Application of number: level 3 – is house buying a good idea or not?

A table to show the data collated for the samples for other houses and first-time buyers' houses (in ascending order): Other housesPrice (ï¿½)First-time buyers' housesPrice (ï¿½)132, 500118, 500235, 000229, 950337, 950337, 500439, 950439, 500544, 950539, 950646, 250639, 950754, 950739, 950864, 950841, 950964, 950943, 9501065, 0001044, 9501171, 9501146, 5001274, 9501246, 9501382, 5001349, 9501487, 5001450, 9501589, 9501551, 9501694, 9501651, 95017110, 0001752, 50018110, 0001852, 99519131, 9501953, 00020139, 5002054, 95021145, 0002154, 95022145, 0002255, 95023149, 9502357, 95024175, 0002469, 50025175, 0002569, 95026195, 0002670, 95027195, 0002772, 95028210, 0002879, 50029215, 0002979, 95030249, 9503084, 950The mean of a set of data is the sum of the values divided by the number of values. Mean = sum of values / number of valuesThe range is a measure of spread and the range of a set of data is the difference: Greatest value – least valueFirst-time buyers' houses:* Mean: Sum of house prices / 30= ï¿½1, 584, 445 / 30= ï¿½52, 815 (to the nearest ï¿½)* Range: highest house price – lowest house price= ï¿½84, 950 – ï¿½18, 500= ï¿½66, 450 (to the nearest ï¿½)Other houses:* Mean: Sum of house prices / 30= ï¿½3, 334, 600 / 30= ï¿½111, 153 (to the nearest ï¿½)* Range: highest house price – lowest house price= ï¿½249, 950 – ï¿½32, 500= ï¿½217, 450 (to the nearest ï¿½)All houses:* Mean: Sum of house prices / 60= ï¿½4, 919, 045/ 60= ï¿½81, 984 (to the nearest ï¿½)* Range: highest house price – lowest house price= ï¿½249, 950 – ï¿½18, 500= ï¿½231, 450 (to the nearest ï¿½)All of the calculations have been double checked in order to ensure that they are correct. The data in the tables of the samples was arranged in ascending order in order to be able to easily recognise the highest and lowest values required for calculating the range. The

calculations for the means are seemingly correct since they are similar to mean values provided by the Internet. It can be quite simply proved that the mean for all houses is correct as:[First-time buyers' houses' mean + Other houses' mean] / 2 = All houses' meanAll of the means are also values, which are almost in the middle between the largest and the lowest values of each sample.

a) Cumulative frequency graphs will be produced to find the medians, the middlevalues of distribution, and interquartile ranges, measures of spread, for the data collected. In order to produce the cumulative frequency graphs (for first-time buyers' houses, other houses and all houses), a cumulative frequency table needs to be made, organising the house prices in ascending order. First-time buyers' houses: House price (ï¿½0000)Cumulative frequencyLess than 0010213247513623725829930Other houses: House price (ï¿½)Cumulative frequencyLess than 00102030445667710812915101611161218131814201523162317231825192520272127222923292429253 0All houses: Price (ï¿½0000)Cumulative frequencyLess than 00102132411519630735841945104611461248134814501553165317531855195520572157225923592459256 0The median can be easily estimated using a cumulative frequency graph. Strictly speaking the middle value of the distributions of the cumulative frequency graphs is the : (n+1)/2 value (where n = the highest value of the distribution)However when using cumulative frequency graphs an estimate is used.

Therefore it is considered accurate enough to read of the value when the value is n/2. On each of the cumulative frequency graphs the drawn lines

demonstrate how the median values were read off. Median price for first-time buyers' houses = ï¿½52000 (to nearest ï¿½000)Median price for other houses = ï¿½90000 (to nearest ï¿½000)Median price for all houses = ï¿½60000 (to nearest ï¿½000)All of the values for the medians have been double checked in order to ensure that they are all correct. They all undeniably seem ideal as middle values between the largest and smallest values of each sample. The 15th values for the first two cumulative frequency tables correspond to the median values for first-time buyers' houses and all houses and the 30th value of the last cumulative frequency table is equivalent to the median for all houses.

