question   **21** views

week 2 problem set question 4 part c help

I did a search on the discussion forum and found this web site for use of a z table:

https://piazza.com/class/i0qpzfmi1eq6ca?cid=809

Question 4 on the problem set from week 2 asks us to calculate:
SUPPOSE THAT HOURS OF SLEEP PER NIGHT FOR SINGLE ADULTS BETWEEN 30 AND 40 YEARS OF AGE ARE NORMALLY
DISTRIBUTED WITH A MEAN OF **6.7 HOURS** AND A STANDARD DEVIATION OF **1.1 HOURS**.
4c. What proportion of adults sleep between 5.38 and 8.79 hours of sleep? *(Report to 3 decimal places.)*

(I got 4a and 4b correct but when I tried the method I used for 4b on 4c, it was incorrect):

Another search of the discussion forum for help on this question said that the way to solve this was to determine how many standard deviations (sd's)
in 4c that 5.38 hours to 8.79 hours sleep was from 6.7 hours sleep and that these z numbers would be the lower and upper z bounds in the above z table.
(Note: This method worked for 4b, noting that 4.5 hours was 2 sd's below the mean 6.7 hours of sleep with sd=1.1, so using lower bound z= -2 and upper
bound z=+5 (to the end of normal curve) produced the correct percentage using the above link to z table area percentage under normal curve).
However, it did not work for part 4c. I used z = 1.2 for the lower bound of z, since 5.38 hours is (1.32/1.1) = 1.2 above the mean, and for the upper bound
I used (2.09/1.1) = 1.9 for the upper bound, and the percent came out to 8.64% or 0.086 for 3 decimal places which is incorrect.

Does anyone know why the z table calculation worked for me for 4b but not for 4c? I"m not sure what I'm doing wrong.   Thanks.

problem_set1	problem_set2

                                                                           5 hours ago by Karen West

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the students' answer, *where students collectively construct a single answer*

yes. First of all, your z of 1.2 is wrong, it should be -1.2 **below** the mean (z values can be positive or negative).

So when you lookup the proportion (probability) corresponding to the z-value, it tells you the area underneath the normal distribution curve to the LEFT of the z-value.

Naturally, the proportion of a negative z-value is less than the proportion of a more positive z-value. So the proportion of the more positive z-value **overlaps** the
proportion of the lesser z-value. How much it **doesn**'t overlap is your answer. The proportion of people sleeping 8.79 hours or less **includes** the proportion of people
sleeping 5.38 hours or less.

Did this help?

3 hours ago by Anonymous

followup discussions *for lingering questions and comments*

◯ Resolved

⦿ Unresolved

Karen West Just now
I don't know why I put the lower bound z value at +1.2 since clearly 5.38 is below the mean of 6.7! Thank you for alerting me to that.
I did not quite get your comment to be honest about the more positive z value overlapping the proportion of the lesser z value, and how
much it does not overlap being my answer--that I found confusing--I think it's because you said "the percentage sleeping 8.79 hours
or less overlapping the percentage sleeping 5.38 hours or less -- but 4c does not say that --it just wants the area in between 5.38 hours
of sleep and 8.79 hours of sleep.

If you go to the link I shared above from someone else's post, the negative z value (-1.2) is the area under the normal curve from that
negative z value up to the mean (where z=0), and the positive z value takes you from the mean (z=0) up to the z=1.9 number, that area
under the normal curve, and you just add both areas together to get the percentage. Please correct me if I'm missing something since
I did not understand the clue you gave after you found me error. Thanks - it's Thanksgiving tomorrow in the US - so I may not be back
for a few days! ;-)