

20. A researcher predicts that listening to music while solving math problems will make a particular brain area more active. To test this, a research participant has her brain scanned while listening to music and solving math problems, and the brain area of interest has a percent signal change of 58. From many previous studies with this same math-problems procedure (but not listening to music), it is known that the signal change in this brain area is normally distributed with a mean of 35 and a standard deviation of 10. Using the .01 level, what should the researcher conclude? Solve this problem explicitly using all five steps of hypothesis testing, and illustrate your answer with a sketch showing the comparison distribution, the cutoff (or cutoffs), and the score of the sample on this distribution. Then explain your answer to someone who has never had a course in statistics (but who is familiar with mean, standard deviation, and Z scores).

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