The median price for all houses is also between the first-time buyers' houses' median and the other houses' median. However I intend to use the estimated mean prices instead of the estimate medians of the house prices to represent the averages. The estimated median prices are undeniably more inaccurate as they are determined by reading of the value on the cumulative frequency graph when the cumulative frequency is n/2 instead of when it is (n+1)/2. Since the house prices are generally very high, it is impossible to produce a graph comprising of tick marks which each represent low intervals (such as ï¿½1 or ï¿½100). Therefore on each of the cumulative frequency graphs the tick marks either represents ï¿½1000 or ï¿½2000 and values can only be given to the nearest ï¿½000 Also the mean price calculated for all houses (ie. ï¿½81, 984) is much closer to a value (ie.

ï¿½80, 468) obtained from the internet, compared to the estimated median value of ï¿½60000. The interquartile range can also be determined from a cumulative frequency graph. This can be achieved by estimating the upper

and lower quartile values by reading of the values when the cumulative frequency is 3n/4 and n/4 respectively (as shown in all the cumulative frequency diagrams). Then the lower quartile value should be subtracted from the upper quartile value.

Interquartile range = Upper quartile – Lower quartileFirst-time buyers' houses: Interquartile range = ï¿½59, 000 – ï¿½41, 000 = ï¿½18, 000 (to nearest ï¿½000)Other houses: Interquartile range = ï¿½148, 000 – ï¿½62, 000 = ï¿½86, 000 (to nearest ï¿½000)All houses: Interquartile range = ï¿½90, 000 – ï¿½45, 000 = ï¿½45, 000 (to nearest ï¿½000)The spread of the data can be determined by calculating the standard deviation. This is a useful measure of dispersion that is the square root of the variance. However a short simple formula can be used:(? x2 / n) – x2In the following calculations x = house price value, x = mean of house price values, and n = no. of house price values in sample. First-time buyers' houses: Standard deviation = (? x2 / 30) – x2= [(18, 5002 + 29, 9502 + ..

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.. + 84, 9502) / 30] – 52, 8152= ï¿½15299 (to nearest ï¿½)Other houses: Standard deviation = (? x2 / 30) – x2= [(32, 5002 + 67, 5002 + ..

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. + 249, 9502) / 30] – 111, 1532= ï¿½62305 (to nearest ï¿½)All houses: Standard deviation = (? x2 / 60) – x2= [(18, 5002 + 29, 9502 + ...

.... +249, 9502) / 60] – 81, 9842= ï¿½41252 (to nearest ï¿½)It can be deduced from the standard deviations that the spread of the prices for the

sample of other houses is considerably higher than those of first-time buyers’ houses and all houses.

This trend was also be apparent when the ranges and the interquartile ranges were also calculated. The standard deviation values are seemingly correct as they do not exceed their corresponding mean and range values. They are also not negative values. a) The percentage increase will be calculated for houses in Leicester since 1998 for first-time buyers’ houses, other houses and for all houses, as well as for houses in my region, the East midlands. The mean values of the samples and mean figures of 1998 house prices (of Leicester) obtained from the internet will be used for these calculations.

Leicester:* First-time buyers’ houses: Mean (of current house prices) = ï¿½52, 815 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½41, 462 (to nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ 1998 mean] x 100= [(52, 815 – 41, 462) / 41, 462] x 100= 27. 4% (to 3sf)* Other houses: Mean (of current house prices) = ï¿½111, 153 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½88, 502 (to the nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ current mean] x 100= [(ï¿½111, 153 -ï¿½88, 502) / ï¿½88, 502] x 100= 25. 6% (to 3sf)* All houses: Mean (of current house prices) = ï¿½81, 984 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½64, 982 (to the nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ current mean] x 100= [(ï¿½81, 984 – ï¿½64, 982) / ï¿½64, 982] x 100= 26. 2% (to 3sf)The East (midlands):* First-time buyers’ houses: Mean (of current house prices) = ï¿½64, 900 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½49, 600 (to

nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ 1998 mean] x 100= [(64, 900 – 49, 600) / 49, 600] x 100= 30.

