To test if my secondary evidence is correct



Not everyone has the same pulse rate, and pulse rate cane be effected by a number of different variables.

For my task I will be investigating the difference in MEN and WOMEN'S pulse rates. In order to form my hypotheses I have used secondary data from the Internet, cited at: www. vitalstatistcs. htm.

Statistics show that the average male pulse rate is about 72, and the average adult female is between 76 to 80, and the average pulse rate for men and women is between 60 – 80. AIMTo test if my secondary evidence is correct and therefor to find if adult men have a higher pulse rate or adult women and the average pulse rate for both sexes. HYPTHESISOn average Adult men will have a pulse rate between 71 – 73, adult women will have a pulse rate of 76 – 80, and the average pulse rate for both sexes will be between 60 – 80. OBJECTIVES1.

To collect data from a suitable number of individuals using an appropriate sampling method. 2. To present the data in a meaningful way. 3. To interpret data and analyse results and diagrams.

4. To draw conclusions on analysis, state weather the prediction was correct. (Page 2 of 24)METHODIn order to test my hypothesis I will use stratified random sampling, as it is more accurate then random sampling. Therefore I can take into account the age of my subjects, since age is also an important factor in individuals pulse rates.

For each sex I have used a total sample of 60 people and divided them into 3 categories (sratum) of age groups. Using random sampling (Giving each

individual a number and selecting random numbers by using the RAN button on my calculator.) A sample of 10 is then taken from each group, giving me a total sample of 30 for each sex. Also by adding the samples of each gender together I will also have a larger sample of 60 to test the second part of my hypothesis. I have obtained my sample from students at college, friends, family who fit my criteria of age and gender. I have also used the residents of the local retirement home where I work to obtain the sample number required for those above the age of 50.

Thus the calculations containing the numbers for each gender is as follows: MEN WOMEN20 X 30 = 10 20 X 30 = 10 Age Group 18 ? -? 30 60 Age Group 18 ? -? 30 6020 X 30 = 10 20 X 30 = 10Age Group 30 ? -? 50 60 Age Group 30 ? -? 50 6020 X 30 = 10 20 X 30 = 10Age Group 50 ? -? 90 60 Age Group 50 ? -? 90 6010 +10 +10 = 30 MEN 10 +10 +10 = 30 WOMENOnce I have obtained my sample 30 for men and a sample of 30 for women. I will also add the two samples to obtain a sample of 60 to test the second part of my hypothesis. My next task was to Proceed to take each individuals pulse rate using a watch to measure the pulse rate per minute. (Page 3 of 24) Below I have represented my data into a grouped frequency distribution table for me to be able to find the mean of each gender and the frequency of both sexes added together. HERE FOLLOWES MY GROUPED FREQUENCY DISTRABUTION TABLE FOR EACH SEX AND THE FREQUENCY OF BOTH SEXES ADDED: Pulse RatesMid IntervalMen FrequencyWomen FrequencyMen ; Women FrequencyMid-interval i2¹/₂ Frequency of MEMMid-interval i2¹/₂ Frequency of WOMENMid-interval ii 1/2 Frequency of MEN; WOMENXFFFF ii 1/2 XF ii 1/2 XF ii 1/2 X56 - 60582131165817461 - 656333618918937866 -

706854934027261271 - 75739514657365102276 - 8078571239054693681 - 8583461033249883086 - 90881348826435291 -

95931129393186Totals303060220522854490MENWOMENMEN AND WOMENMean = ? x�f? f74 (to 2 sf)76 (to 2 sf)75 (to 2 sf)(Page 4 of 24)I have also used the same grouped frequency distribution table as above to find the grouped standard deviation of each gender and the frequency of both sexes added together. PulseRatesMid Interv-alMen's Freque-ncyWomen's Freque-ncyMen ; Wom-en's Freque-ncyTotal frequ-ency for MenTotal frequ-ency for Wom-enTotal frequ-ency for Men & Wom-enSqua-red deviation for menSqua-red deviation for Wom-enSqua-red deviation for Men and wom-enXFFFfXFX0fXF(x-()2F(x-()2F(x-()256-605821311658174480.

