

State the null and alternative hypotheses using only mathematical symbols.

1. A medical researcher is interested in finding out whether a new medication will have any undesirable side effects. The researcher is particularly concerned with the pulse rate of the patients who take the medication. Will the pulse rate increase, decrease, or remain unchanged after a patient takes the medication? The mean pulse rate for the population under study is 82 beats per minute.

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2. A chemist invents an additive to increase the life of an automobile battery. The mean lifetime of the automobile battery without the additive is 36 months.

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3. A contractor wishes to lower heating bills by using a special type of insulation in houses. The average of the monthly heating bills is \$78.

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4. A researcher thinks that if expectant mothers use vitamin pills, the birth weight of the babies will increase. The average birth weight of the population is 8.6 pounds.

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5. An engineer hypothesizes that the mean number of defects can be decreased in a manufacturing process of compact disks by using robots instead of humans for certain tasks. The mean number of defective disks per 1000 is 18.

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6. A psychologist feels that playing soft music during a test will change the results of the test. The psychologist is not sure whether the grades will be higher or lower. In the past, the mean of the scores was 73.