8% (to 3sf)* Other houses: Mean (of current house prices) = ï¿½107, 700 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½82, 800 (to the nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ current mean] x 100= [(ï¿½107, 700 -ï¿½82, 800) / ï¿½82, 800] x 100= 30. 1% (to 3sf)* All houses: Mean (of current house prices) = ï¿½86, 300 (to the nearest ï¿½)Mean (of 1998 house prices) = ï¿½66, 200 (to the nearest ï¿½)Percentage increase = [(current mean – 1998 mean)/ current mean] x 100= [(ï¿½86, 300 – ï¿½66, 200) / ï¿½66, 200] x 100= 30. 4% (to 3sf)Assuming that house prices will increase at the same rate the average house price can be estimated for two years time. Average price in 2 years = [(percentage increase +100) / 100]2 x current priceLeicester: All houses: Average price in 2 years = [(26. 2 +100) / 100]2 x ï¿½81, 964= ï¿½130, 539 (to nearest ï¿½)East (midlands): All houses: Average price in 2 years = [(30.

4 +100) / 100]2 x ï¿½86, 300= ï¿½146, 745 (to nearest ï¿½)c) The percentage increases for all houses in Leicester and in the region of the East midlands slightly differ by only about 4%. The main findings on average house prices, for my data as well as regional data (for the East) are presented in the form of suitable graphs and charts. Graph 1 is a bar chart, which compares the average house prices in Leicester as well as those within the region. The data is divided (i.

e. by using different coloured bars) in order to be able to easily differentiate the various house price averages for first-time buyers’ house, other houses

and all houses. The bar chart visually provides a clears easy-to-read representation of the data, with the actual values indicated above the bars, and it allows comparisons to be made distinctly. Graph 2 is a clustered bar chart comparing the percentage increases of house prices between the years 1998 and 2001. Its approach is undeniably rather similar of that of graph 1.

The bars are alternately coloured in order to differentiate between the house prices of 2001 and 1998. The differences between the 2001 values and the 1998 values are equivalent to the percentage increases. The data is furthermore divided by spacing in order to easily distinguish between the house prices for first-time buyers' houses, other houses and all houses. Graph 3 shows boxplots, which are designed to give an easy-to- read representation of the location and the spread of the distribution for the data of the sample for first-time buyers' houses, other houses, and all houses. It is clearly able to demonstrate the three quartiles (i. e.

lower quartile, median and upper quartile) as well as the two extremes of the data (i. e. lower and upper extremes). Each of the boxplots effectively shows the main features for the house prices of each of the samples. Each one consists of a box, representing the middle half of the data (between the quartiles), and two " whiskers" showing the more extreme values, above and below the quartiles.

Accuracy of the graphs and charts were ensured by carrying out the following:* Using tick marks with lower intervals* Adding values above bars (on Excel software) and ensuring that they correspond to the data in each of the sample tables. According to the data for all houses the average house

price in my survey (i. e. ï¿½81, 984) is lower than the average house price for my region (i.

e. ï¿½88, 700). Evidently this difference is not very considerable. The difference could be due to the following:* Lack of demand as Leicester may have less to offer as a city (e. g.

employment, education, leisure and recreation, low crime rates etc.)* Inaccuracies in selecting the house prices for the sample, which may be caused by not including enough data or ineffective selective sampling (due to data being selected too randomly). However the average house price (for all houses) in my survey generally tendsbe similar to that of the UK (ï¿½81, 800). Generally I think that buying a house in my local area would be a good investment due to the following reasons:* Average Leicester house prices being only relatively slightly above the national average.* Leicester house prices having the tendency to increase relatively considerably by about 26% within 2 years.