5408. 04702. 2761-6563336189189378330. 75522. 72636.

5466-7068549340272612151. 25268. 96252. 8171-7573951465736510222. 2551.

21. 2676-80785712390546936101. 2522. 68265. 0881-85834610332498830361277.

44940. 986-908813488264352210. 25417. 72864. 3691-95931129393186380. 25282.

24388. 09Totals3030602205228544902017. 522014051. 31MENWOMENMEN & WOMENStandard deviation V? F(x - ()2(()8.

20 (to3sf)8. 57 (to3sf)8. 22 (to3sf)(Page 5 of 24)My results for men show that the mean obtained from the grouped data is outside the predicted pulse rate range for men. However as the mean and the standard deviation obtained https://assignbuster.com/to-test-if-my-secondary-evidence-is-correct/ each group where the mid interval is applied.

from the grouped data can only be an estimate, since there is a spread in

Therefor I have used the standard deviation and the mean obtained from the raw data. I can also use the raw data to find the median, interquartile range and the semi-interquartile range for each gender. The mode however is not relevant in this case, as there are several identical pulse rates in each group. Also In relation to the second part of my hypothesis, by adding the frequencies of men and women I have a larger total frequency of 60.

I can find the mean and the standard deviation for the frequency of both sexes added by using the raw data.(See overleaf, page 6) FOR RAW DATA SORTED IN ORDER AND BY GENDER. My next step is apply the data collected in a frequency distribution table for each sex and represent it in a population pyramid, as this will allow me to compare the distribution of two sets of data at a glance. I will also be able to see in which modal classes the largest frequency occurs.(See overleaf, page 7) FOR POPULATION GRAPH AND FREQUENCY DISTRIBUTION TABLE FOR MEN AND WOMEN.(Page 8 of 24)As the range is a very crude measure of spread I have chosen to use the 10-90th percentiles to avoid the extreme outliers of my data from each sex and the frequency of both sexes added together.

Hence I have drawn the respective cumulative frequency curves for each sex and both sexes added together and found the 10-90th percentile range. BELOW FOLLOWES MY CUMALATIVE FREQUENCY TABLE BY GENDER AND THE TOATAL FREQUENCY OF MEN AND WOMEN ADDED: Pulse RatesFrequency for menFrequency for WomenFrequency for Men & WomenCumulative Frequency for MenCumulative Frequency for WomenCumulative Frequency for Men & Women56 - 6021321361 - 6533654966 - 705491081871 -75951419133276 - 80571224204481 - 85461028265486 - 9013429295891 - 95112303060(See overleaf, page 9) FOR PERCENTILE RANGE, REPRESENTING EACH SEX.(See overleaf, page 10) FOR PERCENTILE RANGE, REPRESENTING FREQUENCY OF BOTH SEXES ADDED.(Page 11 of 24)However as averages can only provide a typical value for my data I need to know the spread (or dispersion) of my data to get a complete picture. As the standard deviation takes into account all the data, I have decided to use the interquartile range, which allows me to cut out any extreme values. It also allows me to find 50% of my values (pulse rates) that lie between the upper and lower quartiles, in comparison to the 80% of my values (pulse rates) obtained from the 10-90th percentile range.

Furthermore it allows me to find the skeweness of my data, if skewed. Other advantages are that it permits me also to visually see the outliers of my data if any by drawing a box-and whisker diagram. The cumulative frequency curve (or ogive) is drawn using the same grouped data from the frequency distribution table used to find the percentile range (see page 8) in this way I can compare the interquartile range and the percentile range. The frequency distribution table used to find the percentile range is also used to draw a box and whiskers diagram for the frequency of both sexes added.

