the UK Eurostar terminal buys Euros from customers at an exchange rate of £1 = €1.28. It sells Euros to customers at a rate of £1 = €1.07.

If they buy £50,000 worth of Euros, how much profit will they have made when they sell them?

Answer………………………….

**QUESTION SEVEN (15 Marks)**

**a)** The following data represent the time taken (minutes) for a certain scheduled rail service between London and Southampton, over a 15-day period.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 72 | 75 | 68 | 71 | 76 | 71 | 72 | 70 | 78 | 155 | 69 | 71 | 72 | 74 | 75 |

Find the mean and median journey time.

Answer: Mean …………………………. Median………………………………

Which of the two measures is more appropriate here and why?

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**b)** The number of cars per household was recorded for a sample of 1000 households

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Cars | Number of Households |  |  |
| 0 | 117 |  |  |
| 1 | 390 |  |  |
| 2 | 429 |  |  |
| 3 | 64 |  |  |
| Total | 1,000 |  |  |

Find the mean, median, and mode for the number of cars per household.

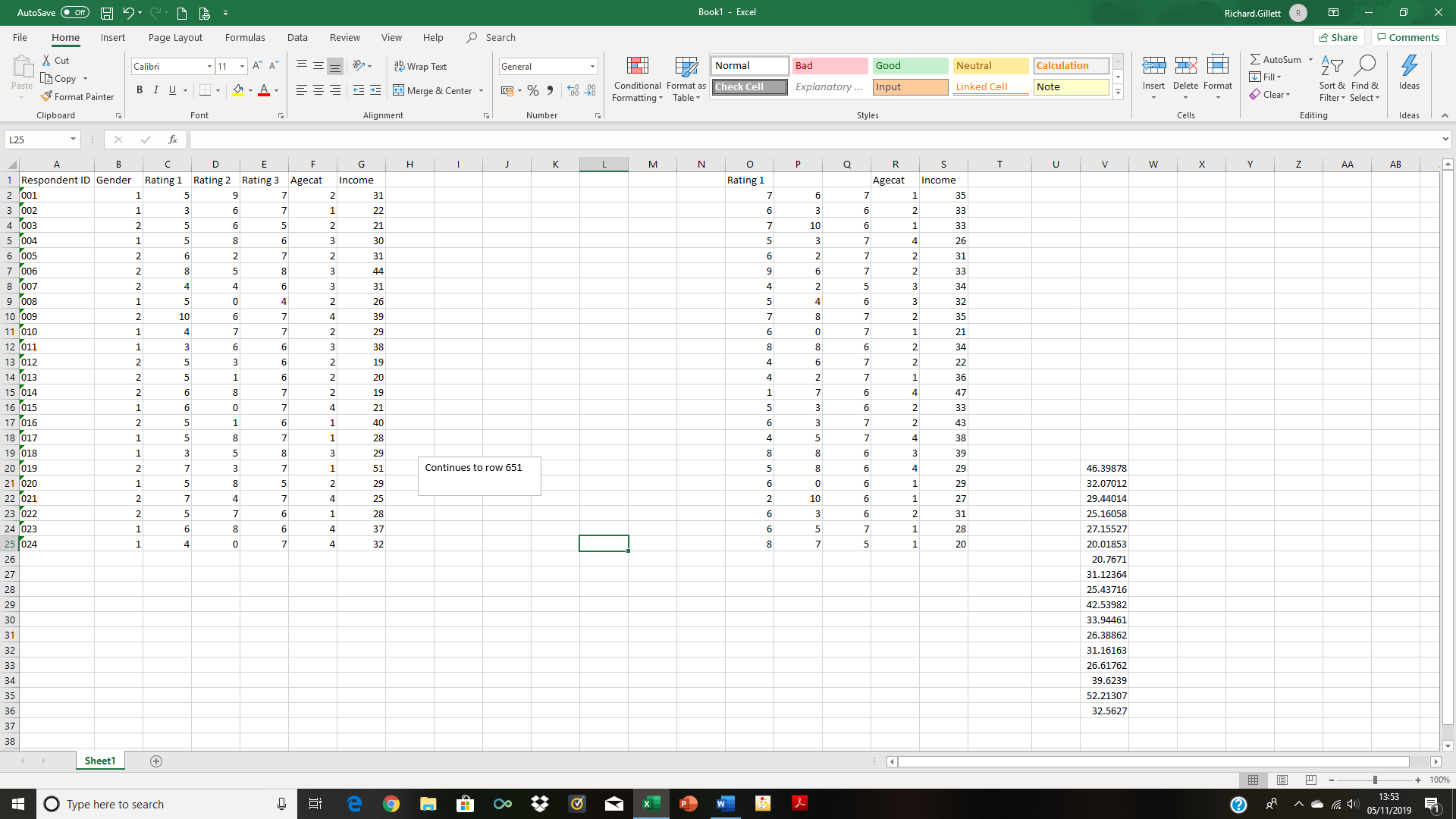
Answer: Mean………………………….. Median……………………… Mode…………………………..

**QUESTION EIGHT (20 Marks)**

*Please note that this question does not require you to perform any calculations.*

The screenshot below shows part of an Excel spreadsheet which represents the results of a marketing survey for a new food product completed by 650 potential customers.

Respondents were asked their gender (1 = male; 2 = female), age category (1 = under 25; 2 = 25 to 44; 3 = 45 to 59; 4 = 60 or over), and annual income (in £000). They also gave a rating out of 10 for the product for three different aspects – packaging, taste, and value for money (given as Rating 1, Rating 2, and Rating 3).



(a) From the columns in the data file, identify a field with:

(i) nominal level of measurement

Answer………………………………………….

(ii) ordinal level of measurement

Answer…………………………………………

(iii) scale level of measurement

Answer………………………………………..

(b) Write down the Excel formula you would use to find (for all 650 respondents, not just the ones shown):

(i) the mean score for ‘Rating 1’

Answer………………………………………………………………………………………..…

(ii) the median income

Answer………………………………………………………………………………………..…

(iii) the mean income for men

Answer………………………………………………………………………………………..…

(iv) the numbers of men and women in the survey

Answer (Men)……………………………………………………………………………………..…

Answer (Women)…………………………………………………………………………………..

(v) the number of respondents whose income (£000) was 60 or over

Answer………………………………………………………………………………………..…

(vi) the number of respondents whose income (£000) was between 20 and 29

Answer………………………………………………………………………………………..…

**END OF QUESTIONS**