Answer each question as True or False and give some justification

1. Every bounded sequence is convergent.
2. Every convergent sequence is bounded.
3. Every monotone sequence is convergent.
4. Every convergent sequence is monotone.
5. If a sequence is monotone and bounded, then it is convergent.
6. One subsequence of $(1, 1, 2, 3, 5, 8, 13, 21, 34, \dots)$ is $(1, 2, 5, 13, \dots)$.
7. One subsequence of $(1, 1, 2, 3, 5, 8, 13, 21, 34, \dots)$ is $(1, 2, 1, 5, 3, 13, 8, \dots)$.
8. One subsequence of $(1, 1, 2, 3, 5, 8, 13, 21, 34, \dots)$ is $(1, 1, 2, 3, 5, 8, \dots)$.
9. One subsequence of $(1, 1, 2, 3, 5, 8, 13, 21, 34, \dots)$ is $(1, 1, 2, 2, 5, 5, 13, 13, \dots)$.

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Answer each question as True or False and give some justification

10. If (x_n) converges to x, then every subsequence of (x_n) converges to x as well.
11. If some subsequence of (x_n) converges to x, then (x_n) converges to x as well.
12. If every subsequence of (x_n) converges to x, then (x_n) converges to x as well.
13. Every sequence of real numbers contains a convergent subsequence.
14. Every monotone sequence of real numbers contains a convergent subsequence.
15. Every bounded sequence of real numbers contains a convergent subsequence.

At least one of the statements above happens to be true and is called the *Bolzano-Weierstrass Theorem*.

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