(See overleaf, page 12) FOR CUMALITIVE FREQUENCY CURVE & BOX AND WHISKER PLOT REPRESENTING FREQUENCY OF MEN AND WOMEN.(See page 10) FOR CUMALITIVE FREQUENCY CURVE & BOX AND WHISKER PLOT REPRESENTING THE FREQUENCY OF MEN AND WOMEN ADDED. In order to https://assignbuster.com/to-test-if-my-secondary-evidence-is-correct/ get a different perspective of the skewness that takes into account all of my data I will need to represent my data in form of histograms. This form of representation of data also gives me the added advantage of being able to draw a frequency curve by joining the midpoints and comparing the results at a glance.

In relation to the higher standard deviation for women I would expect the frequency curve representing women to be less peaked and more spread out in comparison to men's frequency curve, as they have a lower standard deviation. The frequency curve will also provide the means for me to be able to analyse if my graphs have a recognisable shape that illustrates the shape of distribution, such as skewness, bimodal or symmetrical.(Page 13 of 24)Moreover I have insured that my class boundaries are kept the same as the cumulative frequency table, due to the fact that a number of my values (pulse rates) are identical in both groups as evident in the raw data table (see page, 6). Hence any small change to the class boundaries will result in a large proportion of data falling into different groups.

This in turn will effect the shape of distribution when comparing the skewness with the box-and whisker diagram. The added frequency of both sexes shown bellow will likewise enable me to draw a frequency curve and visually see the shape of distribution of all of my data in comparison to the middle 50% of data used in the box and whisker diagram. FREQUENCY DISTRIBUTION TABLE SHOWING CLASS BOUNDERIES AND THE FREQUENCY OF MEN, WOMEN AND BOTH SEXES ADDED BELOW: Pulse RatesClass BoundariesFrequency for MenFrequency for WomenFrequency for Men ; Women56 – 6055. 5 – 60. 521361 – 6560. 5 – 65.

https://assignbuster.com/to-test-if-my-secondary-evidence-is-correct/

533666 - 7065. 5 - 70. 554971 - 7570. 5 - 75. 5951476 - 8075. 5 - 80.

5571281 - 8580. 5 - 85. 5461086 - 9085. 5 - 90.

513491 – 9590. 5 – 95. 5112(See overleaf, page 14) HISTOGRAM FOR MEN(See overleaf, page 15) HISTOGRAMS FOR WOMEN(See overleaf, page 16) FREQUENCY CURVE FOR MEN AND WOMEN.(See page 19) FOR HISTOGRAM AND FREQUENCY CURVE REPRESENTING THE FREQUENCY OF MEN AND WOMEN ADDED. Moreover in order to acquire a more detailed visual perspective of distribution I need to make the class boundaries for the histograms smaller.

I have presented my data in a histogram with bigger class intervals at the lower pulse rates where there is notenough data to obtain a class width of 2. Thus I have done the relevant calculations to present my data in a histogram with bars of unequal widths (See frequency density table overleaf).(Page, 17 of 24)I will also draw a histogram with bars of unequal widths and smaller class widths constructed from the frequency of men and women added together. This will enable me to compere my shape of distribution with the histogram of equal widths and equal class boundaries.

HENCE HERE FOLLOWES MY TABLE SHOWING FREQUENCY DENSITY: Pulse RatesFreque-ncy for MenFreque-ncy for WomenFreque-ncy for Men ; WomenClass IntervalClass WidthFrequen-cy Density for MenFrequen-cy Density for WomenFrequen-cy Density for Men ; Women56 – 5921355. 5-59. 540. 50. 250. 7560 – 6111259.

5-61.520.50.5162 - 6311261.5-63.

520. 50. 5164 - 6511263. 5- 65. 520. 50.

5166 - 6713465. 5- 67. 520. 50. 75268 - 7041567.

5-70.531.30.31.671 - 7263970.5-72.

5231. 54. 573 - 7421372. 5- 74. 5210.

51. 575 - 7622474. 5- 76. 5211277 - 7822476. 5- 78. 5211279 - 8034778.

5-80. 521. 523. 581 - 8213480. 5- 82. 520.

