Sample Question to Demonstrate the Nature of Normal Distributions

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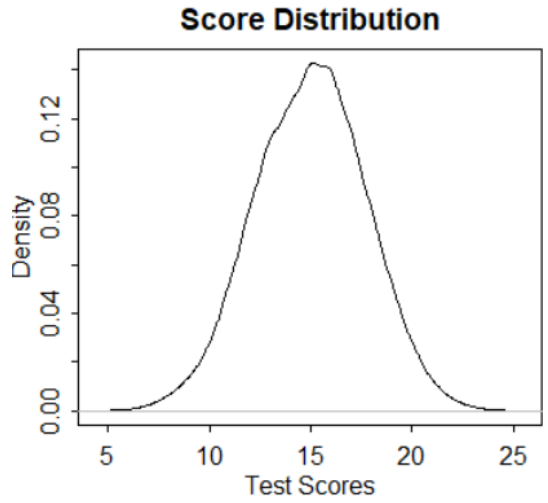
Question: Suppose a human skill can be measured by 15 questions that are each worth 2 points, what could be a likely distribution of overall scores (i.e., sum of 15 questions) of 5000 randomly selected test-takers?

Find a visual answer in R:

```
source("https://raw.githubusercontent.com/rnorouzian/m/master/qs.r")

add.norm(n.test.taker = 5000, n.question = 15, pt.worth = 2)
```



Explanation: Think of each test taker as being able to obtain any equally possible points (from 0 to 2) on each question which when added together leads to an overall test score for that test taker. Additive phenomena (sum of 15 questions) in nature tend to cluster heavily around their average when we study them in a population (the scientific reason is not exactly clear, see Breiman, 1968). Here because we think of each test taker as being able to obtain any points on each question on an equally possible basis, the average overall score among all test scores is simply the midpoint of lowest (i.e., 0) and highest (i.e., 30) possible overall score (i.e. average overall score = 15). Most likely, the distribution of overall scores for all test takers is going to be a normal one centered at a mean of 15 (see figure above).

Reflection: In the absence of any other evidence, if a phenomenon in psychological and educational research may consist of addition of sum measurable subcomponents, it is likely for that phenomenon to have a bell-shaped, normal distribution when studied in a population.