51. 5283 - 8523582. 5- 85. 530. 711.

786 - 8713485. 5- 87. 520. 51. 5288 - 9511287.

5- 95. 580. 1250. 1250. 25See overleaf, page 18) FOR HISTOGRAM WITH BARS OF UNEQUAL WIDTHS REPRESENETING THE FREQUENCY OF MEN AND WOMEN.(See page 19) FOR HISTOGRAM WITH BARS OF UNEQUAL WIDTHS REPRESENETING FREQUENCY OF MEN AND WOMEN ADDED.

(Page 20 of 24)Interpretation/ analysisI began this investigation with the aim of testing if my secondary evidence was correct, and consequently to determine if men have a higher pulse rate then women and also to find the average pulse rate of men and women. Having write down and check all my results. My first task was to process the data into usable information by collecting the data into groups I was able to find the mean and standard deviation of my grouped distribution for men, women and the frequency of both sexes added. The estimate of the mean for men obtained from my grouped distribution table and rounded to 2 significant figures was 74 (see page 3).

This figure was marginally outside the predicted pulse rate range of 71 to 73 for men and did not collaborate with my prediction. However as it is impossible to determine the exact mean of my grouped distribution from the mid-intervals I have used the mean obtained from the raw data for men and women. Hence I used the raw data in order to find the mean, standard deviation, interquartile range and the semi-interquartile range for men and women (see page 6). I found that the mean for men was (73. 1) and the mean for women was (75.

9). The mean pulse rates for both sexes were out of my predicted pulse rate range of (71 – 73) for men and (76 – 80) for women by the value of (0. 1). However in light of the fact that I did not measure my samples pulse rates electronically, it would only be possible for me to obtain discrete values. Therefore if rounded to the nearest number the mean for women would be (80) thus complying with my hypothesis of an average pulse rate of between (76 -80) for women. And the mean for men would be (73) again complying with my hypothesis of an average pulse rate of between (71 -73) for men.

I also found that the more accurate measure of the mean derived from the raw data portraying the frequency of both sexes was (74. 5), which again complied with my hypothesis of a pulse rate range of (60-80) for both sexes. (Page 21 of 24)As the grouped standard deviation is the less accurate measure of spread in comparison to the standard deviation obtained from the raw data, therefore I have used the latter. From the standard deviation for men (8.

36, to 3 sf) it is evident that men have a more constant data and a smaller spread then women who had a standard deviation of (9.00 to 3 sf). In relation to the second part of my hypothesis the standard deviation representing the frequency of both sexes added (8. 53 to 3 sf) shows that 2/3 of the values lie within 1 standard deviation of the mean.

Hence for both men and women and the frequency of both sexes added, approximately 95% of the distribution are within 2 standard deviations of the mean and over 99% are within 3 standard deviations of the mean. As the interguartile range attained from the graph is likely to be less accurate then the interquartile range attained from the raw data I have used the latter. The interguartile range obtained from the raw data shows that half of men and half of women have a pulse rate between the lower and upper quartiles. The interquartile range is smaller for men and that the middle 50% of the pulse rates measured lie in an interval of 11 for men and an interval of 12 for women.

Hence women have a wider spread, but this is not significant. The upper quartile and lower quartile for women is higher. The upper quartile for women is 82 and the lower quartile is 70 the upper quartile for men 79 and the lower guartile is 68 this again suggests that women have the higher values (see page 6). The semi-interguartile range of 5.

5 for men and 6 for women was attained from the raw data. This show that the middle 50% of the pulse rates measured are within the range with in 5.5 https://assignbuster.com/to-test-if-my-secondary-evidence-is-correct/

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pulse rates of the median mark for men, and within 6 pulse rates of the median mark for women. I can perceive from the population pyramid that the modal class with the highest bar for men and women correlates with my hypothesis. The highest frequency occurs at the modal class of 71 – 75 for men and the modal class of 76 – 80 for women, which supports my hypothesis. I can also see that the majority of the frequency occurs at the pulse rate range of 60 to 80, which was also predicted in my hypothesis.

I can see from the percentile range graph that 80% of values (pulse rates) for men has a range of (21), And 80% of values (pulse rates) for women has a range of (22). The extreme values are smaller and more concentrated for men then women. Therefor women have a wider spread in pulse rates then men. The percentile range for men and women show that although the measure of spread is smaller for men then women. The difference between the two however is not significant (see page, 9). The percentile range representing the frequency of both sexes added also has a percentile range of 22.

This shows that the middle 80% of pulse rates lie in an interval of 22 (see page 10).(Page 22 of 24)Since the results from my graph can only be an estimate I have checked the median, interquartile ranges, semi-interquartile range with the corresponding table attained from the raw data representing each gender. I found that the interquartile range and the median correspond closely with the parallel measurements obtained from the raw data (see page 6). I can recognise from my cumulative frequency graph and box-and whiskers diagram that Q2 (median) is closer to Q3- (upper quartile) for women. Thus women have a negatively skewed distribution. This implies that most of the values (pulse rates) for women are large which supports my hypothesis. For men Q2 (Median) is closer to Q1 (lower quartile). Thus men have a positively skewed distribution.

This implies that most values (pulse rates) situated in the middle 50% of the sample for men are smaller then women's which backs my hypothesis (see page 12). Furthermore I can see that I have one outlier for men just outside the whiskers and no outliers for women. Showing that there are no unusual values in comparison to the rest of the data for women. The single outlier for men may be due to a value that has been mis-recorded or a value that has been measured correctly but dose not fall in line with the rest of my data.

The box and whiskers diagram representing the frequency of both sexes added showed that although there was a positively skewed distribution, this was not significant as the median mark was close to the centre of the box. Hence the semi-interquartile range of 6 for men and women shows that the middle 50% of the pulse rates measured lie within the value of 6 of the median mark. As the median mark for the frequency of men and women added was 74, and 6 values above or bellow the median mark falls into my prediction of an average pulse rate of between 60 to 80 for both sexes. I can therefor conclude that 50% of my sample comply with my hypothesis.

Also my box and whiskers diagram did not show any outliers for this data, suggesting that there were no unusual values when taking account all the data (see page 10). My results from the histogram for men show that the shape of distribution represented in a frequency curve for men (see page 16)

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is relatively bell shaped. However the equivalent results for men illustrated in my box plot diagram showing a positively skewed distribution do not reflect the shape of distribution shown in the frequency curve. This is due to the fact that the histogram and the related frequency curve take into account all of my data and not the middle 50% of my values (pulse rates) used to obtain a box plot representing men.

The histogram and the related frequency curve representing women remains negatively skewed. This implies that most values are large and corroborates with my hypothesis. Also the higher standard deviation for women is reflected in the frequency curve representing women, which is less peaked and more spread out (see page 16). The frequency curve is likewise symmetrical about the mean and median mark for women.(Page 23 of 24)Furthermore the bell shaped distribution shown in the frequency curve for men is consistent with the mean and the median acquired from the raw data.

As the mean of (73 to 2 sf) and the median of 72 are approximately half way between the range of pulse rates for men: (56-95). Hence the curve is symmetrical about the mean and median. In relation to the second part of my hypothesis I can observe that in interpreting the histogram for men that the bars that fall into my predicted pulse rate range of between 60 to 80 have an area of 11 large squares (see page 14). The histogram representing women has an area of 9. 5 large squares (see page 15). Hence a total of 20.

5 squares represents both sexes. This equates to a total of 41 people, as each square represents 2 people. Therefor by carrying out the following calculation: 41 $\ddot{\iota}_{2}^{1/2}$ 60 X 100 ? 68% (to 2 sf), I can consequently determine that the majority of my sample (68%) complies with my hypothesis. The histogram with bars of equal widths representing both sexes (see page 19) showed that the shape of distribution is relatively bell shaped. I can also observe that the frequency curve is symmetrical about the mean and median mark.

The shape of distribution reflects the distribution seen in the box plot as although the pox plot showed a positive skewed distribution it was not significant, as the median mark was close to the centre of the pox plot. The histogram with bars of unequal widths representing men showed that the highest frequency density occurs at the class interval of 70. 5 to72. 5, which was predicted in the hypothesis. The histogram with bars of unequal widths representing women showed that the highest frequency density occurred at the class interval of 78. 5 to 80.

5. As my original class boundary was 78 to 80 and my data was also originally discrete data and only treated as continuous for showing frequencies of grouped data in a histogram. I can conclude therefore that the highest frequency density falls into the predicted pulse rate range (76-80) for women (see page 18). When comparing the histogram with bars of equal widths representing men and women's frequencies added with the histogram with bars of unequal widths drawn by adding the frequency of men and women (see page 19). I can identify that the second of the two shows to some extent a bimodal distribution, although not an overt bimodal distribution. This is due to the fact that I have made the class intervals smaller, thus showing more precisely the distribution of my data. The highest frequency density representing men is in the class interval of 70. 5 – 72. 5, thus substantiating my hypothesis for men's pulse rate range to be correct. The second highest frequency density, which is representing women, falls into the class interval of 78.

5 – 80. 5. My original hypothesis was that women would have a pulse rate of 76-80. However as the original class intervals were rounded numbers and likewise my original data was actually discrete data and only treated as continuous for showing frequencies of grouped data in a histogram. In relation to the second part of my hypothesis that men and women will have a pulse rate range of 60-80, I found that the majority the frequency density occurs at the pulse rate range of 60-80, which was predicted for both sexes in the hypothesis.

(Page 24 of 24)Conclusion/ EvaluationTo conclude my prediction of the average pulse rates for men, women and both sexes is correct. In every measure of spread including the following: standard deviation, percentile range, inter-quartile range, I found that women had a larger spread then men. This is reflected in the skeweness of box plots and the frequency curves showing shapes of distribution, In both cases the women's results show a negatively skewed distribution. Thus supporting my hypothesis, as it implies that most of my values are large. The population pyramid and histograms also showed that the highest frequency occurred at predicted pulse range of 76 to 80 for women and 71 to 73 for men. In the histogram of unequal widths, representing the frequency of both sexes added I could see a covert bimodal distribution where the highest frequency density occurred with in my predicted pulse rate range for women and men. The mean and median for men, women and both sexes obtained from the raw data also proved my hypothesis to be correct. In interpreting the histograms of men and women I found that 68% of the total area fell into the pulse rate range predicted for the frequency of both sexes added (see pages 14, 15). I also found that the interquartile range for both sexes showed that 50% of my data collaborated with my hypothesis (see page 10). The only result that did not fall into the pulse rates identified in my hypothesis was the mean of grouped distribution for men (see page 3). However as this is not the exact mean but an estimate I have used the mean calculated from my raw data table, which collaborated with my hypothesis.

The results for the frequency of men and women added and represented in a histogram of equal widths showed a relatively bell shaped distribution which reflected the box plot as the median was close to the centre of the box. I could also observe that the majority of the frequency occurred at the pulse rate range predicted. The highest frequency density also occurred at the pulse rate range of 60 to 80, in the histogram of unequal widths (see page 19). Therefor proving my hypothesis to be correct. In regard to my sample size, although I had a larger sample of 60 for men and women, I had a smaller sample of 30 for each sex. My investigation would have been more conclusive if I had a larger sample to test.

However as I used stratified sampling method and obtained my final sample from an overall larger sample originally it was more difficult to obtain a https://assignbuster.com/to-test-if-my-secondary-evidence-is-correct/ larger sample due to time restrictions and availability of access to a large number of people. Likewise if there was more time I could have carried out wider investigations. As pulse rate can be effected by a number of other factors other then age, which was taken into consideration in the stratified sampling method, such as smoking, consumption of caffeine, and fitness levels of individuals tested.